# Start

Ideate. Innovate. Inspire. JULY 2019 NEWSLETTER - ISSUE 4





The Pegasus on the cover page is located on the 11th Floor, B Block, PES University

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## **Student Contributors**

#### **Content and Research**

Kartikeya Jain Parth Krishna Rakshita M Swathi Reddy Sanjna Chaturvedi Design Samanvitha AN

Team Lead Lalitha Padmanabhan M

# From the COO's Desk

## Prof. Ajoy Kumar COO PES University



As a group of institutions pursuing academic excellence in multiple disciplines, our focus has been solutions for the real world. Our approach at PESU has been to expose students to the best faculty, state of the art infrastructure, industry-oriented research in departments, and a vibrant student community participating in activities ranging from technology to social responsibility. This has resulted in our students coming up with innovative ideas and converting the ideas into solutions.

The spirit of innovation is evident in the events on campus that showcase projects, summer programs, workshops and lectures by experts. We also have our staff who go beyond teaching and research to implement innovative methods to make learning a great experience. For instance, our staff members administer computer-based testing, a digital library of lectures and performance metrics available at all times in the app.

Innovation at PES is grounded in deep expertise. Over the years, we have developed a research framework with department-linked research domains, independent research centers and a center for interdisciplinary research. These efforts have created an environment on the campus that instils the students with the confidence to undertake projects of their interest, participate in competitions and volunteer for industry events.

Building on the confidence in one's competence and skills, the students come together to form clubs that brainstorm and collaborate to build solutions and devices. There are over forty student clubs on campus. The innovation and inventive step are very much seen in the creations of car racing enthusiasts, aero-modelling clubs or students winning in popular hackathons.

As an educational institution, we are proud of each and every one of our students and we are doing our best to help them realize their aspirations. We want to inculcate the spirit of innovation and entrepreneurship in each and every one of our students.

I am convinced that CIE is an integral part of learning for every PESU student.

Be your best in everything that you do. Wish you the very best in all your endeavours.

CIE is a great place to learn, experiment and to prepare ideas for the rough and tumble of the real world.

I look forward to seeing all of you in this interesting hub innovate solutions to industry problems in ways never thought possible.

# From the Director's Desk

## Prof. Sathya Prasad Director, CIE www.cie.pes.edu

Greetings and welcome to the 4th edition of the CIE Newsletter! It's been an exciting time between the publication of the last edition and this one with several innovation and entrepreneurship events, programs and courses being conducted.

As you know, the CIE Newsletter (content, design and layout) is completely done by students drawn from various disciplines/semesters. The previous 3 editions of CIE newsletter have garnered much praise from visiting industry professionals and faculty from institutions in India and abroad – thank you for your interest in CIE!

In this editorial, I would like to highlight the innovative elements in the design and delivery of CIE's courses that seek to enhance tech innovation and entrepreneurship.

# Student Contest sponsored by Intel Corporation at PES University (Center for Innovation & Entrepreneurship)

I'd like to share the results of an engagement between industry and academia, that was anything but cookie-cutter, to promote student tech innovation and research.

The purpose of this section is to share CIE's experiments with the design and mechanics of an industry-academia engagement. This can possibly serve as a template for further experimentation and discussion with like-minded stakeholders from the industry.

For lack of a better term, we'll call this a contest, although it is different in many ways from a 'regular' student contest. The engagement was with Intel India (Intel Corporation) and CIE at PES University as part of a broader engagement to promote tech innovation and research.

CIE strongly believes in the synergistic link between academia and industry that results in greater learning opportunities for students and hopefully, meaningful engagement for the industry. This took the form of a contest in the area of Artificial Intelligence / Machine Learning (AI/ML). The theme covered speech recognition and image processing using AI/ML, spanning the duration of the semester from Jan through May 2019. The goal was to use this contest to set up foundational elements for possible future tech innovation and research.

#### Why do we consider this CIE initiative an innovative program unlike any other student contest or hackathon?

I would like to highlight some of the differentiating factors:

1) Scope and Success Criteria (right topics with optimal breadth & depth): Intel India and CIE spent quality time defining outcome and success criteria. This took ~3 months and several rounds of discussions resulting in the identification of the theme and 6 related topics which had a good balance between complexity and implementation and were meaningful to both sides.

