YOURSTORY / kyndryl PRESENTS

FUTURE OF WORK

TOP 30 CTOS

TABLE OF CONTENTS

INTRODUCTION

The COVID-19 pandemic pushed the world to change and transform like never before. The past 18 months have pushed the entire world population to rethink the way they interact and work with one another. From a complete remote setting we have now arrived at a more blended model. There is a near consensus among experts and industry folks that the key to a successful future is a flexible and hybrid model.

With the pandemic fast-tracking the growth that tech, product and design would have seen in 10 years, to just over 18 odd months, we believe there are important conversations to be had.

We need newer, more advanced technologies today to solve even the most basic human needs. COVID-19, for example, showed us how healthcare could be put to better use with technology.

At the same time, we need a mixed mantra of smart products and intuitive and futuristic design to push the agenda of tech integration with human lives forward. And that is indeed being made possible by some of the top technologists and product designers.

After looking at different companies and how their products have grown and evolved, YourStory has come up with a list of top emerging CTOs who have built and created products that have really stood out.

These techies have not only built their company's products from scratch but have also helped scale them to reach a certain base of critical mass, which in turn are helping consumers transform the way in which they interact with the world around them.

TOP CTO PROFILES

Ajit Narayanan
Co-Founder and CTO,
Mfine

Amit Sharma
CTO,
Dream 11

Ankit Gera
Co-founder,
Junio

Ashish Anantharaman
Co-founder and CTO,
ZestMoney

Avlokita Tiwari
Co-founder and CTO,
AarogyaAI Innovations

Deep Ganatra
CTO,
The Good Glamm Group

Dr Geetha Manjunath
Founder and CEO,
Niramai Health Analytix

Gaurav Srivastava
CTO,
FarEye

Gauri Kanekar
VP-Engineering,
Pratilpi

Hemesh Singh
Co-founder and CTO,
Unacademy

Himanshu Verma
Chief Product and Tech-
nology Officer, Licious

Kailash Nadh
CTO,
Zerodha

Manisha Raisinghani
Co-founder and CTO,
LogiNext

Marut Singh
CTO,
Cars24

Monish Darda
Co-founder and CTO,
Icertis

Mukund Jha
Co-Founder and CTO,
Dunzo

Natasha Jethanandani
Co-founder and CTO,
Kaleidofin

Neeraj Singh
Co-founder and CTO,
Groww

Pooja Gupta
Co-founder and CTO,
PurpleDocs

Prakash Ramachandran
CTO,
BYJU'S

Rahul Chari
Founder and CTO,
Phone Pe

Ramakrishna Gaddipati
Co-founder and CTO,
Zeta

Ranjan Sakalley
Head of Engineering,
Vedantu

Sachin Shenoy
Co-founder and CTO,
HealthifyMe

Sanjay Suri
CTO and CPO,
Nykaa

Sanjeev Kumar
Former CTO, Pine Labs;
Founder, Edumatica (Jan 22)

Saurabh Tiwari
CTO,
Policy Bazaar

Shantanu Preetam
CTO,
Apna

Shashank Kumar
Co-Founder and CTO,
Razorpay

Tanya Raghuvanshi
Co-founder and CTO,
Peer Robotics

AJIT NARAYANAN

Key achievement(s):

Led teams of 400 engineers at 25x scale at ecommerce giant Myntra and drove the mobile app to be one of the top-rated applications on PlayStore; now designing healthcare solutions for India at Mfine leveraging mobile and AI technology

Known as:

Co-Founder and CTO, Mfine

In his journey as a technology architect spanning over two decades, Ajit Narayanan's core expertise lies in high-performance computing, big data systems, machine learning (ML), and artificial intelligence (AI).

Ajit started his career at a time when landing a job at Infosys was considered something prestigious in India. Though he did not land a job at Infosys, Ajit carved his own path by building tech solutions for SAP Labs, Schneider Electric, and ecommerce major Myntra.

As the ex-CTO (chief technology officer) of Myntra, Ajit drove engineering teams of over 400 engineers at 25x scale for the ecommerce platform's end of season sale.

With a deep passion for healthcare in India, Ajit then joined Mfine as one of the founding members, with an intention to build something from scratch.

Ajit says, ***"Trying to define protocols for better healthcare outcomes and solutions for a country like India makes a world of difference, especially for the fact that healthcare has a plethora of problem statements."***

The story begins in Thiruvananthapuram, Kerala, where Ajit was born and where he spent his early childhood. He later shifted to Bengaluru in 1986 after his father, who was working with the Vikram Sarabhai Space Centre, got transferred.

While in college, he tried his hand at programming. ***"It took me a while to realise there was going to be a lot of maths in it. In fact, I looked down upon computer science for the longest time, though I built some management systems for my school library. Electronics seemed like the stuff that drove computers deep inside. I thought, what's more fun than that intersection,"*** he recalls.

During his campus placement, Ajit fumbled in his final

interview with Infosys, and did not land a job in the company. However, he got through a software company in Pune, in 1998, where he worked on COBOL, the object-oriented programming language. Realising that COBOL was not his cup of tea, Ajit quit the job in just five days.

"I landed at ANZ IT three months later, where I was dabbling with Visual Basic and C++. I even went to New Zealand for nine months to work on an online banking software and a cheque processing machine. It was my first ever experience working on real products," he says.

After returning to India, Ajit got married. He did not want to go back to New Zealand, and hence quit ANZ IT.
Soon, an advertisement led to a phone call, a written test, and some interviews, and he joined SAP Labs in Bengaluru.

At SAP Labs, Ajit started off as a basic developer and went on to lead the NetWeaver studio's delivery. Towards the end of his stint, he was looking after the development and delivery of the mobile middleware called the data orchestration engine and the client libraries.

He even helped define SAP mobile platform 1.0 and the Sybase SUP Lite, a light-weight proxy mobile middleware for device onboarding, notifications, and security.

After building solutions for enterprises, Ajit got the opportunity to head the India technology innovation for Schneider Electric in 2011. He worked for a year with Schneider Electric, and then moved back to SAP Labs as VP, Engineering, to lead the product departments of HANA Cloud integration's CMS and manage SAP's APIs.

As opposed to a consumer-centric ecommerce startup, the solutions built at a company like SAP takes a couple of years to reach the end-users. Typically, these users and the solution architects have three to four layers in between, and the architects hardly get to see their excitement result in real-time value generation.

Ajit went through the same experience while building multiple B2B (business-to-business) applications from an enterprise perspective. He wanted to be closer to the end-users he was developing solutions for.

During this time, Ajit was also in talks with Myntra's Mukesh Bansal. In the second half of 2015, Ajit joined Myntra as SVP Engineering for the startup's online storefront. Over time, he got the mobile app to be one of the top-rated applications on PlayStore.

"The transition from building for enterprise solutions to merely observing the patterns of a single button and its colour teaches you a lot about user behaviour and consumption. It certainly made me revisit all of my learnings and how product building is an entirely different ball game when it comes to not-so tech-savvy consumer internet users," he says.

In 2017, he joined Mfine as one of the founding members of the team, with an idea to use mobile technology for access and large reach for the users, and to use AI to simplify the healthcare solution in India.

Mfine allows users to consult doctors from premium healthcare institutions through a video or chat. It follows a model where it partners with leading hospitals, rather than aggregating individual doctors on the platform.

Ajit says, ***"The product is actually an AI-based virtual doctor to come up with the best-possible clinical outcomes for any ailment".***

A techie at heart who is also a guitarist for a rock band in Bengaluru, Ajit says, apart from production and deployment, he still likes to build hands-on. He says he is now able to carve out real-world business outcomes and technology solutions, not just from a product-based view but also from a tangible business point of view.

Ajit is now looking at building devices for micro use-cases like health monitoring and blood tests, which are an extension to a smartphone mobile application.

Advice to techies

"The transition from building for enterprise solutions to merely observing the patterns of a single button and its colour teaches you a lot about user behaviour and consumption. It certainly made me revisit all of my learnings and how product building is an entirely different ball game when it comes to not-so tech-savvy consumer internet users," says Ajit.

AMIT SHARMA

Key achievement(s):

Spearheading both the product and technology division at Dream11 and introducing new technologies along with scale

Known as:

CTO,
Dream 11

Having been fascinated by technology all his life, Amit Sharma, CTO (chief technology officer) at Dream11, chose Computer Science as his field of study at Mumbai University and then moved to the United States to pursue his Masters at the University of Massachusetts.

His interest in working on massive scale distributed systems took him to California, where he worked with large consumer companies like Yahoo and Netflix for nearly a decade. While working in the US, Amit also completed his MBA (Master of Business Administration) from Leavey School of Business.

When Amit was considering relocating to India, he was intrigued by the technology challenges at Dream11 to build India's largest sports tech infrastructure.

Dream Sports' journey began with the launch of Dream11 back in 2008. Starting with a simple online fantasy sports format, the platform pivoted to a freemium format in 2012 and since then has scaled up to over 120 million users. Amit had come onboard in 2016 and was tasked with driving the convergence of sports and new technologies at Dream11.

"We conducted various experiments to assess users' adoption of new additions and developed a plan based on our learnings for upcoming events," says Amit.

He explains how the team follows a process while launching any new feature on its platforms. ***"This four-step process is called HEAL - Hypothesis, Experiment, Analysis, and Learning. We put down the hypothesis before everything we do. Then, we experiment with A/B or Multivariate testing on different users and cohorts, analyse the findings and share our learnings with everyone. There is no better way to succeed than to learn from failure,"*** he adds.

From setting up war rooms, building live ball-by-ball match commentary, dynamic scorecards as well as detailed statistics

on player performance and their fantasy scores, to launching 'flexible' private contests, the technology behind Dream 11 is what sets it apart from other platforms today.

A Manchester United fan and a fitness enthusiast, Amit believes there is a lot to learn from how a sports team operates, and tries to incorporate the same ethos such as FairPlay, teamwork and a competitive spirit in all his teams.

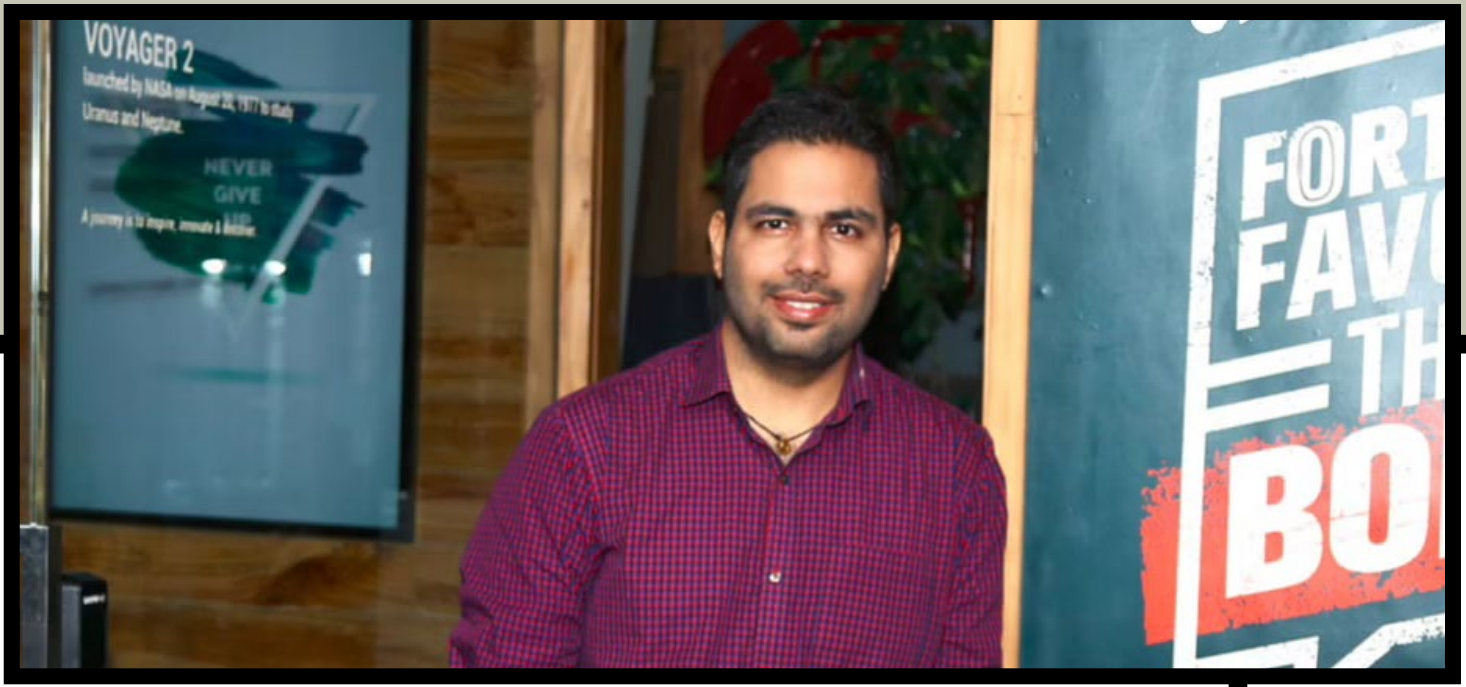
Since the beginning, the techie focused heavily on deepening real-time fan engagement while building the fantasy sports platform with a multitude of sports on offer. This is reflected in the product that has comfortably handled five million daily active users and supported just under a million concurrent users at peak during the busy T20 season.

"During Dream11 IPL 2020, we served an enormous amount of traffic. Some of the services got more than 80 million requests per minute. The ultimate challenge in such cases is to provide our users with a seamless experience even at a huge scale. We automated this entire process and named the framework - 'Torque'. For IPL (Indian Premier League) 2021, we updated Torque to include new changes or services and introduced a new tool, to mock those dependencies which do not affect our transactions directly and help us in simplifying the complex setups that we need for our tests," he says.

Being able to manage that level of scale is purely attributed to the robust tech architecture. The CTO had carefully implemented the data-driven engineering with ML (machine learning), AI (artificial intelligence) and analytics very early in the company's automation journey, even though they were considered relatively new in the tech industry.

