CANARA ENGINEERING COLLEGE

Department of CSE

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DEPARTMENT VISION

To be recognized as a center of knowledge dissimilation in Computer Science and Engineering by imparting value-added education to transform budding minds into competent computer professionals.

DEPARTMENT MISSION

- Provide a learning environment enriched with ethics that helps in enhancing problem solving skills of students and, cater to the needs of the society and industry.
- Expose the students to cutting-edge technologies and state-of-the-art tools in the many areas of Computer Science & Engineering.
- Create opportunities for all round development of students through co-curricular and extra-curricular activities.
- Promote research, innovation and development activities among staff and students.

PROGRAM EDUCATIONAL OBJECTIVES

- Graduates will work productively as computer science engineers exhibiting ethical qualities and leadership roles in multi-disciplinary teams.
- Graduates will adapt to the changing technologies, tools and societal requirements.
- Graduates will design and deploy software that meets the needs of individuals and the industries.
- Graduates will take up higher education and/or be associated with the field so that they can keep themselves abreast of Research & Development.

PROGRAM OUTCOMES

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Select/Create and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling to complex engineering activities, taking comprehensive cognizance of their limitations.

6. **The Engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the relevant scientific and/or engineering practices.

9. **Individual and team work:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with the society-at- large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for and above have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological changes.

PROGRAM SPECIFIC OUTCOMES

a. Computer System Design: Ability to apply the knowledge of computer system design principles in building system software and hardware components.

b. Computer Communication and Internet Applications: Ability to apply knowledge of layered network Models, their protocols and technologies in building network and Internet based applications.

c. Solve Computational Problems: Apply the theoretical foundations of computer science in modeling and developing solutions to the real world problems.

d. Software System Design and Development: Design and develop the application software systems that meet the automation needs of society and industry.

Innovations that made the Engineer's proud

1. Memory-processing unit could bring Memristors to the masses.

Date: July 30, 2018 *Source: University of Michigan*

Summary: A new way of arranging advanced computer components called **memristors** on a chip could enable them to be used for general computing, which could cut energy consumption by a factor of 100

This would improve performance in low power environments such as smart-phones or make for more efficient supercomputers, says a University of Michigan researcher.

"Historically, the semiconductor industry has improved performance by making devices faster. But although the processors and memories are very fast, they can't be efficient because they have to wait for data to come in and out," said Wei Lu, U-M professor of electrical and computer engineering and co-founder of memristor start up Crossbar Inc.

However, unlike ordinary bits, which are 1 or 0, memristors can have resistances that are on a continuum. Some applications, such as computing that mimics the brain (neuromorphic), take advantage of the analog nature of memristors. But for ordinary computing, trying to differentiate among small variations in the current passing through a memristor device is not precise enough for numerical calculations.

Computers with these new blocks, which the researchers call "memory-processing units," could be particularly useful for implementing machine learning and artificial intelligence algorithms. They are also well suited to tasks that are based on matrix operations, such as simulations used for weather prediction. The simplest mathematical matrices, akin to tables with rows and columns of numbers, can map directly onto the grid of memristors.