2) Real-world challenges : Topics chosen were not generic problem statements. This influenced the design and implementation tactics and allowed students to get a feel for the magnitude and complexity of real-world challenges.

3) Encourage innovation (it's fine to fail and there isn't only one correct answer): Students were encouraged to try out-of-the-box approaches with a prize for innovation – recognition for a creative and bold approach even if the implementation wasn't fully functional. This allowed students to experiment and try out bold ideas.

4) Optimal duration (there are no shortcuts to learn and be innovative): As opposed to the usual 1-3 day hackathons, the semester-long contest allowed the students to explore topics in greater detail and perform background research, design their solutions with appropriate tradeoffs and implement their designs.

5) Learn-as-you-go: Intel India exposed the participants to a number of new AI/ML tools and frameworks and also graciously arranged for training on select topics. Not all students knew the various tools needed, initially but they quickly learned and implemented the solution as they went along. This learning is essential and far more valuable than the relatively shallow learning that happens in most contests. I would say that the biggest benefit of this engagement was the quality tech mentorship the students got from senior industry technologists.



All the teams (70 totalling ~200 students) were supported by PES Faculty (drawn from Depts. of CS and ECE) with multiple interim reviews conducted by Intel technologists.

The finale was held on 18th May 2019 at CIE Studio where 12 teams presented their solutions and the top 3 were chosen for awards. The contest was judged by a panel of senior Intel Corporation technologists and managers and awards given which was good motivation for the students in addition to all the learning they had.

An experiment like this is not easy. It takes trust, diligence and patience amongst all stakeholders. I can say that while most things worked as planned, several learnings emerged, which can help us construct more efficient and effective programs going forward.

I would like to thank Intel India for their farsightedness in sponsoring this engagement and PES University for the commitment and support. I welcome other industry stakeholders to come explore win-win collaborations between industry and academia.



## Summer Semester Course – CIE Level 1: Getting to Know Entrepreneurship

Entrepreneurship is tough. Teaching entrepreneurship is even tougher.

CIE continues to try out different methods to impart the necessary entrepreneurial knowledge and skills and make it an experiential learning experience. The broader agenda is to encourage students to be more entrepreneurial and have them decide when and how they adopt the entrepreneurship path.

In this section, I would like to highlight some of the innovative elements of course design implemented in the CIE Level 1 summer course.

- **Content:** Emphasis is on entrepreneurial mindsets (60% mindset/attitude, 30% business acumen, 10% technology). Below are notable module highlights -
  - **1.** Effectuation: This is a practical and effective way of approaching entrepreneurship introduced in addition to the 'regular' (or 'causal') methods.
  - 2. Team: Students are grouped into startup teams for the entirety of the course so that they can experience the dynamics in a team.
  - 3. Design Thinking: This is a human-centered approach to innovation. ~20% of the course is allocated to this and to concepts that encourage right-brained thinking and combined with 'action thinking'.
  - 4. Emphasis on 'learning-by-doing': Classes are built around the two themes of learning and doing and therefore structured as 'Learn->Do' and 'Do->Learn'.
  - 5. *Modular:* Topics are carved out into modules, with the following elements: Concept, Discussion/Q&A, Activities, Report-out and Assessment.
- Decoding-The-Entrepreneur session (DTE): Bringing real-world entrepreneurs into the class who share their experience, failures/mistakes and takeaways through story-telling. A major part is the Q&A session between the entrepreneurs and students.
   'Piteb' to real world Startup Mentars/Entrepreneurs/VCe : The students 'piteb' their idea to experienced falls.

entrepreneurs and students. 'Pitch' to real-world Startup Mentors/Entrepreneurs/VCs : The students 'pitch' their idea to experienced folks from the startup ecosystem. This semester, we were fortunate to have 2 folks with both startup and 'corporate innovation' experience: Mr. Ramesh Phatak (Angel investor, Startup Mentor, ex-Schneider Electric) and Mr. Natarajan (Startup Mentor, Entrepreneur-in-Residence (EIR), ex-Intel).

- Learning space: Unlike a regular classroom, there are as many tables as teams in the class. Effort is made to allow sufficient time for breakout discussions and prototyping, done in the state-of-the-art CIE Studio or the adjoining makerspace.
- **Delivery:** There is no teaching per-se the instructor shares content through stories/videos/cases and gets the class to discuss/debate and encourages them to apply the learning in implementation. We strongly believe that learning and fun go hand-in-hand. We have fun activities as part of the sessions and try to create an atmosphere where the creative best can find expression.