Advice to techies

Speaking about sports technology as a new, exciting and rapidly growing sector with a lot of opportunities, Amit looks for talents who share a passion for sports, are data-driven, and are keen on building the latest cross-platform offerings. "Always put users first and then design innovative solutions. It's always good to build things that are future-proof and may need more investment right now," he adds.



ANKIT GERA

Key achievement(s):

Disrupting the cluttered fintech space with Junio, a children-focussed platform and building a strong and ease-of-use tech stack for the digital pocket money app

Known as:

Co-founder, Junio

Shankar Nath, the ex Vice-President of payment gateway and financial services company Paytm, founded Junio — a children-focussed financial platform specialising in the "pocket money" principle — along with Ankit Gera, former Assistant Vice-President and head of growth at one of India's most valuable unicorns.

The startup that was launched in September 2020 serves as a payments instrument for children under 18.

An alumnus of Indian Institute of Technology (IIT), Kanpur, Ankit is a believer of ease of use when it comes to building a tech product. ***"There are many financial products, but the reason people keep going back to Paytm is because of its simplicity,"*** he says.

Apart from the back-end tech, the front end has to be simple and usable. "This we have learnt from Paytm: to build it in a simple and extremely easy manner," says Ankit.

Ankit commands core competencies in product, growth and marketing, business P&L across consumer internet (payments and ecommerce), as per his Linkedin profile.

Ankit worked with the financial unicorn for close to four years, for the most part of which he led its user growth and product team. He also headed the payment gateway business for a year. He quit in October 2019.

What differentiates the Junio product?

The payments product targets the under-18 population and has a stake in everything digital spurred. It's tailored for Generation (Gen) Z, any child from the age of 11 or 12 who begins connecting, shopping and sharing on online platforms by the virtue of being "digital natives".

While this young cohort might be exposed to digital interfaces, in the absence of a payment instrument tailor-made for them, they mostly end up using their parents' cards or payment instruments.

Building a unique product for juniors was what drove the Co-founders of Junio, as they believe the world has moved on and so has the negative value associated with money when it comes to adolescents handling them. It aims to digitise the adolescent "pocket money" space by offering unique solutions and inculcating the values of savings and financial awareness.

The Junio leaders soon realised that designing a debit card for the under-18 group was not enough as there was a need for a more interactive approach to money including an understanding of savings, earnings and compounding.

Parents can also set tasks on the app and incentivise these with money that gets added to the card.

"Do you want your child to make the beds at home? Then you can choose to incentivise them with Rs 15 or Rs 20 every day," explains Ankit. "The idea is to make the child independent and learn financial intelligence early on," he adds.

The app-based smart card for children's digital pocket money aims to impart financial literacy to kids. While the app facilitates the flow of pocket money in both the digital and physical world, it encourages children to manage e with parental guidance.

In an interview with a publication Ankit said, ***"The present need is of digital payment compared to cash. Millennials are shopping online, ordering food, paying for a roadblock in a game. Parents have realised this need too. They are not comfortable handing over their personal credit cards to kids because they can't control the amount being spent and what it's being used for. If they can give their child a personal Junio card at the subscription cost of less than a cup of coffee then it's a win-win situation. Imparting financial literacy to their kids will be very valuable for parents."***

Ankit says Junio's product roadmap primarily revolves around the habit of saving money.

He further highlights that Junio wants to introduce recurring deposits to further cement the lesson of incremental savings and monetary returns among children, as well as a small credit card to introduce kids to the concept of credit, interest rates, and repaying debt on time.

Advice to techies

During his stint with Paytm, Ankit got first-hand experience of how to build for scale. Ankit believes that a strong tech is critical for building a payments instrument for scale.

"The uptime plays a significant role, as if somebody is spending money, they don't have an immediate alternative. While we won't be at the level of what Paytm was at five million transactions a day, we need strong tech in the space," says Ankit, indicating Junio's expected scale.

ASHISH ANANTHARAMAN

Key achievement(s):

Was a part of the team that developed the operating system (OS) towards the end of the MicrosoftWindows 95 launch; brought the Buy Now Pay Later (BNPL) concept online in the Indian market through ZestMoney

Known as:

Co-founder and CTO, ZestMoney

Today, Ashish Anantharaman, an engineer from Mumbai University, is best known as the Co-founder and CTO (chief technology officer) of one of the fastest growing fintech startups, ZestMoney.

And yet, Mumbai-born Ashish isn't your quintessential techie from any of the IITs (Indian Institute of Technology) or even BITS Pilani (Birla Institute of Technology and Science, Pilani). In fact, Ashish's least favourite subject in school was mathematics. Schooling was a tough period for Ashish owing to economic constraints. "Academically, I was average, but then I had some passion towards computers. This was around 1991," recalls Ashish. At the time, computers were just making their presence felt in India.

"Every time I would walk by computer institutes, I would be fascinated with those machines with large screens and keyboards. For me, it was a big thing as I hadn't even seen a calculator," adds Ashish, who was 16 then.

Incidentally, someone from the institute noticed Ashish doing this every single day for a few months and invited him into the academy. Ashish was then given a quick introduction to computers. Talking about the early days, Ashish says,
"It was the first time I had touched a computer. But much to my own surprise and others at the institute, I was able to write a programme within 45 minutes. I understood most things about software and hardware, I asked questions and everyone explained how it worked, and that's how I just came up with the first programme. It was about the Fibonacci series."

This eventually led him to take up engineering from Mumbai University in 1993. In 1995, Ashish secured his first job at Microsoft. It was the time when Windows 95 was being built.

"Towards the end of Windows 95 launch, I was a part of the team that was into developing the operating system (OS). It was a great learning curve for me. It was the first time I was getting my hands dirty and building something from an operating system level of programming. It was a building block

for everything I did later," says Ashish.

In 1997, during the internet boom period, Ashish decided to join KPMG. Here, Ashish went on to build websites, shopping carts, proxy servers, and email servers.

Next, Ashish joined Veritas, a data management company in 1999. Veritas was then affiliated with a company in the Middle East and here, he learnt about data management, warehousing, storage, retrieval, backups etc.

In 2000, when Ashish got an opportunity to work with reinsurance company Swiss Re Group in the UK, he also moved there.

Ashish spent close to three years with them, and while slow-paced, the work was technology-intensive and helped him learn all about architecture. It was during this time that Ashish decided to go back to one of his older loves — sports. In 2007, Ashish joined Sportingbet, a UK-based company that was into online sports betting.

However, he later entered the world of fintech when he was headhunted by Wonga. It was one of the most successful fintech companies in the world in 2013. It was here that he had the first exposure to Buy Now Pay Later (BNPL). As the Head of Software Development, Ashish was to build Wonga's BNPL product.

It was during this time that Ashish worked with Lizzie Chapman and Priya Sharma, his co-founders at ZestMoney.

"Lizzie and Priya were already in India building Wonga out of India. But they had decided to do something of their own, and that is how ZestMoney was born," says Ashish.

Having built a BNPL product in 2012, Ashish understood the impact such a product could have in a market like India. ***"I saw how lives were being upgraded. And it was something I felt I could make a difference in,"*** adds Ashish. He also wanted to come back to India and give back to the community and the country. In 2014, when the trio had decided to start ZestMoney, India was going through a digital revolution.

"When we started ZestMoney in 2015, BNPL was already prevalent in the market with players like Bajaj Finserv, but they were offline. We were bringing the concept of BNPL online. While a big opportunity, it also was a big challenge — being a new concept," explains Ashish.

Today, ZestMoney is available at the checkout of leading merchants like Myntra, Nykaa, Amazon, Flipkart and MakeMyTrip. They are also present at physical stores like Apple, Reliance Digital, Chroma, Sangeetha Mobiles across the country.

Today while hiring, Ashish looks for a good software engineer. He goes on to explain how a developer and software engineer play different roles — while a developer is given a set of instructions and works based on that, a software engineer just needs a problem statement.

Advice to techies

Ashish values a strong foundation in software development, holistic thinking, a technology-agnostic approach, and good problem solving skills in techies.

Advising techies he says, "Be prepared to work hard and hone the right skills. Do not have an affinity to just one technology, come out of your comfort zone to look at new technologies and experiment with different solutions."

He says while it is important to want to grow up the corporate ladder, it is also important that the basic thing and core job is to be able to write code. "The fundamental part of any technologist is to remain relevant with technology," says Ashish, who still loves to code in his free time and spends two hours a week learning new things.

AVLOKITA TIWARI

Key achievement(s):

Pioneering genome sequencing-based AI-powered diagnosis of drug resistant diseases such as tuberculosis at AarogyaAI Innovations

Known as:

Co-founder and CTO, AarogyaAI Innovations

Avlokita Tiwari, Co-founder and CTO (chief technology officer) of AarogyaAI Innovations, has an MS (Master of Science) in Bioinformatics from the University of Turku, Finland. Her expertise lies in computational biology and genomic data.

The Bengaluru-based startup is helmed by Dr Praapti Jayaswal and Avlokita who propose genome sequencing-based artificial intelligence-powered diagnosis of drug resistant diseases such as tuberculosis (TB); the diagnosis can be provided in a few hours.

It was in 2013 that the duo was researching at AIIMS (All India Institute of Medical Sciences). After pursuing their respective career paths, they met each other again in 2019 in Bengaluru over a "friendly cup of coffee".

At this time, Praapti had started building on the idea of using artificial intelligence (AI) and bioinformatics for modern healthcare and antimicrobial resistance (AMR) predictions for patients. She was visiting Bengaluru for a "find a co-founder" meet as a part of her six-month long UK-based Entrepreneur First programme. Her search ended with Avlokita, an expert in bioinformatics, who was actually planning to move back to Finland for work. She was invited to join the startup and translate the literature into a commercial product.

Avlokita has worked as a TB researcher and commands an understanding of the disease and its clinical manifestation. She spent over five years coding for biological data.

Together, they pitched the idea to the investment committee of Entrepreneur First and managed to bag their first round of pre-seed funding to develop the platform.

Backed by Entrepreneur First, AarogyaAI was accelerated at Illumina Accelerator San Francisco, the US. It raised a bridge round through the accelerator in 2020.

The duo has built a SaaS (software-as-a-service) platform where the DNA sequence from the bacteria, also known as the genome

sequencing infecting a patient can be uploaded, which is then analysed using a ML algorithm and AI to generate a report showing the patient's comprehensive drug susceptibility status. This report can then be used by doctors to prescribe a more potent combination of antibiotics, significantly cutting down the duration of the treatment.

The software has been validated internally and has reached its external validation and pilot testing stage. It is expected to be rolled out for commercial use by mid-2022.

"We aim to keep the product as affordable as possible. The prices can be brought down with volumes. Drug susceptibility testing (DST) costs about Rs 20,000 in the private sector. We will definately be below this price range," says Avlokita, who is considered to be the bridge between biology and artificial intelligence (AI) and machine learning (ML).

Advice to techies

The scientist-turned-entrepreneur believes in staying one step ahead.

In a bid to bridge the big gap in the healthcare space, Avlokita believes that AarogyaAI's diagnostic solution should pace up innovation leveraging modern technology and genome sequencing. "We already know that superbugs and drug-resistant pathogens are already here and spreading. There are no means to immediately predict how they will affect. We need a way to predict the nature of these pathogens and make predictions and drugs that can cut them off before the harm they do. The idea is to stay one step ahead," she shares.

DEEP GANATRA

Key achievement(s):

Founded web hosting service company, Web1 Solutions; responsible for mapping and developing the core architecture across multiple MyGlamm business units

Known as:

CTO,
The Good Glamm Group

Two decades back, the usage of a computer for a teenager was mostly restricted to playing games or using drawing tools. Deep Ganatra, Chief Technology Officer (CTO) of The Good Glamm Group, was way more curious than his peers to learn what more he could derive from the machine. Even though he had a commerce background, Deep's interest in technology continued to push his adventure with new products and techniques, creating a problem-solving mindset early on.

He started off with music, accounting, and ended up developing a web app!

"I always had an urge to solve certain problems, especially where we end up wasting time doing repetitive stuff. We used to get a lot of problems related to accounting so I ended up creating a web app to solve that problem and released it on the internet. Surprisingly, people started using it and sending me personal messages to help them. That was a turning point for me to think that many such problems can be solved using tech ," says Deep, who went on to pursue his post graduation in Information Technology (IT) from University of Mumbai.

Following his education, Deep started off as a Network Admin and SEO at Tajonline India Pvt. Ltd, and went on to build a web hosting service company, Web1 Solutions. In 2009, after spending nearly a decade at Web1 Solutions, Deep took the overseas route and joined a Canada-based company, BiteBank Websites Inc, where he built the core architecture of the applications, managed various tech teams and chalked out development strategies.

After nearly seven years, he moved on to his next challenge in B2 Information System Pvt Ltd as the Managing Partner before joining the direct-to-consumer (D2C) beauty brand MyGlamm as the CTO. In September 2021, Deep was made the CTO of the parent company — The Good Glamm Group.

The veteran, who was featured in 'Entrepreneur's Tech25 Class of 2021', has been one of the key figures in the exponential growth of The Good Glamm Group in the last few years. He

was the mastermind behind building the scalable technology architecture and tech stack. From mapping and developing the core architecture across multiple MyGlamm business units to performing the role of an advisory when it comes to leveraging technology to improve the efficiency of various departments, Deep always believes in looking at the core problem closely before the technique to adopt to solve the same.

"How quickly can I solve the business problem without a lot of tech debt? That's always been my approach. That does not mean that we have to build everything and just buy things as long as they are solving the problem. You need to see how it's impacting your ecosystem along with its scalability," he says.

While the vision of the group was eventually developed over the years, Deep had foresighted the technology aspect of it early on by building a single stack which would power multiple companies on a single platform down the line.

"We never even thought about buying the companies. We had a different vision, but the goal was to create a single stack in such a manner that it can empower multiple things. Today we are reaping the benefits of it. The system is extremely agile and it takes just about 10 days for a D2C business to go up and running," he says.