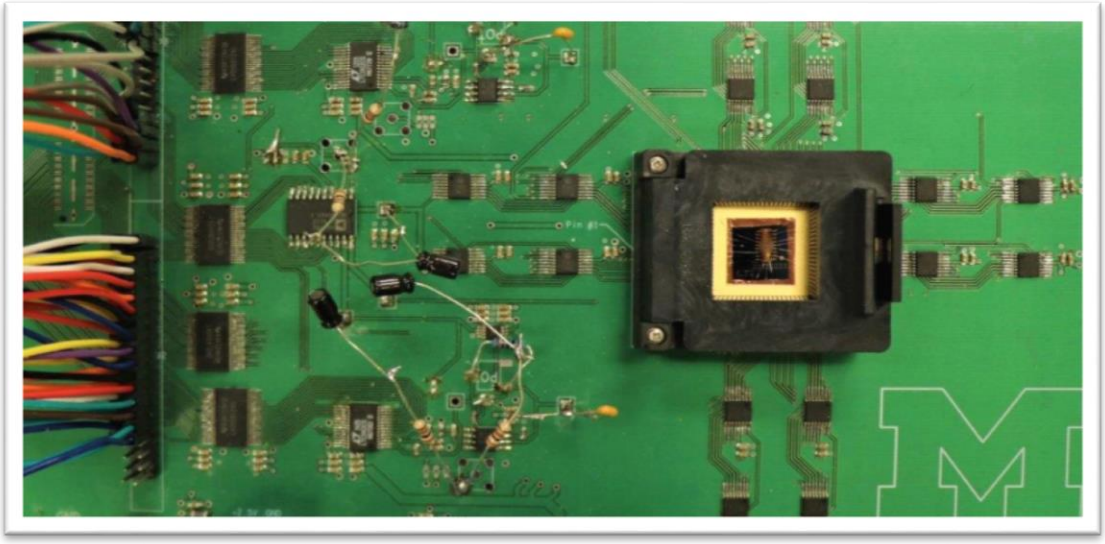


Fig1.Memristor array situated on a circuit board.

Credit: Mohammed Zidan, Nanoelectronics group, University of Michigan.

Amazing Facts:

"The place where Bill Gates resides was designed using Mac-quintosh computers"

2. A kernel of promise in popcorn-powered robots

Date: August 2, 2018 *Source:* Cornell University

Summary: Researchers have discovered how to power simple robots with a novel substance that, when heated, can expand more than 10 times in size, change its viscosity by a factor of 10 and transition from regular to highly irregular granules with surprising force. You can also eat it with a little butter and salt.

Fig 2.A soft robotic device powered by popcorn, constructed by researches in Cornell's Collective Embodied Intelligence Lab.(Credit: Image courtesy of Cornell University.)

You can also eat it with a little butter and salt.

"Popcorn-Driven Robotic Actuators," a recent paper co-authored by Steven Ceron, mechanical engineering doctoral student, and Kirstin H. Petersen, assistant professor of electrical and computer engineering, examines how popcorn's unique qualities can power inexpensive robotic devices that grip, expand or change rigidity.

The study is the first to consider powering robots with popcorn, which is inexpensive, readily available, biodegradable and of course, edible. Since kernels can expand rapidly, exerting force and motion when heated, they could potentially power miniature jumping robots. Edible devices could be ingested for medical procedures. The mix of hard, unpopped granules and lighter popped corn could replace fluids in soft robots without the need for air pumps or compressors.

"Pumps and compressors tend to be more expensive, and they add a lot of weight and expense to your robot," said Ceron, the paper's lead author. "With popcorn, in some of the demonstrations that we showed, you just need to apply voltage to get the kernels to pop, so it would take all the bulky and expensive parts out of the robots."

Amazing facts:

1. An average person normally blinks 20 times a minute, but when using a computer he/she blinks only 7 times a minute.

2. The first ever hard disk drive was made in 1979, and could hold only 5MB of data.

3. The first 1GB hard disk drive was announced in 1980 which weighed about 550 pounds, and had a price tag of $40,000.

4. More than 80% of the emails sent daily are spams.

5. A group of 12 engineers designed IBM PC and they were called as “The Dirty Dozen”.

Trending technologies

1. Artificial Intelligence Will Take a Leap Forward, without Human Data.

2017 was the year that AlphaGo Zero taught itself the game of Go and within 40 days became better than any human or artificial player ever existed. It did so without any human data as input and purely played against itself. As a result, it taught itself strategies and moves no human has ever thought of and arguably progressed the

evolution of the game of Go exponentially in a very short timeframe. This achievement marks a significant milestone in the development of artificial intelligence.

In 2018, this will only continue and we will see more examples of artificial intelligence that will behave in unexpected ways, as it already did so this year. In 2017, for example, AI developers from Google built algorithms that had to compete for scarce resources, resulting in increasingly advanced strategies to beat the component. Google Brain developed algorithms that created new encryption methods, unlike any seen before, to protect information from other neural networks. Finally, Facebook had to shut down two algorithms that created its own secret language, unsolicited and used advanced strategies to get what it wanted. If one thing becomes clear from these developments, it is that artificial intelligence will be fundamentally different to human intelligence.