In summary, we try to create the best possible student-learning experience as that's the only way to 'teach' entrepreneurship. You are invited to come check out CIE – looking forward to seeing you!



## A Student's Perspective

## CIE Course overview Level 1 – Getting started with Entrepreneurship

## Special Topic – 2 credits course

Entrepreneurship is as much a mindset as it is about action. It involves "building something from nothing" and successful entrepreneurs know how to manage and mitigate uncertainty and risk. As this is an introductory course, it will give an expansive view of the cycle of taking an idea to a product/solution and along the way, develop discipline, knowledge, critical thinking and problem solving, teamwork & communication skills, ethical competency, and emotional intelligence.

This newly emerging demand for entrepreneurs was one of the primary inspirations behind the "Getting started with Entrepreneurship" course offered by the Centre for Innovation and Entrepreneurship (CIE).

Below is my perspective as a student enrolled in this course.

At first glance, I had thought that entrepreneurship would be difficult to learn via conventional learning methods due to the subjective nature of the topic. A traditional classroom just wouldn't allow the students to freely explore the vast and intricate world of the topic, so it was an absolute delight to discover that the course was designed to be a mix of interactive lectures, discussions and activities alongside a final project! All of us were given a variety of resources (web, articles, videos that are freely available), allowing us to delve deeper into the entrepreneurial landscape. The elements and resources covered in this course could very well serve as a foundation for the 'intrapreneurial' journey that some (or many) students might decide to undertake.

While the heart of this course lies in exploring the fundamental principles of the entrepreneurial mindset, there will be a diverse set of skills that will develop along the way such as discipline, critical thinking and problem solving, teamwork and communication skills, ethics, emotional intelligence and much more! This diverse and well-rounded skill-set is crucial to the entrepreneurial process.

Entrepreneurship is redefining the global standards for innovation, so, what better time to join the revolution than right now?

- By Kartikeya Jain

# A Student's Perspective CIE Level 2 – Building a Lean Startup

## Special Topic – 2 credits course

It is common knowledge that entrepreneurship is revolutionizing the way our industries develop, but in the midst of all the buzz, a lesser known fact is that a majority of all startups fail. Why is that? This question was the primary influence behind "Building a Lean Startup," the follow-on course to "Getting Started with Entrepreneurship" by the Centre for Innovation and Entrepreneurship (CIE). Below is my perspective as a student enrolled in this course.

As a beginner, "Getting Started with Entrepreneurship" established the foundations of what it meant to be an entrepreneur and how day-to-day ideas could be evaluated and processed into becoming an actual start-up. It was a wonderful experience, but for me, Building a Lean Startup helped transform these ideas into reality. This course pushed me to test out my hypotheses in the real world instead of ideating in a vacuum. Immediately, the focus shifted from finding better ideas to validating existing ones through surveys, market research, interviews and so much more! These elements helped us develop a better understanding about potential customers and what their exact needs and wants were.

Another focus of this course was the development of a business model canvas which now included creating a prototype of the product/service that we were working on. This business model prototype helped us shape our thoughts into a real life object and realise the challenges involved in deployment of a real product.

Just like its predecessor, this course was a mix of interactive lectures, discussions, activities and a final project. The heart of this course lies in encouraging key elements of entrepreneurial thinking processes such as a learning-by-doing attitude, team-work and above all, identifying and solving real-world problems in novel ways.

- By Kartikeya Jain



## A Student's Perspective CIE Level 1 Summer Course



"Summer study @ PESU" is an innovative teaching initiative wherein departments are asked to deliver a 5-day course, as a platform for students to explore various fields of interest during the summer break. CIE was one of the departments to offer a course titled "Getting Started with Entrepreneurship".

Driving focus towards the foundational values of entrepreneurship, this summer course included concepts such as effectuation, teamwork, design thinking, opportunity analysis and business modelling. Below is a day-by-day summary given by a student enrolled in the course:

**Our first day** was an introduction to the world of entrepreneurship. We were taught about effectuation, a mindset for making decisions in the face of uncertainty. The second half of the day was about teamwork and on forming the dream team, followed by a variety of activities ranging from a DISC personality checklist to team-based presentations, helping me interact with my teammates and develop a sense of comfort in working with them.