Advice to techies

Deep advises techies to not think too much about failures and execute whatever they have in their mind. "You will look back and repent why you never took that chance," he says, adding that every techie must ask himself how his solution would help solving a business problem.

"Perfection is an illusion. Always focus on solving the business problem rather than being perfect. We always seem to keep polishing things, and then don't even launch it," he adds.

Most of the techies think a lot and execute less and end up wasting a lot of time building something, which is not even required.

DR GEETHA MANJUNATH

Key achievement(s):

Developed a software to detect breast cancer in its primitive stages and pioneered Niramai - "Non-Invasive Risk Assessment with Machine Intelligence"

Known as:

Founder and CEO, Niramai Health Analytix

Dr Geetha Manjunath has been instrumental in developing a system that could detect breast cancer in its primitive stages. She is the founder and chief executive officer (CEO) of Niramai Health Analytix. She believes you do a job to enjoy it rather than for the results.

The software detects breast cancer by combining both computer intelligence and high-resolution thermal sensing. The AI (artificial intelligence) software detects the temperature of the chest, while the algorithm detects abnormal thermal patterns.

However, the inspiration to create the software came when Dr Geetha lost her 38-year-old cousin to breast cancer. It is then that she decided to quit her job and dedicate herself entirely to Niramai.

With an experience spanning over 38 years, Dr Geetha has been part of various tech organisations. She pursued her Bachelor's at the University Visvesvaraya College of Engineering where she recalls being one among the two girls in the class.

During her HP stint, she delved into ideas seeking to change the way we interact with machines. Hence, she ventured to pursue her PhD (Doctor of Philosophy) at the Indian Institute of Science (IISC) Bengaluru. Dr Geetha, was the oldest in her classroom, already had 17 years of work experience prior to pursuing her PhD in Data Mining, Semantic Web.

Dr Geetha has won many awards in her stellar career including the BIRAC TIE Winer (Women in Entrepreneurial Research Award) 2018, CSI (Computer Society of India) gold medal 1991, TRS State Award. She has also co-authored Moving to the Cloud, a book on cloud technologies.

Despite all the glory, in the initial days of her career, Dr Geetha was subject to gender-based discrimination. The challenges made her learn an important lesson, which was to back an idea with the prototype and facts. ***"So even now, I just don't present any idea without backing it up with justifications, feasibility, and a complete study,"*** she says.

A determined Dr Geetha recalls there were days when her day started at four in the morning and ended at two the midnight next day. Despite that, she never stopped learning.

Going back to her childhood days that eventually shaped her, she believes that it's her father who played a pivotal role in her career by encouraging her to take up engineering early on. She recalled how her father used to repair broken things at home. At the age of 18, she had a choice whether to take Medicine or Engineering and she chose engineering.

The choice of computer science though was taken after visiting an exhibition. ***"I had just been to an exhibition and seen a computer, and half an hour at that exhibition with the computer was enough. We had no computers at home, and the first one I saw was big and occupied the whole room. I didn't know much about computers, but I knew I wanted to know how they worked,"*** says Dr Geetha.

GAURAV SRIVASTAVA

Key achievement(s):

National champions of image processing at IIT-Kharagpur; pivoting the business model from manufacturing to SaaS and leading the tech team at FarEye

Known as:

CTO, FarEye

Starting as the Co-founder of a bootstrapped GPS tracker manufacturing startup in 2009 to designing a low-code, intelligent delivery management platform with FarEye in 2013, Gaurav Srivastava is no stranger to the Indian startup ecosystem.

He was not only responsible for building FarEye's first tech product, but also setting up the tech team and leading the tech team with a long-term vision.

At present, the startup has offices in New Delhi, Dubai, Singapore, London and Chicago.

But who would have thought that Gaurav, hailing from Dhanbad in Jharkhand, would go on to chart a journey across the world in a career spanning 13 years? Well, Gaurav's story is one of wonder and even wonderful memories.

"No one thought that a boy from a small city like Dhanbad could run a startup and become a CTO (chief technology officer). But when you are young, you need people to motivate you and to support you. You don't need big wisdom, just some simple directions. I was lucky enough to have my brother and teacher who really helped me figure out my purpose in my life at a very young age," shares Gaurav.

Academics was the top priority for Gaurav's father, an Indian Institute of Technology (IIT)-Dhanbad professor, and his mother, who worked at the CSIR laboratory. Gaurav remembers that when he got his own computer at home, his interest in gaming preceded programming. Back in the day, computer science was not a part of school curriculum, nor was the internet the overwhelming reality for school students.

He credits one of his teachers, Subhashish, for pushing him to produce a quarterly computer magazine and organise exhibitions. This got Gaurav learning more about computers, and languages such as LOGO and BASIC. So much so that his classmates nicknamed him 'Vidhayak (Bill)' 'Darwaza (Gate)' owing to his computer prowess that also made him popular

among his peers.

His very first tryst with programming, precisely the C programming language happened when he was in class 7. It coincided with his father showing him an e-greeting card designed with 3D and graphics. This really caught his attention, and since C had good graphic utility, he started exploring. Gaurav found a ping pong coding program, copied it, added his own elements to it with some animated graphics to build a Tetris game.

Gaurav began his engineering in Computer Science at the Kalinga Institute Of Technology in Bhubaneswar, Odisha, in 2005. In college, Gaurav was exposed to Java. During his second year, he worked on building his application development skills, gradually learning and integrating concepts like HTML, PHP, CSS, JavaScript, SQL, and more into robotic engineering, image processing, etc. In fact, continuing his school cred, Gaurav was among the few guys in college who could code.

In 2007, Gaurav started freelancing, charging about $100 per website. A year later, he started a three-month internship at one of his senior's mobile gaming startup in Bhubaneswar. Lalit Patel, the senior was popular as he was the first student from their college who had his startup, a bootstrapped business, which earned good revenue. It was during his internship with him that Gaurav learnt about making money using software development skills, nurturing his entrepreneurial instincts.

"After that internship, I was sure about travelling the entrepreneurial route. We began our startup in the fourth year of college, with no set business plan. Also, 2009 was the recession year. But I was pretty sure that we'll be able to figure out a way to survive. There was risk, but we saw an upside to it, and that's how we went into this startup," says Gaurav.

Gaurav and FarEye's co-founders, Kushal Nahata and Gautam Kumar go back a long way, having been in the same college. ***"We were the leaders managing college tech fests. In my third year, we were the national champions of image processing at IIT-Kharagpur. Today we have Python, but in 2008 we used MATLAB and C-Sharp to get image processing done. That was a pretty core level of coding,"*** recalls Gaurav.

At first, Gaurav, Kushal and Gautam started by manufacturing GPS (geo-positioning system) tracking devices. This was in 2009. The devices were sold to big fleet owners to help them track their vehicles. The trio bootstrapped until 2013.

"With the growth of ecommerce, we realised that there is an emergence of another kind of fleet, including bikes and autos," shares Gaurav. While selling GPS tracking devices alone was not feasible from both scale and cost perspective, Gaurav realised that its mobile app made more sense.

In 2013, the friends-turned-business-partners pivoted their business model to just providing software as a service (SaaS). Looking back, the techie fondly recalls how his journey in the world of technology began when books were the only source of information unlike today's generation with access to unbounded information via unlimited access to the internet. However, he cautions, just copying a code of the internet will not make anyone master a language or a technology.

Advice to techies

"There is a fine line between building a product and a solution. While you can optimise the product, finding a solution requires building an ecosystem. As a techie, you need to have your basics right, execute things well in the simplest manner possible and be ready to adapt to changes. Also, having long sightedness is certainly a blessing," Gaurav concludes, leaving a message for aspiring techies.

GAURI KANEKAR

Key achievement(s):

Made Pratilipi switch from a monolithic to a microservices architecture that made the application easier to develop.

Known as:

VP-Engineering, Pratilpi

Gauri Kanekar is the Vice President of Engineering at Pratilipi. She has a distinctive background in software architecture and design. In addition to that, she is skilled in data models and high availability systems, data warehouses and APIs (application programme interface).

The programming language enthusiast has so far mentored and led more than 15 diverse engineers in her 20-year successful career. She is skilled in setting up product and technology strategies in the B2C (business-to-consumer) and B2B (business-to-business) ecosystem.

Gauri started her career as Group Leader at Progen ERP Systems Pvt Ltd. She developed a common OLAP system for different Erp Modules and worked in growing features across modules.

The techie then went on to become a Senior Software engineer at ZEDO. She had three years at ZEDO. She then went on to become Senior Staff Engineer at Netcore solutions.

Before joining Pratilpi in 2017, Gauri worked as a technical architect at LocalOye. LocalOye is one of the country's largest hyperlocal service marketplaces. She built and managed the whole backend platform with microservice architecture and scaled data stores to support more than 8,000 orders per day. She successfully set up DevOps. She designed and managed version APIs across web, iOS and Android.

Gauri's major contribution to Pratilpi was when she made the company switch from a monolithic to a microservices architecture that made the application easier to develop. She ran a Proof of Concept (POC) for running the architecture on Amazon Web Services (AWS).

The entire team wrote the code for microservices architecture with Amazon Elastic Container Service (Amazon ECS). By changing from the Google Cloud Platform (GCP) to AWS the engineering team of nine members made 4,500 code deployments in one year.

"Once we'd made the migration, even a junior member of our engineering team could deploy code without any training because of the simplicity of Amazon ECS," Gauri says. Apart from her coding capabilities, the Vice President is famous in the company for her singing skills.

HEMESH SINGH

Key achievement(s):

Built music streaming platform MetalGrunge; document discovery and reading app Squifer; real estate discovery platform flat.to; tech brain behind edtech platform FlatChat and Unacademy.

Known as:

Co-founder and CTO, Unacademy

At the age of 12, Hemesh Singh, Co-founder and CTO (chief technology officer) at one of India's largest edtech (education technology) platforms — Unacademy, was proficient in doing programming.

He first got exposed to the world of coding in his school days only where the computer lab used to be his second home. For most part during his early days, Hemesh typed programmes from his textbook into the school computer and relished when the output matched the book.

Born and brought up in Agra, Uttar Pradesh, both of his parents are PhD (Doctor of Philosophy) holders and teachers, who strongly believed in education and its importance in one's life. By the time, Hemesh reached college, he was well-acquainted with most programming languages and hence started working on web technologies, and there has been no looking back since then.

The young undergraduate at Motilal Nehru National Institute Of Technology Allahabad, was often seen engrossed in building new products and fiddling with technologies. As a part of the tech team of his college's Web Development Society, he helped in building the system for counselling of M.Tech (Master of Technology) students based on their GATE scores, which would automatically allot seats for them.

While in college, Hemesh also grew fond of Grooveshark, and was not really satisfied with the way content was managed on the site and the very fact that it didn't have popular Hindi songs. This triggered him to build a music streaming portal, MetalGrunge.

During one of his vacations, Hemesh saw his friends in other colleges running around and exchanging notes, and decided to help them by building a platform (Squifer) where people could upload their notes as PDFs and their friends would download them.

The entrepreneurial turn in Hemesh's life came in when he got in touch with Gaurav Munjal, Co-founder at Unacademy, through a common friend. The duo's common love for technology and building new products led them to start flat.to, which was later acquired by CommonFloor, and relaunched as FlatChat — an app that lets people hunting for flats and flatmates, chat with each other by matching them according to their requirements. Hemesh built the initial version of the platform and was the first employee of the company.

The techie undertook his second innings with Unacademy, which was just a YouTube channel started by Gaurav as a side project. After Gaurav started Unacademy, Hemesh left a well-paid job in FlatChat and joined the startup to build it from scratch.

From introducing live classes to building a full-fledged premium app, Unacademy is today one of the top online learning platforms in the country.

Talking about the struggles in building the tech platform, Singh says the biggest problem was to make sure that the product worked really well because it was one of its kind. And in 2015, when not a lot of creations were happening on mobile, they had an app with which one could create high-quality educational videos, which was turning out to be one of the biggest technology challenges for the team.

Since Unacademy was a technology-first company from day one, it was very easy for the platform to scale. Steadily building on new products and features, today, the Unacademy Group consists of Unacademy, PrepLadder, Mastree, CodeChef, Graphy and so on, with more than 50,000 registered educators and over 62 million learners, in 14 Indian languages across 5,000 cities.

Advice to techies

Sharing his lessons on Twitter, Hemesh writes, "Knowing when to scale is really important. No product scales before it works. If you don't win the current game, you won't have a chance to win the next game. What got you here won't get you there."

HIMANSHU VERMA

Key achievement(s):

Built the world's first software-based router in the early 2000s; part of the team that built Oracle Content database; led the development of Yahoo homepage in 2003-2004

Known as:

Chief Product and Technology Officer,
Licious

For Himanshu Verma, his first tryst with computers happened in the third semester of engineering in 1993. He's never looked back since.

He has many feathers in his cap, such as building the world's first software-based router in the early 2000s, building a new programming paradigm and model for fast web application development in and around the same time, leading the development of the Yahoo homepage. He has been reinventing himself as a techie for a long time now.

"At that point in time, machine learning was beginning to emerge. What we were essentially doing is widely theory, there were no models, no cloud available. So we ended up building everything from the first line of code onwards, and we ended up essentially creating the entire infrastructure for it, which was a big engineering challenge then," he says.

The coding-maestro has seen it all from desktop to machine learning and BASIC to Java in terms of computer evolution and coding. He started his career at Softek Ltd. as a software engineer. In his first job, he had to write compilers and runtime systems for COBOL. The tech veteran before taking up the position as CPTO at Licious in July 2021, had high profile jobs such as Flipkart's engineering director, Yatra's CTO and Amazon's director of engineering.

At Licious, he believes his role as a tech leader in the company is to understand the problems in the space, what technology should the company espouse so that the problems can be solved and also lend a hand at addressing business issues within the company.