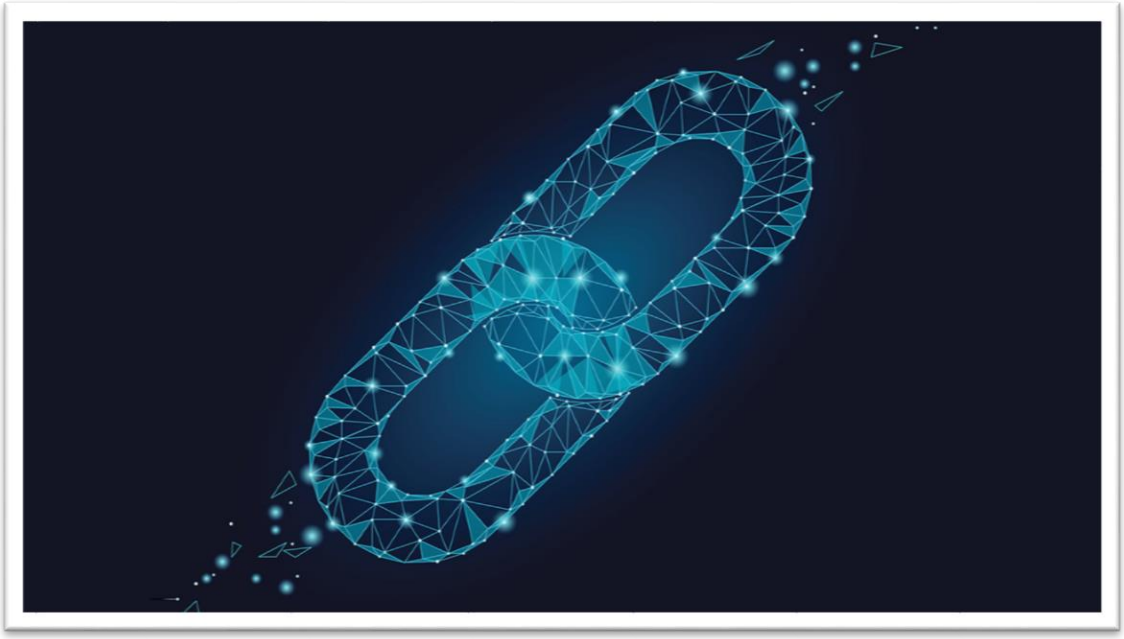
With the AI arms race in full swing, governments and organisations are increasing their investments in the development of ever more intelligent AI. In September 2017, Putin said that "whoever becomes the leader in this sphere will become the ruler of the world", signalling that Russia will intensify its AI activities. On the other side of the world, China aims to outsmart the USA in AI, with Europe unfortunately nowhere to be seen. The AI arms race seriously scares well-known entrepreneurs such as Elon Musk and Stephen Hawking and a solution for the existential threat of AI is still far away.

Amazing facts:

1. The original name of windows was Interface Manager.

2. The first microprocessor created by Intel was the 4004. It was designed for a calculator, and in that time nobody imagined where it would lead.

2. Block chain Will Mature and the ICO Hype Will Slow Down due to Regulation



Last year, it was predicted that 2017 would see smart contracts taking off. And so they did, although not in the area that it was originally expected. Last year, smart contracts were predominantly used for Initial Coin Offerings (ICOs). The hype around ICOs has amazed many and as of the end of November, 228 ICOs raised a total of $3.6 billion. Apart from many successes, there were also many scams and people who tried to game the system and rob people of their money.

Apart from more mainstream ICOs, 2018 will also see the first true Blockchain applications that will be used by consumers and organisations, where those using the services not necessarily know that they use Blockchain technology. After all, for Blockchain to become mainstream, it has to become as pervasive as the internet. Consumers do not know how Amazon or Facebook works, but they are more than happy to use it. That is what is required for Blockchain technology, or distributed ledger technology, to have a real impact on organisations and society.