**Our second day** was about design thinking which inspired us to be creative in solving problems and taught us customer empathy. We also had our first DTE (Decoding The Entrepreneur) session with Altaf Ganihar, the CEO of SnapTrude, who shared his perspective and invaluable experience with us.

**On our third day,** we learned to identify and filter opportunities, understand customer segments and identify our value proposition. We had our second DTE session with Sandal Kotawala, the CEO of Alfaleus Technology. He gave us advice on the importance of user experience and the acceptance of failure.

**On our fourth day,** we learned about business models and tools to help us communicate our customer segment and problem statement. We also learned about marketing and finance from an entrepreneurial point of view.

**Our last day** was focused on pitching our idea / opportunity. We learned to present to a VC panel and got their feedback on our approach and product. Overall, this was a fun learning opportunity and I'm very glad to have experienced it.

## Altaf Ganihar

## CEO, SnapTrude

If asked to describe Altaf Ganihar's journey in one word, it would be 'persistence'. Altaf has always had a good work ethic and massive dedication towards the things he was passionate about. When he was in 8th grade, he found a pamphlet on Einstein's Theory of Relativity, which piqued his interest and led him to delve deep into the math and teach himself some of the most complex topics in physics. He was only in the twelfth grade when he published his first paper, about non-linear transformations.

Having enrolled in engineering, he learned Computer Graphics and Computer Vision and took on a project to make a scalable 3D model of the heritage site Hampi. Little did he know that this would be the bedrock of his future company, Snaptrude, a tool that converts pictures of sketches to 3-D models.

Having realized that such a product could have a whole host of applications and customers by relieving a huge pain point, he wisely decided to focus on the segment that is the root of the real-estate industry - the architects - so as to not spread themselves too thin. Since there is little to no technology to make their job easier, architects use cumbersome, time-consuming software to construct 3-D models manually. SnapTrude was placed in the Top 3 in AI and ML at Disrupt 2017, TechCrunch's flagship tech startup conference in San Francisco. Altaf's perseverance and focus on quality soon drew interns and venture capitalists who offered high valuations.

The session concluded with Altaf sharing his advice for aspiring entrepreneurs. He highlighted the importance of addressing some very fundamental questions about the identity of the customer, building for the customer, marketing the product, etc. He observed that success would be inevitable, even or especially in the face of repeated failure, if entrepreneurs are quick to fail and learn from it. He remarked that discipline is growth over time, and an essential trait in entrepreneurs. He emphasized the need to build a product that even just a handful of people would love, as opposed to getting the masses to merely like it.

# **Decoding the Entrepreneur - 2**

#### Sandal Kotawala

#### **MD, Alfaleus Technology**

Sandal Kotawala is only a year out of college, and already at the helm of his own med-tech company - Alfaleus Technology. With a team of fellow engineers, Sandal created a portable VR-based headset to test for glaucoma by conducting perimetry, greatly simplifying the current testing process. Always having had a desire for change, he had taken to tinkering and inventing right from his college days, coming up with solutions to problems that irked him as a resident on campus.

Being dissatisfied with his hostel's facilities, he'd designed his own sandwich machine, spending an entire summer creating design after design. He learned early on to stand his ground when he was laughed at for measuring various slices of bread in the market for his design iterations.Sandal noted that it was this mindset of not fearing ridicule and failure that led him to form his own company. The constant need to innovate and solve the problems around him was a strong driving factor.

He was volunteering at an eye care hospital when he discovered a problem he thought he could solve. He noticed that glaucoma testing units were bulky and inconvenient to use. He realized that converting the apparatus into a handheld VR-based unit would do the trick. He set out to do just this, by reading book after medical book to incorporate the biology and technology into a seamless solution.

After research, he found that although there were several companies working on the same problem, there were none in India. India, with its diverse and huge population, was in dire need of accessible healthcare, especially in rural areas.

When he was ready with a working prototype, he was sponsored by the hospital and attended the All India Ophthalmic Conference. None of his devices were sold, but he was met with enthusiastic interest and useful feedback which he took into consideration to improve his device till it was marketable.

Sandal encouraged the audience to be bold, to reach out to people and to get out of their comfort zones. His parting advice to aspiring entrepreneurs was to be ready to commit and go the extra mile for customers, just as he did, to make true change in the world.