According to him, there are two ways to look at a problem – from a technology availability point of view, it is a very backwards

approach to take. But to approach from a problem-centric view helps one build optimised engineering with simpler and scalable solutions. For hiring techies, his mantra is simple. "Look for engineers and not programmers." He believes engineers solve problems, while a programmer only writes code. Also, strong basics are a must.

Advice to techies

"Be a voracious reader. Find the right mentors in the early days of professional life. It is also important to have knowledge around the business domain to be able to solve real problems with tech. Always keep learning and evolving yourself. Remember, keep working hard as there is no substitute for it."

KAILASH NADH

Key achievement(s):

Building investment and trading applications for end users to make investing easier at Zerodha

Known as:

CTO,
Zerodha

Kailash Nadh is not the typical techie we come across. A techie without an engineering background, he has always believed in the practical use of coding and learning from building things.

Even today, as the Chief Technology Officer (CTO) of Zerodha, India's biggest online broking firm, Kailash, while hiring for his team, does not look at what institute the candidate has graduated from, but looks at what they have built, and what projects they have been a part of.

"I have only hired hackers — people who have tinkered around. If you want to be a good developer, embrace the hacker culture — build, break, and tinker things for fun," says Kailash.

From coding at the age of 12 to building several open source projects and blogging platforms in his early years, Kailash has come a long way. During his college days, he also started running many online services, and started Boast Machine, which powered several hundred thousand blogs across the globe at its peak.

But despite all the success, he never stopped. Looking at his achievements, one can say that one of the interesting things about Kailash is his ability to consistently create products, which are used by the masses.

As the CTO of Zerodha who continues to code even today, he is currently building investment and trading applications for end users to make investing easier.

After six years in the UK, Kailash packed his bags and returned to Calicut (Kozhikode) in December 2011. He says, while the UK expanded his view of the world, he wanted to come back and continue being a hacker and a freelancer.

"The internet in Calicut was terrible, and when my cousin told me the internet in Bengaluru was good, I got on a bus and came to the city," says Kailash.

Initially, Kailash did freelancing and hacking. ***"I would sit at home and build stuff,"*** he says.

In 2012, another coincidence happened. His college friends who were with him in the UK reached out to him. One of them was a trader in Mumbai and wanted help to build an investment app. ***"It was again a random message on Facebook from a school senior,"*** says Kailash.

For Kailash, trading and investment was completely new. And it was then they came across Zerodha. ***"We had never heard of a stock broker called Zerodha. The website was not very appealing, but we nevertheless met Nithin (Kamath),"*** says Kailash.

They found that Nithin was open-minded and had a great vision for brokerage. But the app they were planning didn't work in 2013, as they didn't get the approvals. Kailash went back to the drawing board, and everyone went their separate ways.

But Nithin and Kailash continued to stay in touch, and Kailash started learning about the stock market. ***"I was shocked that modern tech didn't exist, and all platforms sucked and didn't have any ubiquitousness. So, I sat with the risk management teams and built the process,"*** says Kailash.

The focus was clear — building investment and trading applications for end users to make investing easier, and creating a robust internal stack to allow stock broking to operate at scale.

Advice to techies

"Always find ways to build something. I have always believed that building and hacking your way through is the best way to learn about technology."

MANISHA RAISINGHANI

Key achievement(s):

Found insights across thousands of fleets on how to increase vehicle efficiency as part of a GE project during her IBM stint; now heading the product department at LogiNext Solutions with a tech team of 80-100 people

Known as:

Co-founder and CTO, LogiNext

One of the few women techies, LogiNext Co-founder and CTO (chief technology officer) Manisha Raisinghani is a new-age entrepreneur working at the intersection of business, logistics and leadership.

Once a backbencher yet geek in school, today, she has established a growth-stage logistics-tech company with a $100 million valuation. Being a CTO, she heads the product department at LogiNext Solutions with a tech team of 80-100 people.

"My father was a first-time entrepreneur who faced his share of struggles. I was expected to continue the legacy. But I chose a different path. A lot of the credit here goes to my father who gave me and my sister an opportunity to explore and find our own paths," shares Manisha, who spent her childhood in Ulhasnagar, a city on the outskirts of Mumbai.

Manisha recalls that she had a flair for mathematics, which honed her analytical skills at an early stage, and an interest in the practical application of the subjects. ***"I used to teach maths to even my older cousins. This interest later pushed me towards engineering,"*** she notes while adding that she was, however, never a computer or coding geek.

Manisha pursued an engineering degree in Electronics and Telecommunications, and got her first placement opportunity in a Tata company. ***"But it was a field job in a village near Solapur. I never wanted to leave Mumbai, so I moved past it,"*** she says.

Later, she joined Mastek, a global listed digital transformation company, where her interest in programming languages bloomed.

"I never looked back after that. I joined a startup, rose there from a software engineer to system architect role in two years, went to Carnegie Mellon University (CMU) for my Masters and found my way towards entrepreneurship," she adds.

It was there that she met her co-founder Dhruvil Sanghvi, with whom she worked as part of a Deloitte case study project. ***"Dhruvil was organised, structured about the meetings, was interested in how the meetings should go, and kept motivating people. He still has those qualities,"*** she added.

Manisha later worked as a consultant at Warner Bros during her Masters, where she got fascinated with databases. ***"Data makes me curious and analytics excites me,"*** she quips.

At CMU, Manisha got a placement with IBM Watson — an open, multi-cloud platform that lets clients automate the AI lifecycle. During her stint at IBM, Manisha came across a project from GE Transportation, wherein she had to find insights across thousands of fleets on how to increase the efficiency of vehicles, saving fuel, and so on.

"Incidentally, Dhruvil was also working with logistics clients in Chicago. We realised that these guys were spending millions of dollars to build a custom software, which was not something everyone could use. That formed the genesis for LogiNext," she adds.

They came back to India in 2014 and within two months, launched the first LogiNext product.

Talking about her learning curve, Manisha shares that while scaling LogiNext, they did a few right things.

First, they built separate products to address specific concerns, and did not hop on making a single product that could do everything. Second, they kept technology at a minimum.

"When required, we moved from a product or process to a platform approach. We implemented microservices architecture which removes our dependence on one programming language. Now, we can use two or more languages easily. But we also take care that we do not make our systems tech-heavy to avoid complexity at all levels — whether in operation or hiring," she adds.

She believes that with curiosity, strong analytical skills, and the right attitude, anyone can learn anything in a very short time.

An important lesson for entrepreneurs and technology architects, Manisha says: ***"Don't solve for billions: Manisha says that if we try to solve for billions right from Day 1, then there are chances to miss the market for millions. Quality is the most important asset and it always comes at the cost of time. What needs to be done in three months cannot be done in a month, just by increasing the number of people working on that project."***

One thing Manisha looks for while hiring techies is the right attitude. ***"Attitude beats aptitude. But skills are definitely important. Also, we give more focus on skills rather than the domain,"*** she reveals.

Advice to techies

User-facing technology is key. Engineers nowadays are not just expected to code but to empathise with their users to build the right code, she emphasises.

With the introduction of new technologies on what seems like a daily basis, techies may sense a fear of missing out (FOMO). "But one should keep their focus on learning one or two fundamental languages. Once you master them, you can go ahead to learn new things and become a jack of all trades," she adds.

MARUT SINGH

Key achievement(s):

Created TradeMogul, India's first web-based trading software; built the tech team from scratch at Cars24

Known as:

CTO,
Cars24

Marut is a tech leader with experience in building teams and guiding them to develop high performance enterprise applications. He loves building large scale softwares, exploring the latest technologies and "breaking" things. He calls himself a failed entrepreneur and his approach is to get things "done" while delivering solutions with a balance of time, budget and quality using cutting edge technologies.

He joined Cars 24 as a CTO in April 2018. However, his journey towards becoming a CTO started a decade ago. In 2009, he got an opportunity to run and build a team of 23 from scratch. He created India's first web-based trading software with real-time price feed, TradeMogul. This is where he built his foundation and his managerial role began.

He firmly believes that for any executive, it is crucial that they have the autonomy and the control to make their own decisions. This is highly important because it is where one learns the most.

As a techie, he is an expert with Reactive applications, Distributed Systems, Micro-services, streaming architecture. With domain expertise in ECommerce, Algorithmic Trading, Project Management, Mobile Apps, he has special interest and expertise in identifying the right technology and using them to build rock solid systems .

Advice to techies

"As a CTO, I swear by the motto that one must be sure and know how to invest in tech, where to invest, and what should be picked at what point in time. For me, I have experienced a vast range of situations in the tech world but one never stops learning. With almost ten years of experience behind me, I believe I still have a long way to go."

MONISH DARDA

Key achievement(s):

Co-authored two patents in the area of cloud resource management and provisioning; now leading a team of over 400 engineers at Icertis

Known as:

Co-founder and CTO, Icertis

"It is not about choosing the technology. It's about first identifying the problem, and then fitting the technology to solve that problem," says Monish Darda, a familiar name in the world of software-as-a-service (SaaS).

The CTO of Icertis, India's second-most valued SaaS unicorn, has been building startups for around two decades, even before the term 'startup' was glamorised.

Donning the 'problem-solving approach', Monish today leads a team of more than 400 engineers at Icertis. He has been instrumental in building and contributing to the success journey of many companies, and is also the co-author of two patents in the area of cloud resource management and provisioning.

Hailing from a middle-class Marwadi family in Pune, opportunities weren't handed to Monish on a silver platter.

While his father, a mechanical engineer, worked in a scientific instruments laboratory, his mother was a banker. Interestingly, Monish's first aspiration was to become a bus conductor or maybe a pilot.

But when he was unable to crack the engineering entrance exam, all his dreams came crashing down. ***"My parents had a rough beginning. By the time I reached Junior College (Class XI), we had our own house but still donating for college admission was completely out of the question,"*** he says.

However, not all was lost. Monish started with a diploma course, topped in his first year, and landed an opportunity at Thermax Software, where he got his first real-world coding experience.

After he finished his mechanical engineering, he went to study MS (Master of Science) at Florida Atlantic University in the US in 1987 earning a scholarship of $11,000. As Monish described, it was a life-changing experience for him.

Monish returned to India, leaving his PhD (Doctor of Philosophy) halfway, and ended up building India's first data acquisition system for automotive cars, where you could put a sensor in a car or a scooter engine cylinder to measure the pressure and temperature inside. This was huge at that time, and it sold really well! After shifting jobs in India and the US, the techie took the entrepreneurial plunge in 1998 with Websym Technologies, that aimed at encouraging smaller companies from the US, such as the Boston-based Storability to come to India and set up shop.

Monish was introduced to Samir Bodas (Icertis Co-founder) through Websym. "We both were planning our retirement but had the itch to build something big. We decided to build a company, not for making money but to build something consequential," he adds.

In 2014, they finally zeroed in on contract management and have not looked back since. "We've redefined that category. Nobody actually thought about contract lifecycle management. We are the only company in the world which has 400 engineers focused on this problem, which makes us a better partner for our clients," he adds.

Advice to techies

Reflecting on his journey, Monish highlights some of the key learnings for fellow techies. He believes one should be modest enough to learn from everyone in the room and should be aware of their limitations.

"Remember, it's not the technology that makes the world tick, but the application of the technology. Also, try and find joy in the journey of what you are building and not the destination. Else, you may not grow as a person," he adds.

MUKUND JHA

Key achievement(s):

Built Google's 'Education for all' platform and the core tech that drives hyperlocal delivery app Dunzo

Known as:

Co-Founder and CTO, Dunzo

What does someone like Mukund Jha, who has been Instrumental in taking the hyperlocal delivery platform Dunzo from a WhatsApp to an artificial intelligence (AI) and machine learning (ML)-driven app, look for when it comes to hiring tech candidates?

The chief technology officer (CTO) of Dunzo insists on the need for techies to keep experimenting and outlines how hiring for areas such as AI and ML is made difficult by a limited talent pool.

"We mostly go for referrals and hackathons, and conduct up to six rounds of interviews to zero in on the right specialist — someone who doesn't just code or develop products but also fits into our culture," he had said in an interview to a publication. Rooting for the dynamism and ever-evolving nature of new technologies, Mukund's ideal candidate should have an ability to learn things faster and recognise the potential of new technologies. With emerging technology, adoption is always in phases. Speed cuts it for him.

In fact, Mukund believes that a person in tech should really think of consumers and products as it adds a very high leverage on how you build things.

At Dunzo, his approach has been to build the user interface from an "impact point of view" and tap the creative potential of technology to mitigate or minimse friction between the stakeholders — consumers, merchants and delivery partners. Realising how the consumer couldn't care less about chatting but wanted to locate merchants in her locality to cater to her needs, his overarching idea has been to build for a generic user case. To integrate tech deep into their lives. Earlier this year, the Bengaluru-based hyperlocal, quick commerce startup raised $240 million in its latest round of funding (led by Reliance Retail Ventures Limited), valuing Dunzo at $775 million.

But how did Mukund transition to his current role?

As a pre-teen, Mukund would spend most of his time at internet cafes and chat rooms, playing games. A programmer since the age of 10, Chandigarh-born Mukund started coding early with C++ when his father, an electrical engineer, got him and his brother a programming CD instead of a game.

Mukund eventually joined for a Master's course in machine learning (ML) at Columbia University.

However, it was in 2010 that Mukund got his dream project — an opportunity to intern at Google. While at Google, working with the early leadership and the founding team, Mukund worked on the 'Education for All' (Google) product (an edtech platform similar to Udacity) and built that together. .

By 2012, the startup ecosystem in the US was exploding, and bitten by the startup bug, Mukund decided to start something of his own. In 2013, Mukund along with a couple of batchmates started Wisdom.ly, a group video platform for virtual meetups and conferences. Wisdom.ly was one of the 20 companies that was chosen for the Startup Chile programme but they had to shut shop owing to lack of product-market fit. By 2015, Mukund came back to India and he started figuring out what to do next. Initially, Dunzo ran on WhatsApp. The biggest bottleneck was that a lot of people were using WhatsApp, and a lot of the operators weren't able to get them to shift.