2018 will see more applications being developed and launched, of which many of these by the companies that did do an ICO in 2017. It will move Blockchain towards maturity. All in all, 2018 will be a very interesting year in terms of Blockchain.

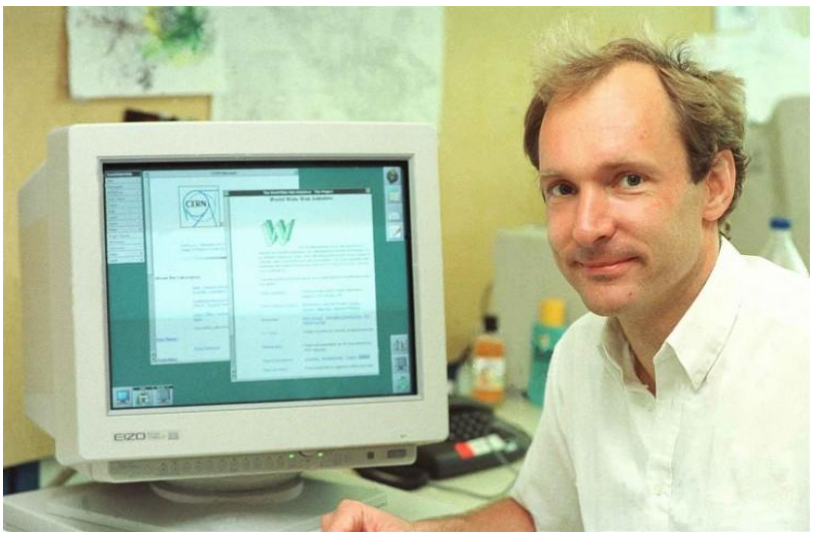
Amazing facts:

1. IBM 5120 from 1980 was the heaviest desktop computer ever made. It weighed about 105 pounds, not including the 130 pounds external floppy drive.

2. Genesis Device demonstration video in Star Trek II: The Wrath of Khan was the the first entirely computer generated movie sequence in the history of cinema. That studio later becomes Pixar.

Renowned personality

Berners-lee Inventor of World Wide Web



Sir Timothy John Berners-Lee

Berners-Lee had a career more or less divided into two phases. In the first, he attended Oxford; worked at the European Organization for Nuclear Research (CERN);

and then, in 1989, came up with the idea that eventually became the Web.Tim Berners-Lee is the man who created the World Wide Web. Tim Berners-Lee is a British Computer Scientist who enabled a system to be able to view web pages, known as hypertext documents, through the internet. Tim Berners-Lee also serves as a Director of the World Wide Web Consortium, W3C. W3C oversees the standards of the web.Tim Berners-Lee was born on the 8th June 1955 in London. He completed his A-levels at Emanuel School after which he went to Queens College, Oxford.At Oxford he successfully completed his physics degree gaining a first-class degree in 1976. After his time at Oxford, he started working for a printing firm in Poole.In 1980, Tim Berners-Lee began working at CERN in Switzerland. His time at CERN required him to share information between researchers across the world. He suggested using hypertext, a language used for sharing text electronically, to do the job. With this in mind, he began to create his first prototype called ENQUIRE. Tim Berners-Lee himself has said of these early days, that all the technology involved in the Internet was already in place. And so it was in 1990, with the help of Robert Cailliau, that the first version of the World Wide Web was launched. It came complete with the very first web page, web browser, and server.

As Tim Berners-Lee himself says on the matter:-

"*I just had to take the hypertext idea and connect it to the TCP and DNS ideas and — ta-da!— the World Wide Web*."

Tim Berners-Lee helped found the W3C in 1994 at the Laboratory of Computer Science (LCS) at MIT, Boston. W3C had one simple, if not critically important role, to try to improve the quality and standard of the World Wide Web. Such a ground breaking creation could easily have made him a very rich man. Seeing the potential for the future of humanity he offered it to the world with no patent or royalties of any kind. That's incredibly generous.

Tim Berners-Lee believes if he hadn't, someone else would have come up with it further down the line. It is not unusual to find him referencing others who were involved in the creation of the World Wide Web.