# Alumnus Speak SAAHIL KAMATH

Educational Background -

B.E, Electronics & Communication (PES 2014-2018 Batch)

Present Company and Role -Founder, Director, CTO - Marsview.ai (Bangalore, India / Sunnyvale, California)

My primary responsibility as the CTO is to apply my knowledge in technologies such as Computer Vision, Python and Artificial Neural Networks to develop new technology. Additionally, as a director and co-founder at Marsview, my role requires me to identify market opportunities and products that can fill a specific niche, manage product development and create business plans and strategies. I need to understand the business and technical needs of the vendors and design a comprehensive roadmap to achieve the targets. I am responsible for building and leading the team towards the company's vision. I also take charge of developing financial estimates and set milestones and timelines with the CEO.

#### 1. What are some of your career highlights?

- **Founded Visio.ai in 2016**, which worked on Computer Vision and Visual-based Deep Learning for smart cities, smart schools and hospitals.
- Was awarded the "Top 10 Al solution providers in India 2018".
- Started a company now known as **Marsview.ai Pvt.** Ltd., in 2018, a SaaS based platform for Media and Enterprise Companies.
- **Expanded** the company to the **USA** (Marsview.ai Inc.) in early 2019 & got multi-crore funding.

# 2. How did you start your entrepreneurial journey and what was your inspiration?

It all started back in late 2016 when I was a research assistant at IISc Bangalore. My team struck on an idea for a Driver Drowsiness and Attention Detection System which we soon patented. We then had a choice - sell the project as an 'IP transfer' or sell it as a product. We chose to do the latter, and have never looked back. I was fortunate to have been surrounded by people with positive and enterprising mindsets. There is a quote that has always stuck with me since a young age - "Only work for the Man in the Mirror".

# 3. What was your mission when you started? Has it changed over the years?

I still remember our original mottos:

- 1. Bring AI to the hands of laymen
- 2. Strive to create value for them
- 3. Have fun and make money while doing #1 and #2.

While the vision has remained the same, a lot of ideology has matured around those mottos. The way I look at problems and solve them has changed.

# 4. If you could start your career over again, what would you do differently?

To be very honest, I would not change a thing. I am a huge believer of journey over destination. There is no point avoiding or undoing mistakes. We need to fail so we can learn how not to do things. You will either win or learn, you will never lose by being an entrepreneur.

# 5. Can you share examples of critical moments in your venture?

- Meeting our present CEO (Murali Mahalingam): Murali has been a Silicon Valley technologist for over 25 years, and has been the CIO at large banks and tech companies. In fact, he met us initially as a customer. Our visions matched and we immediately clicked. This was a massive turning point for our company.
- The day we decided that less is more: We initially had around 2 dozen solutions to 2 dozen different problems. But, we didn't have the bandwidth to support such a service, and it went against our vision of being a product based company rather than a service based company. So, we went back to the drawing board and relaunched our startup with one product that served one purpose and pledged to perfect that.

# 6. What do you attribute your success to and how do you measure it as an entrepreneur?

- I attribute the success to our hard work and hustle. We have worked day and night to reach impossible deadlines on time. Finding people with the right mindset is the key. You can have all the Einsteins of the world in one room and not get any work done if everyone does not agree on a single vision.
- Success is not just building a novel product, success is when the customer starts to use the product in a meaningful way.

# 7. What are some of the challenges you've faced on this journey?

 Noise : As a young entrepreneur, one of the biggest challenges is to cancel out the noise.. I had an impeccable marks card, opportunity to study at CMU and an opportunity to work at IISc. One of the hardest choices I had to make was the gamble of dropping all 3 offers and choosing to continue with the startup. To date, I'm still not sure if that gamble will pay off, but I have complete confidence that it was the right choice.

- Finding the right team: One of the hardest tasks to find the **RIGHT** talent, not just the **BEST** talent. 99.9% of startups fail due to this reason.
- Funding and investors: As an early-stage startup, we were always thirsty for funding. If you do get your capital, you will have to give up a huge chunk of your pie. We even went 2 years without taking any salaries and using the revenues to pay the employees.
- Age : Although times are changing now, age was one of the hurdles back then. No amount of wearing suits and growing beards could help the issue. No matter how good the product is and how well it solves a problem, India is still a bit skeptical about a 22-year old trying to sell something. The only way to overcome this was to let the quality of the product speak for itself.