So, Dunzo wrote a hack on WhatsApp where they would get the messages on the interface. It made the backend operations simpler, people could work on the interface, and it helped the team build strong operations, while the consumer side kept running on WhatsApp.

The Dunzo tech takes complex workflows in life and makes them into systems behaving predictively. For running a single task, there are thousands of variables running on the computer — are you a new user, a user moving from a different city, a task from a store that we have tied up with or not, does the store have a PoS (point-of-sale) machine, etc.

Advice to techies

"Try everything. Join a startup, as the learning curve is super high, and start building. The moment you try something it becomes super easy, keep experimenting, try new things on the side. Spend time networking with the right kind of people, fresh engineers don't network enough," he advises, and adds, "Can you build something for a problem that is bothering you? I have my own bot, which emails me a newsletter."

NATASHA JETHANANDANI

Key achievement(s):

Led the conceptualisation and alpha launch of DFP Video at Google; built the core technology of Kaleidofin platform

Known as:

Co-founder and CTO, Kaleidofin

Natasha Jethanandani grew up to love maths with tons of puzzles at the dinner table. She had started learning BASIC programming at school and was hooked. Even after two decades, the techie's passion for coding and programming remains the same.

From building products at Microsoft and Google to leading engineering at BankBazaar, Natasha is now using her skills on making financial services inclusive, especially for the unbanked, as a CTO (Chief Technology Officer) of Kaleidofin.

This switch to Kaleidofin was "driven by a strong personal motivation" to use her learnings to make more of a social impact on lives.

The Stanford graduate has always been intrigued by problem-solving techniques, building new products and the endless possibilities that come along.

Starting at Stanford (University, California) itself, Natasha built multiplayer games from scratch, dabbled in animation software, and double majored in CS (Computer Science) and Economics. She also pursued statistics and modelling techniques. From pursuing summer internships at Infosys, Sun Microsystems, and Microsoft, to researching at Stanford in interactive workspaces blending real-time, audio-video detection for camera direction control and feedback in online classrooms, Natasha gained significant exposure to the world of engineering and products.

Soon after her graduation, Natasha lost her father, which, she says changed her as a person, making her quieter and more focused.

In 2002, she joined Microsoft as an engineer on the .NET framework and web services team. "It was an eye-opening experience. My first project was to work on fixing performance issues that required drilling deep into the stack, including understanding C++ COM at times. Learning from technical

fellows like Don Box and being in design discussions helps you realise you have a long way to go," says Natasha. At Microsoft, she also built the serialisation stack from scratch, which taught her the importance of performance and being detail-oriented.

She later went on to join Google as a lead engineer at their Chelsea office. At Google, Natasha got a chance to work with the smartest minds in the industry and drive a startup and build a team within a larger organisation. Here, she led the conceptualisation and alpha launch of DFP Video.

"I was super excited when I got the chance to present the demo to Google founders Sergey Brin and Larry Page. I worked on a product plan and pitched the idea within the AdSense team," she adds.

After 16 years in the US, Natasha decided to move to India, and in 2013, co-founded Pinpoint Systems, which shut shop within a year. She took the opportunity of joining BankBazaar as the Head of Engineering. In the four years Natasha was at BankBazaar, the startup introduced several new products, including insurance, mutual funds, and credit scoring with market success. It also introduced personal finance support into its mobile app and built up app acquisition organically to over one million instals.

The leader joined Kaleidofin as CTO at a stage when the company was just starting to take shape. Natasha has been the brain behind building the technology platform, and recently, the company appointed her as Co-Founder.

Advice to techies

On being a woman techie, she says while it is hard to often be the "only woman in the room," it is important to not get intimidated. She advises women to openly ask for things you want, discuss your compensation and promotions.

"Find the right role models, even if you aren't working directly with them. When I was at Google, a woman was leading Google Maps. I found that inspiring," recalls Natasha. "Even if there are very few, find them. The biggest change will happen if you encourage girls to code earlier and say they are no different from the boys."

Today, while hiring techies, she says there are two important things to look for — learning and the willingness to learn.

"It is a given that you need to be good at your basics. Your core ability to look through problems and the ability to solve them comes from (your understanding of) basics, which needs to be strong. I also look for people who dabble with things, build products and apps outside the work. That matters. It shows passion," says Natasha.

NEERAJ SINGH

Key achievement(s):

Built Flipkart's customer return and refund system

Known as:

Co-founder and CTO, Groww

Neeraj Singh, the Co-founder and CTO of Bengaluru-based fintech platform Groww, has been an advocate of breaking through the clutter and "keeping it simple and transparent". This straightforward philosophy is reflected in his 15 years of career as a techie across multiple organisations.

Even his early days at Flipkart, which was at its growing stage back then, were dedicated towards simplifying the supply chain management with the power of technology. As an engineering manager, he is also credited with helping build Flipkart's customer return and refund system.

He had joined the supply chain team at Flipkart, which was then at 30,000 orders a day. The ecommerce giant needed software for warehouse management to streamline orders, pickups, packaging, and shipping. Everything was handled by the warehouse team, but the need for a new product was high as orders went up with every day. He effectively spearheaded the creation of new product/software and optimisation of order management flow.

Even when the startup moved to a marketplace model, Neeraj was one of the initial members. He was the only person who had worked with the supply chain, product management, and order management. This helped with integration at marketplace level.

Neeraj recalls his first introduction to computers in 1997 through his father who was a computer instructor for the Indian Army. The techie had developed a keen interest and went to Kanpur for IIT coaching, but failed to crack the entrance. Following his graduation from ITM, Gwalior with a degree in Information Technology and a PG Diploma in Advanced Computing from CDAC, Neeraj was placed at JDA Software, where he built Inventory Planning and Optimisation (IPO).

A lot of people would work on a release for six months, but he would finish his work in two weeks. "I would take up work

from other people and it still wasn't enough…I knew I had to shift jobs." In 2010, he joined IVY Comptech, an online gaming startup, and worked on casino games and even built a jackpot game.

Having experienced building products from scratch, Neeraj, along with his ex-Flipkart colleagues and co-founders, Lalit Keshre, Harsh Jain, and Ishan Bansal, had realised the potential impact they could make outside the startup, which led to the inception of Groww.

The passionate engineer and coder, Neeraj took a stab at simplifying the process of buying financial products in India, which was largely slow, complex and opaque.

What started as a platform for mutual funds in 2017 has now morphed into an online investment platform offering a wide range of investment options such as stocks, IPOs, ETF, Gold, NFO, futures and options, fixed deposits and US equities. Groww has over 1.5 crore registered users across 900 cities.

The platform has maintained a simplified user interface to make investing easy, accessible, hassle-free, transparent and paperless. It has been designed as an advisor or 'buddy' and powered by intelligent UI and UX. The app has worked really well for the safety and security of the customers and financial transactions.

Groww's pace of growth is not surprising. Most of the investment platforms were either too expensive because of high commission or were offline agent-driven models. Even the ones with some online presence had a clunky user interface, which was not suited for smartphone generation. Groww plugged the gap.

Neeraj continues to code even today, but his focus now is overall product growth and evolution.

Advice to techies

"What you learn next is extremely important. It is important to continue learning. I always learn about tech in other spaces, even agritech, advanced computing…anything that speeds up your work or can be replicated. I focus on how I can speed up processes."

On what he looks for when hiring, he says he considers energy level and a never-give-up attitude in the early days.

"Today, we also look for skill sets and the ability to solve the problem. How do you approach the problem? We are not new; how you solve the problem is important. Engineers can do the same work in two months and in one day…there are variations, and we look for people who can work with speed," Neeraj says.

POOJA GUPTA

Key achievement(s):

Built the tech stack of healthtech platform PurpleDocs

Known as:

Co-founder and CTO, PurpleDocs

Pooja Gupta, Co-Founder and CTO (Chief Technology Officer) at PurpleDocs, is leading the healthcare revolution from the front with her SaaS (software as a service) startup that empowers stakeholders across the terrain to access patient data in an easily retrievable and analysable format — thereby helping doctors trace a patient's medical history over multiple visits and make informed clinical decisions.

Like most engineers, Pooja followed the trend of her time by working across MNCs (multinational corporations) and startups across India and USA following her BTech (Bachelor of Technology) in Computer Science in 2002 from Priyadarshini College of Computer Sciences in Noida.

Her first stint was at HCL as a Product Development Engineer. At HCL, she worked on the first indigenous firewall based on packet filtering using the base layer of Linux OS and led a team of young engineers and guided them through the product development cycle, unit test, integration test, regression testing and so on. She also worked across companies like SAP-KhiMetrics in Arizona, the US, as a java developer, before returning to work with Saama Technologies and Tieto in Pune. She continued to shuttle across the countries before finally deciding to relocate to India to take care of her mother-in-law's health.

This marked the turning point for Pooja and her husband-turned Co-founder, Deepak Gupta.

It was during this time that they realised that there is little or no technology being used for preserving patient treatment history by any hospital. In case of emergency surgeries, doctors had practically no clue about their patients' health history. Crucial time was lost in profiling the patient, resulting in delayed treatment sometimes becoming fatal.

There were some stubborn hurdles to modernisation and digitisation of medical records, which prompted the 'techies' to

try their hand at cracking the puzzle, leading to the foundation of PurpleDocs. As a Co-founder of the company, Pooja wore multiple hats initially ranging from recruiter, HR (human resources), Operations manager to majorly being the tech designer and developer.

In her role as CTO, Pooja designed the systems architecture, explored business requirements and led the development team. She developed an angular-based online portal for clients to access their records from Google cloud, an enterprise-level app that works on distributed databases for processing hospital records. She also designed an Android and iOS app for clients to access their records from their phones.

Today, the startup is present across 15 cities and is currently serving 130+ hospitals with over 60,000,00 health records on its platform. Switching to PurpleDocs has been proven to save upto (and sometimes more than) 30 minutes in a day in OPD (outpatient department) activities.

The journey has not been very easy for 'mompreneur' Pooja, right from leaving her plum job in the US to starting a company from a Tier-3 city when her kid was just two years old. There were times when Pooja was seen attending meetings with her kid playing at the office next door.

Advice to techies

The techie wants to be recognised as an innovator and get involved in something that fulfils her appetite for innovation. Pooja encourages entrepreneurs and tech leaders to undertake market surveys and talk about their ideas with the actual stakeholders and potential adopters and try to gauge their pulse. There is no better litmus test of product feasibility, she adds.

To women leaders, Pooja advises to continue to upgrade their skill sets and stay up to date. "Do not shy away from trying new things," she advises.

PRAKASH RAMACHANDRAN

Key achievement(s):

Worked on India's first super computer Param; built one of India's most popular social media game FarmVille; now building edtech decacorn BYJU'S

Known as:

CTO, BYJU'S

Prakash Ramachandran has played a pivotal role as the CTO of BYJU'S and has been instrumental in the rapid rise of the Indian multinational edtech company. He believes one of the major mantras for this success has been the constant push towards diversity and inclusivity.

The techie has been around for over 25 years in which he made strong contributions in major organisations such as HP and CDAC, by blending technology and management skills and developing system and product solutions. He has used gamification for making learning easy in BYJU's. He has been part of Zynga where he worked as a US social game developer.

In CDAC Prakash was a part of building a supercomputer, and later he did his first private stint at HP. He believes the major lesson he learnt from these organisations was building the smaller components only after looking at the bigger one.

However, despite not having a degree from the hallowed IITs or BITS' of the world, the technophile has proved that a bit of hands-on learning and passion can take you a long way.

"I remember one time we went to our professor and told him that the systems in the computer lab weren't working. He simply looked at us and said 'okay, why don't you fix it? It was a new college, a small one with a total strength of 480 students. It was where I learnt the idea of hands-on coding, programming, and building things," says the former student of Model Engineering College, Kochi.

Prakash simply believes that team is what helps build a great product and to become successful as a company, one needs people who are intrinsically motivated. Having different points of view is beneficial in solving a problem in different ways and along with that brings a different set of skills.

Advice to techies

"You have to be an expert in learning and trying new things. There are roles that didn't exist in 2005, so keep your mind open. Even at Zynga, explaining to people what we do was difficult. So challenge yourself every day."

RAHUL CHARI

Key achievement(s):

Among the first movers to build India's new-age payment container; built Mime 360, a music app believed to be ahead of its time in 2009

Known as:

Founder and CTO, Phone Pe

Rahul Chari is a firm believer in acquiring skills over a degree or some designation as a testimony to success. In his early years, he refused to join IIT Mumbai to pursue civil engineering. Instead, his love for coding made him opt for the University of Mumbai to study Computer Science and Engineering. He later acquired a Master's degree in Computer Science from Purdue University.

Today, with more than 20 years of experience under his belt and expertise in areas such as storage visualisation, content management, and supply chain technology, he is building one of India's leading fintech unicorns. With an estimated $5.5 billion valuation, PhonePe operates as an independent subsidiary of Indian ecommerce decacorn Flipkart (acquired in 2017 by the global retail giant Walmart).

Right from the beginning, he made a clear blueprint, keeping the core technology part of the company separate from the business side of things– an uncommon trend almost a decade back. For him, hustle is overrated when it comes to technology, taking the shortest path is the end of innovation. He firmly believes that simplicity should not be looked at from a product building perspective, but rather from a consumer's perspective and their experience of the product.

Prior to PhonePe, he built Manoramic.com, then known as the iTunes of India, an ad-free property where one could download tracks. Later, this was pivoted to MIME360 (Manoramic International Media Exchange) in 2010, until it was acquired by Flipkart in 2011. He is also known as the man who built the stack for eKart logistics at Flipkart before he went on to build PhonePe.

He believes that as a techie, the key challenges he has faced so far are getting out of his comfort zone in pure technology to understanding business, operations, marketing, etc that amplifies the impact and value creation one can drive. Also, it has been challenging to keep continuously learning to keep up with changing technologies.

While hiring a team, he constantly looks for techies outside of technical skills and raw smarts such as deep curiosity, demonstrated ability to negotiate steep learning curves and data-driven thinking.