By October of 1990, Tim had written the three fundamental technologies that remain the foundation of today’s web

- HTML: Hyper Text Markup Language. The markup (formatting) language for the web.
- URL: Uniform Resource Locater. A kind of “address” that is unique and used to identify to each resource on the web.
- HTTP: Hypertext Transfer Protocol. Allows for the retrieval of linked resources from across the web.

Tim also wrote the first web page editor/browser (“ WorldWideWeb.app ”) and the first web server . By the end of 1990, the first web page was served on the open internet, and in 1991, people outside of CERN were invited to join this new web community.

Tech Predictions

Nanobots will plug our brains straight into the cloud

Tech of the future: nanobots. He believes, that by the 2050, nanobots will plug our brains straight into the cloud3, it will give us full immersion virtual reality from within the nervous system. Just like we do know with our smartphones, we will be able to do it with our brains, we'll be able to expand our neocortex in the cloud. And forget about memory problems, evidence problems, etc.

People reincarnation through AI

Sounds scary, I know! And probably most of the religious people will be very against it, however, Kurzweil says that we will be able to "bring back" our relatives through artificial intelligence. He says that by 2050, we'll be able to send nanobots into people's brains to extract memories of loved ones. Augment that with a DNA sampling of the deceased, and it will be possible to create a convincing virtual version of somebody who's passed on. If you are interested in it, there is a movie about it: the discovery.

AI will become a positive net job motivator

Many people worry about AI in our lives as they think that at the end robots will replace people and we won't have jobs for is. But. according to Forbes, In 2020, AI will become a positive net job motivator, creating 2.3M jobs while eliminating only 1.8M jobs. And we are talking about 2020, just in 2 years, so let's see what opportunities it can bring us in 30 years.

Space tourism: a week in orbit

According to Business Insider, Space tourism could be feasible in 21050, but likely only for the very wealthy. Rocket companies like Jeff Bezo's Blue Origin and Elon Musk's SpaceX will push the envelope with space travel enough that tourism will be feasible in the year 2050. For example, "someone who could afford to pay 100 million quid could spend a week in orbit… but it would only be for rich people in 2050." he said. "It's not going to be something that's cheap anytime soon."

Charge your iphone with the power of a plant

Did you know that you can charge your iphone with the power of a plant? Forests can become the energy stations of the future. Now it is becoming possible, for example, Bioo is a clean-tech company capable of generating electricity from plant's photosynthesis. Here you can watch a video to know more about it.

Ocean Thermal Energy can take us to 100% renewable-energy

Ocean thermal energy, is a largely untapped resource, and one of the world's largest renewable energy sources. For example, right now Bluerise is working on creating an energy breakthrough by generating utility scale electricity through Ocean thermal

energy conversion. It will be able to outcompete fossil fuel based generation and other renewable that require storage and grid balancing. It will play a crucial role in the future energy mix being one of the very few constant energy sources, available day and night, year-round.

Drone solution for discovering untouched places

Deep in underground mines, some zones are inaccessible. But company like Inkonova started to work on builds drones that fly, drive and climb and use laser technology to scan zones, and create a 3D map of them. With this advancing aerial robotics technology we will be able to push human reach to any space untouched by man-made infrastructure.

Technological advancements and their effects on humanity

Our personal life is highly dependent on the technology that people have developed. Technology has advanced with years and it has changed the way we purchase products , the way we live , the way we communicate , the way we travel , the way we learn and so many changes have been brought about by these continuous technological advancements. As people's demands and life style change, the demand for advancing the type of technology we use is high. Almost everything we use has been innovated to better standards, a good example is the "Mobile Phone ", the type of mobile phones we had in 1995 are no longer on demand in this century, the demands of mobile phone users have changed greatly, and this has resulted in the advancement of mobile phone technologies.

Users of mobile phones demand simplicity and more functionality, which has forced mobile phone manufactures to develop computer minded smart phones, which are so easy to use, but also they come with more functionality compared to the type of mobile phones we used to have in the past.