#### 8. What is your advice for aspiring student entrepreneurs?

- There is no job description for an entrepreneur. Be ready to travel the world for a mere 30 minute meeting that could have happened over the phone. Be ready to work in a small, dingy room because you wanted the solitude. Be ready to work 20 hours a day, be ready to fix leaking taps in the middle of the night because you could not afford a good office. Just know that it will all be worth it.
- The **secret** to being a successful entrepreneur is **persistence.** That's the only difference between a 'wantrepreneur' and an entrepreneur. We need to understand to be resolute in why we do what we do. There are going to be scores of people who say 'no', for every one person who says 'yes'. But, if you recognise the value of the journey, you will persist.
- One of the biggest mistakes entrepreneurs make, is having a know-it-all attitude, and I'm guilty of that too. While ideas are dime-a-dozen, we thought our idea was 'special'! Ideas don't make you rich; clever execution of an idea does.

# **Innovation Corner**



#### Project Soli by Google

Soli is a touchless interaction sensor that uses radar for motion tracking of the human hand. Packed into an ultra-compact 8mm x 10mm package, the controls gather feedback generated by haptic sensation enabling 3D tracking and imaging - with no moving parts. During the showcase, Google presenters were able to kick a virtual soccer ball by flicking their fingers, and shift the hours on a clock by turning an imaginary dial. The chip can be embedded in wearables, phones, computers, cars and IoT devices, opening up a realm of possibilities for the human hand to be a universal input device for interaction with technology.

Source: https://atap.google.com/soli/

#### Amazon Scout by Amazon

Amazon is entering the robot delivery game with an electric hamper on wheels called the Amazon Scout. It will be accompanied by human overseers to begin with, to ensure that it can navigate around pets, pedestrians and anything else in its path. Amazon uses detailed virtual maps of American suburbia including 3D data, textures, and sidewalk modelling right down to the storm drains for simulations. The focus in development is said to be in ensuring that the robots don't come across as unusual, but as a natural part of the environment. This was accomplished partly through industrial design, like Scout's friendly curves, toy-like rubber tires, and chirpy blue paint.

Source : https://www.theverge.com

#### Parker Solar Probe by NASA

NASA's Parker Solar Probe is officially the fastest thing ever made by humans, reaching a top speed of 430,000 miles per hour as it makes its 7-year mission in the sun's outer corona, within 4 million miles of the surface, getting closer to it than any spacecraft ever before. This is the first NASA mission to be named for a living individual, Eugene Parker, an astrophysicist who explained several complex aspects of solar physics. The previous record, 26.55 million miles from the Sun's surface, was set by the Helios 2 spacecraft in April 1976.

Source : http://parkersolarprobe.jhuapl.edu

Gravity Jet Suit by Gravity

Gravity is ushering in a new era of human flight with their jet suit that is breaking barriers in aeronautical innovation. The jet suit can soar at speeds of 32 mph and ascend to an altitude of 12,000 feet. Powered by a mammoth 1050 bhp output from five miniature jet engines, it takes off vertically and can be controlled by moving the arms, while a display inside the helmet gives updates on fuel consumption. It achieved a record for the fastest speed in a body-controlled jet engine-powered suit on Guinness World Records Day 2017. For the more daring jet suit pilots, a racing series has been announced.

Source : https://gravity.co/

# **Deep Dive**



## The Future Of Mobility

## Introduction

The invention of the wheel was a pivotal point in the history of mankind. From originally being used for pottery around 3500BC, mankind has since harnessed every ounce of its power such that it is an indispensable part of nearly every form of transportation today. But, with innovation being a perpetual journey, the world stands on the brink of another revolution today.

What with the depletion of fossil fuels, global warming, and the relentless surge in technology, mobility, as we know it, is all set for a massive disruption.

## Four futures may materialize

Four possible futures for personal mobility are envisioned, arising from the intersection of vehicle control (driver versus autonomous) and vehicle ownership (private versus shared) models.<sup>[1]</sup>

#### Future State 1: Incremental Change

This is the most conservative vision of the future. It sees private ownership remaining the norm, assuming that autonomous vehicles will not be readily accessible in the near future. Vehicles with advanced technology will proliferate, with the masses largely unwilling to abandon the perks that come with private ownership.

Future State 3: The driverless revolution

The third state sees the onset of autonomous-drive technology with pilot projects, with most people still banking on private vehicles but predicts that these vehicles may be unlike the ones we have today. Conventional designs may be replaced by technically advanced and customized features.