Advice to techies

"Avoid information asymmetry and embrace transparency. Empower your team by letting them make decisions with the confidence that success will propel them while in failure, you have their back. Chart your career with a long-term view of learning and wealth creation instead of a short-term view of brand and compensation," shares Rahul.

RAMAKRISHNA GADDIPATI

Key achievement(s):

Established Bridle Information and Technology Solutions pivoting computer interfacing; built Pillpal reminding patients to take their pills on time; built SchoolMATE to track children's wellbeing; now leading technological innovations at Zeta

Known as:

Co-founder and CTO, Zeta

A reluctant engineer, Ramakrishna Gaddipati, turned out to be a successful Co-founder and CTO of the fintech startup Zeta. With an entrepreneurial heart and commitment towards excellence and knowledge, he achieved remarkable success.

Ramakrishna completed his Bachelor's degree in 2002, graduating from the prestigious BITS. He worked as a software engineer for a year in Leapstone Systems where he developed an HTTP interface for Over The Air provisioning system Supporting WML, HTML and XHTML. He then returned to BITS to resume his higher education. Along with doing his Master's he was also an assistant teacher at the institute.

The CTO prior to establishing Zeta had established Bridle Information and Technology Solutions Pvt. Ltd. and was Co-founder and CEO there. Ramki, as he's popularly known as, took care of computer interfacing. He came back to Hyderabad where he built Pillpal which was a system that reminded patients to take their pills on time.

The trailblazer's entrepreneurial stretch continued when they introduced a system called SchoolMATE which enabled the parents to know about their children's wellbeing in schools. SchoolMATE grew to help 70,000 parents in Hyderabad and Vizag. Bridle was recognised as one of '5 Asia's best entrepreneur ideas under 25' by Business Week in 2006. After leaving Bridle he had a stint at Directi for five years.

The passionate innovator was just getting started. The hunger to build something right from the scratch ignited a fire that ended in creating Zeta in the payment industry. He felt the payment industry has a lot of scope for growth. In May 2021, six years after its inception with Ramakrishna's technological innovations as CTO, Zeta became a unicorn. Zeta has enabled banks to rapidly innovate and meet consumer needs.

Advice to techies

"Coding is more of an art than science. If you ask an artist what they love about art, they will say it is about representing immediately what's in one's mind. Computer programming is similar, you don't need an external dependence to validate it. You think, create, and validate - the entire loop is in your hand and that is super powerful."

RANJAN SAKALLEY

Key achievement(s):

Built a phone-based application for UNICEF to track the welfare of children during the Iraq war; built several open-source applications; solving problems at ground level for students and teachers from the infrastructure and tech perspective at Vedantu

Known as:

Head of Engineering, Vedantu

Like many ’90s techies, Ranjan Sakalley’s love for technology came from video games and never-ending tinkering during computer lab sessions at school and college. While most of his family members pursued the medical profession, his interest towards maths led him to engineering.

However, his actual tryst with programming began when he started his first job at Everest Software, Inc. That is where he came across various coding languages and was part of many design patterns, databases and so on. In 2006, he joined ThoughtWorks as a Lead Consultant and worked there for over a decade. He then headed to Gojek Tech where he worked for a couple of years before extending his legacy overseas. He became the CTO of GoPay, an Indonesian company.

Now, as the head of engineering at Vedantu, Ranjan is someone who has been interested in working across different business domains, working with different people, crossing role boundaries, and working on software architect and implementations throughout his career. In his 25-year illustrious career, he has always created products built on the inherent value of customers’ love.

“I was very lucky that in the first few years of my career, I was able to work in places, which were solving good problems, and work with people who were happy to teach me and happy to allow me to fail and learn from them. And what I’m doing right now is a function of what I did then,” he added.

Ranjan’s idea of approaching a problem is simple: always go back to the first principles and identify different solutions, on the basis of multiple parameters. Going by the first principles not only lets you make decisions at a smaller level, but also helps you see the big picture. He emphasises that tech can never work in isolation. “If you see any great piece of software, the coding time was perhaps very less compared to ideation and iterations,” he says, adding that one has to understand that maybe 1000s of betas have gone before.

He further believes that in today's world where tech is changing at a fast pace, it is very easy to go out of touch with new technologies. Being in a leadership role, this also impacts one's ability to interact and advise team members as well as contribute to the overall growth of the organisation. "With more than 20 years of programming experience, stopping now for something else is like becoming a handicap. In fact, within a very less time, I can actually pick up a lot of new things, compared to somebody starting zero to one and make my conversations richer and relationships better," he adds.

When hiring a techie, he primarily goes beyond degrees and looks more for passion towards programming, an ability to take feedback and a high sense of ownership.

Advice to techies

"If you are passionate about something, then pursue that passion and do not get distracted by other things around it. Also, when it comes to technology, it's important to have knowledge and specialisation about a certain few areas along with a broader knowledge of other things. Instead of a practitioner, be a student and be humble always," he shows the way ahead.

SACHIN SHENOY

Key achievement(s):

Worked on building Google's Gmail, CloudMan and other financial products; developed tech stack of HealthifyMe (AI assistant Ria)

Known as:

Co-founder and CTO, HealthifyMe

Having worked with the likes of HCL Technologies and Google, healthcare was something Sachin Shenoy, Co-founder and CTO (chief technology officer) of healthtech startup HealthifyMe, believed needed disruption with technology and AI (artificial intelligence).

Hailing from Kozhikode, Sachin's tryst with technology had began during his teens hobnobbing with his father's computer, spending long hours, fascinated, in front of the screen as he discovered the world of programming: BASIC first, then Pascal, followed by C and C++.

"This was around 1993, and my brother was doing engineering at NIT (National Institute of Technology). Every time I spoke to him, he would talk about algorithms or programmes that his classmates couldn't solve, so I would take that up as a challenge and code those programmes," Sachin says.

During those days, AI was just picking up the pace; while people could see machines could work as fast as humans, their potential was yet to be tapped. Sachin recalls that even with games like chess, humans were beating machines.

"I wanted to build something where a machine could play against a human and win," he adds. With that goal in mind, Sachin test-built a simple knots and crosses game, and soon moved onto Othello, the checkers game taking them both online, where a human could play against a computer. This game also won him an award in Delhi.

By the time Sachin joined NSS Engineering College for Electronics, he had already learnt most of the programming languages on his own and was teaching coding to seniors.

Moving to HCL, Sachin worked on several projects that proved to be a solid base and training ground. He doesn't agree with people who call HCL, Infosys, and other software companies 'legacy' organisations, citing that there is plenty of learning at these corporations. He, along with other engineers, built the

sessions initiation protocol (SIP) for voice over IP for a client, besides other testing products.

While selling the products he, for the first time, connected with users. ***"It was then that I realised I needed to keep building always and that one needs to be connected with the user,"*** says Sachin, who later joined Google after a five-year stint at HCL.

"While HCL taught me how to build an error-free system without any memory leaks, Google taught me how to build a product from a user's and scale perspective," he says. He worked on building Gmail, Google's financial product and CloudMan (similar to Amazon's AWS).

And after six years with the tech giant, Sachin decided to pursue a different path. It was around this time he met Tushar Vashisht, who had already begun work on building HealthifyMe. The duo got to talking and Sachin decided to join the team as the CTO.

"Consumer-facing healthcare as a problem excited me and I knew the tech stack could be made better, so I joined as co-founder and CTO," he says. Sachin says they spent a year in understanding the Indian taste palate and food preferences to build the right nutrition programmes and algorithms, and the AI assistant, Ria.

The health and fitness startup combines technology and human services to deliver measurable impact for users via its mobile app.

Advice to techies

To all the young and aspiring techies out there, Sachin has an important piece of advice: finish any task that you take on, while still being open to learning and trying new things.

"There are different ways to reach a destination as an engineer. Are you open to seeing those different ways," asks Sachin.

SANJAY SURI

Key achievement(s):

Spearheading both the product and technology division at Nykaa and building the highly scalable multi-tenant Nykaa platform; built two startups Videocrux Inc and Clearsenses before joining Nykaa

Known as:

CTO and CPO, Nykaa

Founded in 2012 by Falguni Nayar, former Managing Director of Kotak Mahindra Capital, the company has ever since scripted a golden growth story. Having pioneered the new initiatives Nykaa Fashion and Nykaa Man, India's largest multi-brand beauty unicorn offers 4,000 beauty, personal care, and fashion brands through its website, app, and 80-odd brick-and-mortar stores.

While Falguni is India's wealthiest self-made female billionaire, according to the Bloomberg Billionaires Index, Nykaa's parent company, FSN E-Commerce Ventures, is the country's first woman-led unicorn to hit the stock exchange.

But behind the gutsy and glitzy success story lies the power of terrific technology foundation.

Leading the technology expertise is Sanjay Suri, the Chief Technology Officer (CTO) and Chief Product Officer (CPO) of Nykaa, who leads product and engineering, data, user experience (UX), information security (InfoSec) and information technology (IT). Sanjay comes with an experience of building high-impact teams and scalable software platforms. Sanjay is no stranger to the startup world. Before taking over the tech mantle at Nykaa, the ex-Amazon and Oracle executive co-founded two startups — Videocrux Inc and Clearsenses.

Having been entrusted with the ownership of the growth roadmap at Nykaa, Sanjay has been spearheading both the product and technology division since 2016. He has pioneered the highly scalable multi-tenant web services platform that can power multiple businesses on the same stack — Nykaa.com, Nykaafashion.com and Nykaaman.com.

The technology stack enables to open up more business models to play with. The main technologies used are Python and Java for API (application programming interface) development, and MySQL MongoDB for databases. ***"There's also massive use of caching strategies with multiple CDNs (content delivery***

network) all the way down to Memcached and Redis," Sanjay had shared in an interview with a publication.

On the front end, the team has native apps and also experiments with React Native. The web apps are on React, are multi-tenant and are moving towards PWA. ***"It's worth mentioning that our apps are also multi-tenant and we're very proud of this fact. For instance, NykaaMan and Nykaa apps have 80 percent common codebase. And from a technology standpoint, we're quite open and comfortable with adopting new technologies,"*** Sanjay added.

At Nykaa, analytics is the key focus for engineering and product teams. In a departure from any centralised model, analytics is functionality-driven.

Sanjay believes that the product or tech roadmap should be aligned with the company's goals. ***"And for technology to become perfectly coherent with the business, you need both telescopic and microscopic views. The telescopic view starts with a deep understanding of strategic business goals. From here you work out the product spread that needs to be built and then you derive the technical architecture. This architecture becomes the blueprint for the entire execution,"*** Sanjay explained. The microscopic view is where the entire blueprint is broken down into independent components.

Known for its dynamic entrepreneurial culture, Sanjay shared that honed problem-solving abilities and being able to deliver a good code quality are what they look for when hiring talent.

Advice to techies

"Strong CS fundamentals are the most important aspect. We focus a lot on code quality in our interviews," he shared.

And what should a techie have?

Energy, problem-solving capacity, humility and a very strong work ethic, are qualities that Sanjay recommended to aspiring techies.

SANJEEV KUMAR

Key achievement(s):

Architect of two largest solutions in the country which changed the way the gas stations were automated

Known as:

Former CTO, Pine Labs;
Founder, Edumatica (Jan 2022)

Sanjeev Kumar, through his tech proficiency, has left a remarkable legacy at the organisations he has worked with. In his career spanning two decades, he has worked with companies such as Infosys, IndusLogic and has played an instrumental role in taking PineLabs into the coveted unicorn club as its CTO.

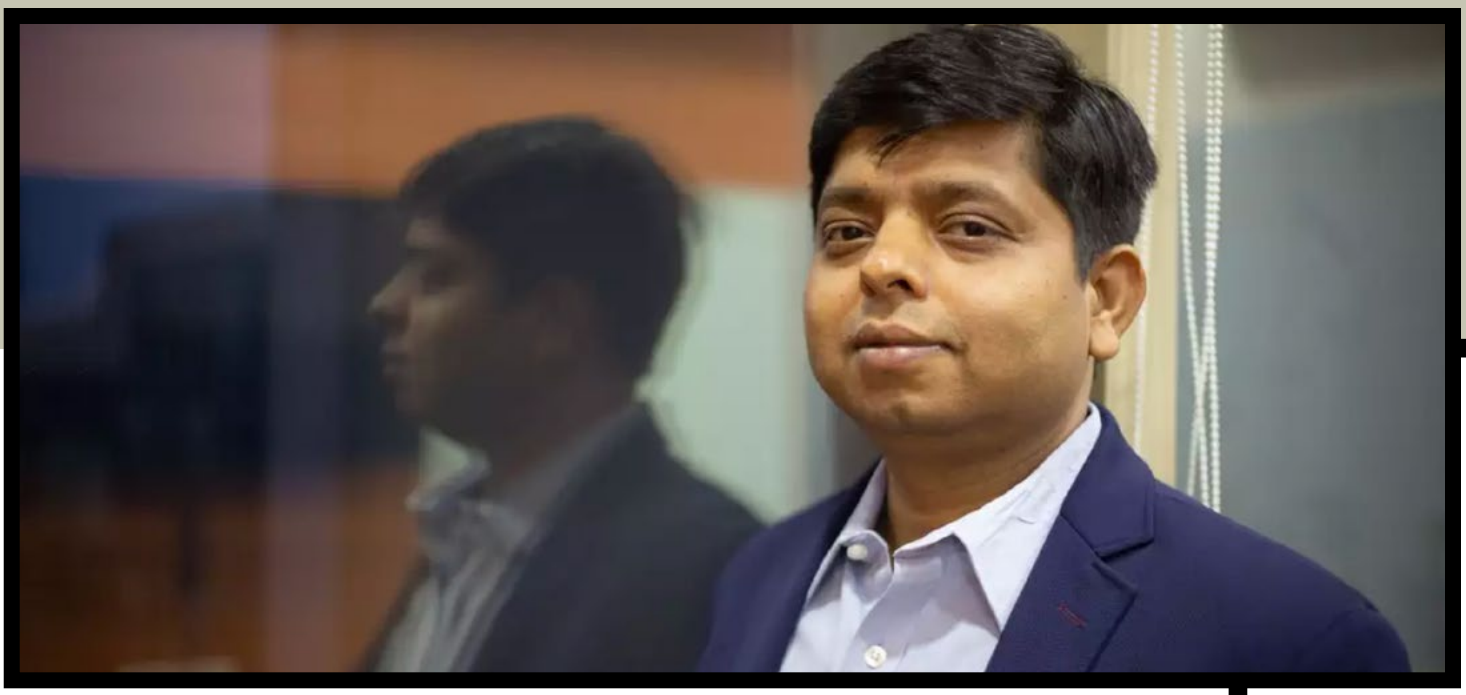
During his more than 14-year-long stint at PineLabs, he has been instrumental in bringing a change in the landscape of Indian payments and leveraged the technical prowess of the team to build merchant focused products.