Technological advancements have helped businesses and organizations save time and cost of production, which has been an advantage to all business, they manage these advancements to gain competitive advantage. A good a example is the 3G / 4G broadband, small businesses have taken advantage of this super fast internet to reach target markets with less costs of operation.

In the past, only big successful companies would dominate the market because they could afford the expensive adverting Medias, like Television, to reach any target market. Small businesses typically don't have fat budgets and find it hard to compete in any given profitable market. Now with advanced internet technologies, a small business can use most advanced internet marketing tools with a small budget which can range from $100 – $5000 to reach over 100,000 target customers.

The effects of technological advancement are both positive and negative. Positively, technology advancement has simplified the way we do things, it saves time, it increases on production, it simplifies communication, it has improved health care and it has also improved our educational environment. Negatively , technology advancement has made humans so lazy , technology users are so dependent on new advance tech tools , this laziness has resulted into less innovation , it has increased on health risks because technology users exercise less , it has affected the environment because of the increase pollution which has affected the Ozone layers which has resulted into global warming. When it comes to **education**, students are more dependent on Calculators and **computers** to solve simple equations; in this case they cannot train their brains to solve a simple task which makes them lame in class.

Successful START-UPS

The 29 year old IIT–B Grad – Bhavish Aggarwal is the founder & CEO of India's most popular Cab Aggregator OlaCabs.OlaCabs, more popularly known as Ola, is just like any other marketplaces online, but more specifically into providing Taxi services. Ola was the collective prodigy of Bhavish Aggarwal and Ankit Bhati and was officially owned by ANI Technologies Pvt Ltd, which translated to 'Hello' in Spanish!Ola, which started as an online cab aggregator in Mumbai, now resides in the Silicon Valley of India a.k.a. Bangalore, and is also known to be one of the fastest growing businesses in India.

Coming back to the man behind Ola,simple yet charming Bhavish with the success of his prodigy has certainly become the talk of the town. But even after becoming a millionaire, he still prefers to not buy a car and take a cab (to set an example, we presume), certainly doesn't goes down well with his wife. He believes that, such is a small price that every entrepreneur has to pay.

Anyways, when not crushing his competitors, one can catch Bhavish cycling, playing squash or doing what he loves the most – photography. He also maintains a largely popular photoblog.Born in Ludhiana, Bhavish just like every other success-driven and successful entrepreneur, began at a very early age. Soon after he completed his

Bachelors in Technology (Computer Science and Engineering) from IIT – B in 2008, he started his career with Microsoft Research India as a Research Intern and later got reinstated as an Assistant Researcher.During his more than two years of stint with Microsoft, Bhavish managed to file two patents and also got three papers published in the international journals.Now what many aren't aware is that, while he was at it, he had also turned into a blogger and had founded his own prodigy called – desitech.in. Desitech was all about hosting content which was mainly focused at technologies which again were inclined towards the Indian scenario. This content was a collection of start-ups in India, events and / or any other exclusive news.Anyways, during this same time, he took the biggest decision of his life and turned his personal pain-point into his first entrepreneurial venture.

So this is how it all began!

After quitting Microsoft, Bhavish started an online company which dealt into selling of short duration tours and holidays online.That was when for the first time, he could vision the amount of potential a cab booking service could have. And after basic calculations, Bhavish changed his business from the earlier mentioned start-up to – OlaCabs.This change including the entrance of Ankit Bhati was brought about somewhere around December 2010.His solution was simply introducing a technology that bridged the gap and connected the cab owners with the computers through the Internet, telephone or a mobile phone app.On the other end, just like every starting entrepreneur, his parents too didn't support his new venture as well, and for them he was as good as a 'travel agent'. Basically a lot of pressure.But nevertheless, their support increased as they got their first round of angel investment (from Snapdeal founder Kunal Bahl, Rehan yar Khan and Anupam Mittal.).

Moving on, Bhavish's believed that anyone can have a good business idea but to function it successfully one must a scalable models upon which the business runs. According to him, the best or one of the best & safest model one can or should adopt is running a business with owning "zero" inventory.And following his own words, Ola, didn't buy even a single car and instead rented them.They went on to partner with a long range of Taxi Drivers, and all he did was added a touch of modern technology to the whole thing through which consumers could book cars at a short notice via their call centers or via their app.

How advanced technology helped him?

Simply putting it, their strategy was to leave no stone unturned; be it attending customer calls to driving a passenger to the airport while managing the operations, they did everything.

And on the other end, to woo the drivers, they used an equally unique strategy!

For the first few months, they used to pay drivers 5000/day tips + no salary. Provided they met the criteria which was that, a Driver must have completed one single trip for that given day. To add to that, the Integration Devices which they use were provided free of cost!

During that time, with a rough potential monthly income of 1.5Lakhs literally every driver, even including many part-timers did anything to get themselves attached with Ola.

As their motive was fulfilled, later this payment module was reduced to half i.e. 2500/day and then 750/day tips + salary consecutively. And now the tips would be provided only if they covered minimum 10 trips in a day.

Now clearly, the idea of cabs was not new to the Indian market, and there already were players like Fasttrack who had established themselves. There were radio Taxi services in every city of the country which used to run in the interiors as well, and you could easily find some of them at the airports and railway stations. Not to forget the car rentals and travel agencies. Basically, all of these had more or less a focus which was on similar lines.

So what made Bhavish or Ola One-up?

Bhavish very smartly had taken only cars which had an All India permit (similar to travel agencies) and used to run them both inside as well as outside the city. And then there were the unique and budgeted plans which they used to offer, to lure the customers. But more than all that or what at least on an equal note, what helped them was M-commerce (mobile). Bhavish could clearly see that, M-commerce was growing at the speed of light and would only get better in the times to come.

Hence, given this environment, it would only become far more easier for the consumer to knowledge or data without much of a hassle, merely through their Smartphone. And with the amount of connectivity this would create would only increase the convenience for the masses. Bhavish decided to capitalise on this untouched factor, and took the leverage of this growing industry.

The Present Growth

With the help of such ahead of its time & long term strategies, the company began to grow at the speed of light. By 2014, the company was now pocketing a network of more than 200,000 cars across 100 cities. Additionally, it was also clocking an average of more than 150,000 bookings per day and also was now sitting on 60% of the market share in India.Soon the company also brought about some huge developments which again, benefited them greatly. Some of these included: –

They launched their Ola Mini service in Bangalore & consecutively in Delhi (NCR) with a fleet over 250 cars and were also in preparations to grow to 800 by 2015. Their offer again was pretty unique and luring. They had started with a introductory price of Rs12/km with a base price of Rs.150 for the first six kilometres, making them the cheapest AC cab services available.

Next, by the end of the year, Ola also expanded to incorporate autos in Bangalore and also expanded this service to other cities like Delhi, Pune and Chennai.

Later, they announced their biggest news so far. OlaCabs bought TaxiForSure or TFS in March 2015 for about $200 million. Although, this wasn't their initial plan. Their initial purpose was to fill in their huge requirement of drivers and hence, they had first tried to attract their drivers by paying them some Initial Bonus + Attachment Devices Free of Cost, but since they failed, they had to buy the company to maintain their stable growth.Additionally, Ola who so far only had worked with Drivers, had now also begun working with the cab operators after the acquisition.With this acquisition in place; they also launched "Cashless Rides" which not only worked with the cabs on their network, but was also extended to "Auto rickshaws and Kaali-Peeli taxis" as well!

And lastly, Ola recently has launched “Ola Cafe”. In simple terms, through this service one can order food, grocery, vegetables etc., and get it delivered to their households.

And when you look at Ola today, it has gone on to become India’s most popular mobile app for cab booking, out-beating their competitors like Uber. To add to that, they are also the largest platform with 40,000+ cars across almost 100 cities (2015) and growing.

Talking about their funding; Ola has raised a total of $676.8 Million so far from investors like SoftBank, ABG Capital, Accel Partners, Mauritius Investments, Tiger Global Management, Matrix Partners, Steadview Capital, Sequoia Capital and DST Global. Their current valuation is roughly $3.5 Billion.