An alumnus of IIT Kharagpur, he has been known as the chief architect behind the way gas stations were automated and the way Credit/Debit Transaction Acquiring Transaction happened. Both these solutions have been in production over the last decade. These solutions are hugely complex as they operate in harsh environments with little or no IT support and are operated by laymen.

He has also worked extensively on frontend devices such as EDC terminal and created a smart thin client on it, which was never envisaged even by the EDC manufacturers, subsequently leading to the evolution of Unified POS (point of sale) in the country. This Unified POS handles multiple banks/schemes/wallets/prepaid/loyalty/EMI/offer systems and involves innovative approach to key handling all the while maintaining the sanctity of individual bank/host security.

Sanjeev is known for his expertise in areas such as handling high performance/secure complex backend application/database servers along with cryptographic servers involving extensive use of HSMs.

In January 2022, he stepped into entrepreneurial shoes and is currently working on his edtech startup Edumatica.



SAURABH TIWARI

Key achievement(s):

The entrepreneur and innovator at heart is best known for scaling PolicyBazaar to a billion-dollar valuation fintech company

Known as:

CTO, Policy Bazaar

Like most of the '90s kids, Saurabh Tiwari's aspiration to become an engineer came from the dreams his parents had. However, his first tryst with computers in 1997 at IIT-Kanpur made him realise his natural fit towards engineering and innovation. Today, in his more than two decades of career, Saurabh is known for playing an instrumental role in scaling fintech startup PolicyBazaar to a billion-dollar valuation unicorn.

Having worked with notable companies such as IBM, he also founded Zphin, a brand under PB Fintech, which is a parent company to Policybazaar & Paisabazaar. Prior to this, in the early 2000s, he also started a SaaS (software as a service) platform, which at the time was known as ASP (Application Service Provider).

"In the first two years of building that product, we were only three people in the engineering team. We built the product, sold it, deployed it, and renewed the licenses. From being an engineer to actually making that product working for a customer, that's something which I see is a big achievement," says Saurabh.

Saurabh also feels that the biggest challenge for CTOs (Chief Technology Officer) today is to keep themselves acquainted with exponential technology growth and scaling systems, architecture and people on a regular basis. Team collaboration, setting up priorities, handing tech debt, and making the team of techies learn, unlearn and relearn with changing tech landscape are the key challenges which come with the profile.

From handling things with the first-principle approach and understanding business requirements well, he finds that the biggest reason why people make things happen is their attitude. With cricketer Sachin Tendulker as his role model, he believes the essence of being successful is to be focused on the end goal and keep trying.

At PolicyBazaar, Saurabh is currently looking at bringing tech

to the service side of insurance, managing risks, and bringing in hybrid modes of operation to deal with the disconnects that consumers feel in the physical versus virtual world with a focus on data science and machine learning (ML). There are also plans to introduce voice and video-recognition based KYC (know your customer) and more such tech efficiencies to improve the systems.

Advice to techies

"The most important thing today's techies miss is having a career road map and focusing more on acquiring skills rather than financial gains. Keep on trying until you find something you like doing, have a vision, and then stick to your goals. For some people it happens in their 20s, for some people it might happen in their 40s or even their 50s. So, stay focused and do the best that you can do. This is the mantra that I always had close to my heart."

SHANTANU PREETAM

Key achievement(s):

From inventory management, first-mile, middle-mile, item and logistics to last-mile delivery applications, drove the core strategy at Walmart; now leading an instrumental role at HRtech unicorn Apna

Known as:

CTO, Apna

Shantanu Preetam is a firm believer in the mantra that while 'doing what' enables us to be present-ready, 'learning how' enables us to be future-ready. From opening up his father's car's tape recorder to understanding AC/DC in 8th standard, to getting his first tryst with Assembly Language Programming during engineering, to spending more than a decade as a principal architect in tech, to starting his new innings in a management role with Apna.co — Shantanu's entire career trajectory has been guided by the same principle.

"I joined GE in 1997 as part of college campus placement and haven't turned back ever since. It's (been) 25 years of relentless programming, learning software fundamentals and I will continue to do it," he says.

As CTO (chief technology officer) at Apna, Shantanu is now influencing the solutioning space, mentoring the engineering team to achieve the business goals coupled with the best of the engineering mindset and thought process. Prior to Apna, he has worked with organisations such as PayU, Walmart, Yahoo, Dell, TriVium Systems and GE.

As he reminisced, at GE one of his proud achievements was creating a worker allocation algorithm, which can pull data from factories across India and save more than two-three hours the team spent daily in strategising availability of workers and orders for the day. This was built in COBOL back in 1997 and similar to how machine learning (ML) and big data algorithms function today.

Shantanu believes that one of his key learnings during his career is that only problems are complex, however, their solutions must be simple. And engineering alone is not good enough to make a product robust or an organisation successful. There needs to be smooth cross-functional collaboration as well. As techies, we need to build systems which are scalable, sustainable, agile and adaptable to incorporate any changes at scale at a lower cost.

He further emphasises that while the job role of a software engineer may look highly rewarding from outside, in essence it is very demanding in terms of continuously adapting to changes as well as keeping the existing functions up and running. It is basically science in implementation and one needs to be accurate to get business decisions built on top of the solution created.

Advice to techies

"First, never ignore the first symptoms of errors. Keep reading and applying that learning. Also, take pride in engineering and be passionate about your work. Today, technology has come to a level where we can enable people to learn different things.

But we need this innate attribute — a willingness to learn and an ability to gel with the team. Also, being in senior positions, take ownership and be accountable. Today's CTOs cannot be just boardroom advisors and must follow a hands-on approach with the team and learn to don many hats to become a true visionary and a leader in true sense," Shantanu advises.

SHASHANK KUMAR

Key achievement(s):

Built the core technology stack for Razorpay, starting from simple payment gateway for small business to an end-to-end financial management suite

Known as:

Co-Founder and CTO, Razorpay

A decade back, this computer science engineer from IIT-Roorkee sparked the disruption of payment gateways in India by asking himself a simple question —"Why isn't anyone solving for payments?"

With zero background in financial services and a degree in computer science engineering, Shashank Kumar, Co-founder and CTO (chief technology officer) at Razorpay had hardly anticipated the challenges he would face stepping into the fintech space.

Nevertheless, he, along with his Co-founder Harshil Mathur, went on to create a full-stack platform for small businesses, offering them everything from payroll products and neobanking to corporate credit cards, insurance and international payments gateway. All it took was a leap of faith, lots of experimenting, risk-taking and, of course, the founder's constant urge to meddle with new technologies and create scalable solutions.

For Shashank, writing a programme and doing complex coding has been fascinating since his teens. At the age of 12, he had executed BASIC programmes, even built a few games, trained in JavaScript and built an HTML calculator on Javascript on his own. A technical architect was in the making early on.

During his IIT-Roorkee days, he started a technology community called SDSLabs, which went on to build numerous software applications for intranet, and automation for software downloading and continues to groom developers at the institution today.

Shashank reminisces how Razorpay was ***"just a by-product of brainstorming sessions between Harshil — who was just out of college — and him, who was enjoying a high-flyer life in the US [sic]".*** The duo had encountered a problem with digital payments while working on a side project and decided to solve it.

In 2013, Shashank quit his job at Microsoft. Together with Harshil, he started working on the product — unnamed at the time, and formally launched in October 2014, making Razorpay the first payment gateway that accelerated ID verification digitally - within 30 minutes. But the real trump card was when Razorpay received funding from Y Combinator in March 2015.

"The thought process was: how do we make payments simpler for startups? The number of startups was only growing, and digitisation was taking off. It was a problem for India that needed a solution."

There will never be a right time or right age, you do it because you want to and are excited enough to solve a problem, says the techie, who takes pride in the fact that Razorpay's first-ever architecture was still in place until 2018. Even though Razorpay 2.0 was launched in mid-2017 with a complete tech makeover, the core architecture has remained the same. In its second innings, however, Razorpay, which was only a simple payment gateway earlier, became an end-to-end financial management suite.

"Payments is a very technical product, and we had to be top-notch. When I wrote the maiden platform, I wrote it twice and trashed it. The third time, it started to work and move ahead," Shashank says.

Subsequently, Shashank went on to build more products like Smart Collect (virtual wallets), Subscriptions, Invoices, Razorpay X (A neo-banking platform), Razorpay Capital (a lending arm), Flash Checkout and much more.

At a valuation of $7.5 billion, the Bengaluru-headquartered startup is a market leader in payments processing in India. Of the 42 startups that have become unicorns in India this year, 34 of them use Razorpay.

A fan of longevity, Shashank is proud of building an agile product with a vision of the next five years in mind.

Advice to techies

The leader encourages fellow techies to trust their gut and put that idea into action!

"The most successful entrepreneurs have stumbled in their journeys and that's absolutely okay! What truly matters is to keep an open mind, be persistent and learn from failures. What matters is that you have a problem at hand that you are passionate about solving – that gets you excited and keeps you going," he advises.

TANYA RAGHUVANSHI

Key achievement(s):

Worked as senior software engineer at McAfee; built a new ML-based product Winnow at Interra Systems; now building robots designed to work with humans at Peer Robotics

Known as:

Co-founder and CTO, Peer Robotics

Tanya Raghuvanshi, the 29-year-old Co-founder and CTO (chief technology officer) at Peer Robotics, has been looking forward to organising interactive sessions with students from various schools and a spectrum of ages at the Robotics club at IIT (Indian Institute of Technology) Delhi, since the past 12 years. The main objective is to develop interest among students in new emerging fields and give them hands-on experience in building robots.

Tanya's interest and passion in robotics goes way back to her graduation days at IIT-Delhi. So much so, even after 12 years, the techie continues to go back to the classroom to spur discussions among the young generation.

An army kid, Tanya was fond of dismantling and assembling mobile phones and other electrical bits and bobs. It was only in IIT-Delhi, while pursuing a dual degree in Electrical and Information and Communication technology, that her obsession with robotics began.

As a student, she demonstrated a dynamic wireless robot with its drive controlled dynamically by eight basic hand gestures, as a part of her engineering project. She even programmed PIC controllers (electronic circuits) for gesture recognition, drive control and wireless communication, and developed algorithms and techniques in computer vision, for identification of identical objects, for pick-up using robotic manipulators, in an industrial set-up.

Following her MTech (Master of Technology), Tanya went on to work as a senior software engineer at McAfee and later on at Inter Systems. She worked on a new product Winnow at Interra Systems which was a Machine Learning-based product for the detection of restricted videos (violent or explicit).

"With myself as an initial single member, the team grew to a big 10-member team. It later also won the Digital Media World 2018 award in the category of QC/QA," says Tanya.

After working in machine vision, Tanya launched Peer Robotics

in 2019 with her college junior, Rishabh Agarwal.

"We want to build robots designed to work with humans. Collaboration is going to be the future," says Tanya. Gurgaon-based Peer Robotics is building out a suite of Collaborative Mobile Robots (CMR) which provides an easier, flexible and cost efficient way to integrate and deploy mobile robots.

With use-cases in manufacturing, warehousing and healthcare sectors, the platform is currently live with paid PoCs (Proof of Concepts). Their adaptable mobile robots are already deployed in companies like Maruti at a time when industrial automation is rapidly evolving.

The company is making robots that understand force detection and human environment better than all the rigid robots Tanya had previously worked with.

SPECIAL MENTIONS

Abhinav Asthana
Co-founder and CEO,
Postman

Dale Vaz
CTO,
Swiggy

Sanjeev Barnwal
Co-founder and CTO,
Meesho

ABHINAV ASTHANA

Key achievement(s):

Built the new version of the Chrome app offering advanced testing features in Postman

Known as:

Co-founder and CEO, Postman

Founded by Abhinav Asthana, Ankit Sobti and Abhijit Kane in 2014, the San Francisco-headquartered Postman is a collaboration platform for Application Programming Interface (API) development, used by 10 million developers and 500,000 companies worldwide.

Ever since the inception of the software-as-a-service (SaaS) platform, it has been Abhinav's mission to streamline the entire API development cycle—designing, documenting, monitoring and publishing.

The tryst with computers happened early on for the Co-founder and CTO of Postman who charted a journey from Basti (near Gorakhpur in Uttar Pradesh) to Silicon Valley when he was introduced to computers courtesy his civil engineer father. By Class 8, Abhinav was able to build an entire web application all by himself.

The voracious reader of the history of computers, the building of Apple 2, the lives of Steve Wozniac, Bill Gates and people who created programming languages, cleared BITSAT (BITS Admission Test) in his first attempt in Class 12.

Just before his admission, Abhinav signed up for a PHP bulletin board-based forum called BITSZone at BITS (Birla Institute of Technology and Science) Pilani's Goa campus.

In his first year, Abhinav, along with a few friends, built a viewer letting users scroll through a high-res panorama. This was before the advent of Google Street View.

Since it was a 360-degree panorama, the team named it BITS360. In his second year of college, Abhinav and three of his friends formed GrayScale, and one of the things they built was ExamCrunch, which was like Quora for students planning to do an MS (Master of Science) or a PhD (Doctor of Philosophy) in the US.

Later, Abhinav refused campus placement as he was keen on building BITS360.

Abhinav shares, ***"We had built a viewer for panoramas in 2006. But the creation of panoramas was itself a problem. We thought we could build a better stitching system combined with a better viewing and sharing system. We wanted to build a community of panorama takers who would go out and capture the world around them and build a crowd-sourced street view (owned by Google). We fundamentally believed that the approach of driving a car—what Street View did—around isn't good enough."***

He and his team built a set of systems and algorithms that would allow people to effectively map the world around them. With this idea they raised $400,000 in seed funding and called their company Teliportme (drawing on the growing smartphone buzz).

Abhinav wrote an early version of Postman as an open-source tool and put it up on the Chrome WebStore. This was when he saw that managing API (testing and debugging) was becoming a challenging task.

He got an invite from the Chrome team in the Bay area working on the new Chrome app platform (Postman existed as a Chrome app). The Chrome team needed a new version of Postman because they were trying to position it as a competitor to native apps. Abhinav decided to rewrite Postman and build it further. He built the new version of the Chrome app with an in-app fee of $10 which would give users advanced testing features in Postman.

Abhinav says, ***"Being API-first, you insulate yourself from any changes that happen in the technology industry going forward."***

Advice to techies

Abinav would like to divide the current crop of developers into two kinds: the "curious lot" who know the fundamentals well. The other kind is the confused lot "who try out all the latest technologies to beef up their resumes, but can't figure out which one to go after". Abhinav also pointed out how companies are also part of the problem because they filter resumes based on keywords and buzzwords.

DALE VAZ

Key achievement(s):

After building the different tech functions at Amazon, Dale is known for building the AI engines behind Swiggy

Known as:

CTO, Swiggy

At Swiggy, Dale Vaz has been helping the Bengaluru-based foodtech unicorn tech platform scale to become a strong hyperlocal delivery platform that goes beyond food. Prior to joining Swiggy in 2018, Dale was with the e-commerce giant Amazon for 11 years, where he led different functions across data engineering, mobile engineering, consumer tech, new initiatives, and payments engineering.

"I have worked with a wide range of software-based technologies starting from the Mainframe through mobile-based software products. Through this journey, I have seen technology evolve from simple forms and UI (user interface) that were used primarily as reporting/data entry tools, to complex workflows and interaction models that are automating business processes and delivering innovative customer experiences," says Dale.

But if you look at the rear view mirror, Dale's interest in computers started back when he was in high school.

"My elder brother had just been given an MS-DOS x386 PC, and I was instantly fascinated by computer games. I taught myself Basic and C programming languages with the hope of writing my own software game. While I never did build a computer game, I was hooked by the combination of science and creativity that is involved in building software. When the IT (information technology) sector started emerging in India, I was fortunate to be at the right place at the right time, and my passion became my career," says Dale.

Now at Swiggy apart from working to build a strong tech stack to support all kinds of delivery, Dale and the team are now also looking to transform the platform into an artificial intelligence (AI)-first product.

However, with any change come challenges, while Swiggy planned and worked towards those changes from end of 2017 onwards, by and large organisations do take time adapting and adopting to new emerging technologies.

According to Dale, some of the biggest challenges in adoption emerging technology include:

- Legacy infrastructure and technology - Adopting emerging technology is harder for organisations that have invested in existing legacy technology. Migrating to new technology is a challenge since it involves significant risk, time and cost in replacing legacy software with its complexity of business rules, workflows and encoded tribal knowledge
- Legacy organisation structures and roles - Technology can often change the way organisations work, making certain roles redundant while creating new ones. This will require re-skilling workforce and investing in creating new structures and roles that are designed to leverage technology
- Limited tech talent to build and operate systems using emerging technology

Tech talent in India has evolved significantly over the last few years. We have expanded our tech capabilities from software services to product engineering, with strong skills in mobile development, large-scale distributed systems, big data and AI.

According to Dale, some of the transformational technology trends include robotics, intelligent humanoids, space exploration, cleaner energy to reverse climate change, AR (alternative reality)/VR (virtual reality) for communication and genome-based cures for terminal diseases, to name a few.

Dale believes with time, humans will increasingly leverage intelligent machines to perform complex tasks that can be learned through analysis of data.

"As AI evolves and becomes more sophisticated, machine intelligence will provide us with unparalleled convenience and a better quality of life. From automated drones delivering critical supplies to robotic arms performing complex life-threatening surgeries, to assisted living through humanoids, intelligent machines will elevate our quality of life. AI will also transform businesses, redefining traditional industries into leaner, more efficient corporations that are networked and interconnected with the larger ecosystem across boundaries of geography and language," he says.

Advice to techies

"Technology has always been a part of humankind, going back to ancient times when humans leveraged science to achieve herculean feats such as building Stonehenge or the Pyramids. Over the ages, technology has evolved, but more importantly become accessible to the masses. Today, we use technology in every aspect of our daily lives. I believe that we are just starting to scratch the surface of how technology will change the world and how we live in it."

SANJEEV BARNWAL

Key achievement(s):

Launching and pivoting Meesho as the social commerce and ecommerce giant, and accelerating access to earnings for women across India

Known as:

Co-founder and CTO, Meesho

Sanjeev Barnwal, Co-founder and Chief Technology Officer (CTO), Meesho, charted a journey from a small town in Jharkhand to IIT-Delhi, then Tokyo before starting up in India. A journey that began with his love for technology culminated in the birth of Meesho, the solution that was waiting in the wings for millions of resellers and emerging brands in India.

Before Meesho, and everything that preceded it, an 18-year-old Sanjeev took a gap year after school to undertake the Kota pilgrimage believed to be made by every IIT (Indian Institute of Technology) hopeful. He made it to IIT-Delhi right after, and pursued Electrical Engineering.

"I knew I wanted to do engineering, and not biology. And the best place for engineering is IIT. If I do anything, I want to be the best at it. And that is why I even took a year off," he says.

Sanjeev, however, notes that engineering just happened to be the most obvious answer for him as he could not think of anything else he wanted to do with his life.

"I got into engineering because that was the option I knew and was aware of. It was a choice by exclusion. My life was not that difficult and anyway things become easier when you get into an IIT. And because my brother was older, he provided me with a lot of guidance. My family was aware that I had to make sure that education was very important," he shares.

Post-IIT, Sanjeev joined Sony in Japan. He was a part of the core tech team that developed the company's digital single-lens reflex camera (DSLR), and Sony's Cyber-shot cameras.

In 2015, while he was still in Tokyo, he sparked interest among a few Indian startups that wanted him to help them with natural language processing (NLP). This made Sanjeev realise that the startup ecosystem in India had arrived.

"So I called Vidit [Aatrey], my batchmate from IIT Delhi. We were in the same department and hostel back then. Luckily, he

was in Bengaluru, at InMobi. I called to ask about the startup that was interested in hiring me. He instead said, 'Why would you join a startup? Let's start one of our own'. So, in a month or so, we decided to go ahead and build something on our own. Both of us resigned from our jobs and I got back to India in June 2015. But even at that point, the idea for the startup was not finalised," Sanjeev recalls.

The initial idea for the two friends was a fashion marketplace: the platform would remap all the shops and then customers could use the app to try the product before they purchased it. But the idea didn't take off.

It was then that Meesho was born. In late 2015, Meesho shaped up in a small two-bedroom apartment in Koramangala, Bengaluru. Sanjeev and Vidit's first desk was a dining table.

Today, Meesho is one of India's fastest growing internet commerce platforms. With a vision to enable 100 million small businesses, including individual entrepreneurs, to succeed online, Meesho is democratising internet commerce and bringing a range of products and new customers online.

The Meesho marketplace provides small businesses — SMBs (small and medium-sized businesses), MSMEs (micro, small and medium enterprises) and individual entrepreneurs — access to millions of customers, selection from over 700+ categories, pan-India logistics, payment services and customer support capabilities to efficiently run their businesses on the Meesho ecosystem.

Advice to techies

"There are two things: First, ask yourself if you really want to start up. Your life changes a lot, and if you want to build something big and really impactful, forget everything else. Think before you start up with an idea. Get a feel of it by working on a side project with friends, and figure out if entrepreneurship is for you. And second, as a techie, get out of your cubicle and meet the customer."

The Evolution of Computer Science Education

Sreekrishnan Venkateswaran
CTO - Kyndryl India

When I was a student over a quarter of a century ago, Computer Science education was about learning finite automata, intractability, formal language theory, compilers and assemblers. They taught us the Turing Test, the Halting Problem and Russell's Paradox. We grappled with the Eight Queen problem and negotiated the Knight's Tour in our programming labs; we were asked to design compilers for hypothetical programming languages for our semester projects.

Lazy evaluations and Greedy approaches were well-known algorithmic paradigms; no one would misunderstand them to be human behavioural patterns! Getting industry-ready for a computer science student meant acquiring the ability to develop and debug Operating System (OS) code and design look-ahead parsers.

Campus interview questions would entail designing fast-performing system software algorithms or a scholarly comparison of programming languages.

During my Master's, when our department purchased new DEC Alpha systems for the computer lab, we had to cross-compile the compiler before we could start indulging in our programming experiments. We were just figuring out what the Internet was, so we neither had to attend courses on social network analysis nor master the Web. And because the online learning economy would not be born for another 15 years, we had to pay attention to what our professors were expounding in class.

When I joined my first job from the campus, I found high-quality alignment between what we had been taught and the customer projects that we were assigned to. We had to, for example, contend with the Dining Philosophers Problem when doing kernel programming, and apply graph theory to optimally traverse network routing tables. We did 'C' programming to code Linux device drivers, developed firmware for OS-less devices in assembly language, and wrote VHDL code to optimise software partitioning between the hardware chipset and the Operating System. My life revolved around kernel debuggers, logic analysers and oscilloscopes as we did software-hardware co-design for embedded systems. The company's University Relations programme leveraged campus industry labs to test our network protocol code for interoperability with systems built by other vendors.

Circa 2010: Sands started to shift. Software started touching every facet of life. OS internals, deeply embedded firmware, and system software became outliers. Application development

turned mainstream. The demand for designing complex user-centric software started outpacing requirements for engineering system software. API Economy took root as a technology design point as the world economy digitised across industries and sectors. Cloud computing, as-a-service consumption, and pay-as-you-go billing started changing information technology.

Artificial Intelligence (AI), Machine Learning (ML) and data science had been in existence for decades. Neural Networks had been around since the 1940s, logistic regression was formulated in the 1950s, statistical models and distributions came centuries ago. But the time had finally arrived for their adoption to explode, thanks to the new-found ease of consumption. Most popular programming languages implemented AI/ML libraries, and they could be delivered through massive yet affordable compute power on the cloud. Smart phones brought a profusion of AI/ML use cases to real-world applications.

People-centric problem solving needs, thus far surpassed system-centric demands. Scalability requirements hence expanded exponentially. Abstraction for easy use and reuse of software also became maximalist. A programmer needed to only know API specifications in order to leverage the technology in question. Software systems became integration-friendly by design, opening up new possibilities.

Platform-as-a-Service and library modules came of age. They masked the theory and the design of complex algorithms, encapsulated the intrinsic, and enveloped it with an interface engineered for easy consumption and portability. You no longer designed code to concurrently search billions of distributed records in the blink of an eye; instead, you used the best-available-fit existing service as your starting point. You didn't have to write an ML model when you needed to automatically track moving objects from a live video feed in real time; rather, you chose from existing models that your favourite programming language supported as importable modules, trained the chosen model with datasets that you could find or buy, and tweaked parameters until you reached acceptable performance.

All these signalled a paradigm shift in computer science education. Universities started adjusting curricula to minimise the ensuing angle of deviation between academics and industry. Simultaneously, Massive Open Online Courses (MOOC) further democratised software skilling and demystified AI usage, though not the core intrinsic of the technology.

Simultaneously, a new dimension entered computer science education, the notion of Return on Investment (RoI). Business was no longer the bounded domain of management graduates. Engineers were now expected to innovate with cost-awareness because of two reasons. First, with the ease of as-you-go consumption of the Cloud and the API Economy, it became easy for spending to exceed budgets. Second, the pressure from stock markets in the new-age economy and the explosion of start-up ecosystems seeking to quickly monetize technology. Delivering in real time while performing longer-term research now had to go at a ratio that would keep investors happy.

This is not to suggest that core computer science theory and research is diminishing in real terms. They are growing indeed. It is not uncommon to see a blockchain engineer model failure-safety after, say, the Byzantine Generals Problem. Or to listen to a distributed applications programmer algorithmically worry about the consistency and durability of a financial transaction. In percentage terms, however, the quantum of user-centric engineering and application work has decisively overtaken core computer science and system software functions today.

Any 35-year career cycle is unlikely to be monotonic. Some fluctuations and at least a couple of disruptions are near-certain. However, basic skills usually endure. Whether you code in Python or JavaScript or C, you can connect your work to principles of programming languages if you look one level deeper. Whether you perform core work developing a new ML model or ancillary processing around an existing model to solve a real-world problem, Donald Knuth's Art of Computer Programming is likely to be relevant. Dijkstra's shortest path algorithm is as relevant to google maps and to help chart flight paths as it has been to network routing.

Charles Darwin theorised that it is not the strongest species that survive, but the most adaptable ones. A combination of mastery of basic skills and the propensity to adapt and transform will help not just survive a long career in technology, but to thrive and flourish!

ACKNOWLEDGEMENTS

Future of Work – India's Largest product-tech-services-design conference – is a YourStory initiative to bring together the best minds in product, tech, services & design for the most decisive, action-able insights and connections to equip organisations and leaders to better predict and prepare for the future of work.

YourStory Media Private Limited is India's leading digital platform for positive, inspirational stories of change-makersand entrepreneurs across India.

Produced by

Key contributors - Sindhu Kashyap, Meha Agarwal, Sanhati Banerjee, Naina Sood, Naga Nagaraju and Tanishq Vaadi

Edited by - Ramarko Sengupta

Design - Aditya Ranade and Anubhav Anurag