#### Future State 2: A world of carsharing

The second state predicts the growth of shared access models such as ridesharing and carsharing. This will relieve several pain points in intracity transportation, leading to an eventual decrease in multivehicle households and future demand.

# Future State 4: A new age of accessible autonomy

The fourth state anticipates the ushering in of driverless vehicles with the convergence of autonomous and vehicle-sharing trends. Advanced technologies like e-hailing, intuitive interfaces, intelligent traffic systems, smart parking networks etc. will support a seamless transition to smart vehicles, originating at urban centers and slowly spreading their reach.

## Vehicles of Change

The rapid breakthroughs in technology are building the stones of the future's megacities by making sci-fi a reality. Things that would have been laughable even a decade ago, are slowly taking shape today, like self-driving pods, robot taxis and shuttles, and even hyperloops. The micromobility frenzy has sprouted dozens of personal EVs providing several options for urban commuters.

Autonomous vehicles will not become the primary means of transport right away, but through incremental changes easing people into the future by breaking technological, social and psychological barriers.

References

<sup>1.</sup> https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/transportation-technology.html

# **Cloud Computing and Big Data Center (CCBD)**



Today, we have a data explosion taking place. An exponential amount of data is being generated due to the proliferation of mobile devices, health monitoring devices and datacollection devices. One estimate is that 90% of the data generated by all humans on the planet has been in the last couple of years and this is continuing to grow. <sup>[1]</sup> Forbes estimates that 2.5 quintillion (2.5x10<sup>18</sup>) bytes of data are generated every day. <sup>[2]</sup> To understand how large this is, assume that a single grain of rice represents one byte. Then, a megabyte would be 8 sacks of rice, and 1 quintillion bytes (or 1 exabyte) is enough rice to cover the 3 Western states of the USA (Washington, Oregon, and California). <sup>[3]</sup>

In India, government policies such as "Make in India" and "Digital India" have led to widespread digitization of data. The key challenges that we foresee range from datacollection, storage and computation to draw meaningful insights from this ever-growing data. The fields of Cloud Computing and Big Data are related in that Cloud Computing provides seamless infrastructure to capture and store data while Big Data explores the topic of managing and developing special algorithms for extracting insights from extremely large data.

The Centre for Cloud Computing and Big Data (CCBD) has faculty, research associates, and PhD students researching the challenges, specifically in the following areas:

- Big Data real-time applications like IoT analysis and speech recognition. In a recent conference, a wellknown cloud provider said that due to the large Indan market, developing speech recognizers is a major requirement. Machine translation is another extremely important area. The Tokyo Olympics will have instant machine translation where Japanese guides can answer questions in many languages. <sup>[4]</sup>
- Cloud Infrastructure Sustainability in Data centres, in terms of reduction of the energy consumed and hence, the carbon footprint in a data centre. Big Data can reduce pollution, but the effect will be nullified if the data centres produce more pollution that they reduce.
   <sup>[5]</sup> Cloud Federation and Interoperability standards are essential to develop applications that can span clouds. One of the CCBD faculties is chairing a government task force to develop these standards.
- Performance Ensuring that cloud and big data applications can deliver the required performance on different types of hardware ranging from FPGAs, GPUs and multi-core processors.

All of the research areas are collaboratively chosen with universities and companies across the globe such as the University of California, Irvine and the State University of

2.https://www.domo.com/learn/data-nev-

er-sleeps-5?aid=ogsm072517\_1&sf100871281=1

New York, Binghamton. Companies like IBM, HPE, EMC, AMD, Intel and start-ups like AlgoShack collaborate and provide research grants.

Student interns are selected at an annual Bootcamp for the 4 th semester undergraduates. Students from higher semesters and master's programmes also work on projects, forresearch credits and as final year projects.

They work for a year or more, get exposure to real-life projects, opportunities to work with industry personnel, author and present papers in conferences. In many cases, we also facilitate students to secure internship opportunities..

Infrastructure @CCBD includes workspaces for students, a small data centre with about 50 rack-mounted servers, a GPU, network switches, routers and a NAS device. This gives students and researchers the ability to set up mini clouds and small Hadoop computational clusters for their research activities keeping in mind an emphasis on handson learning.

Students can also remotely access the data centre from home and work on their research projects.

It has been projected that there will be over a million jobs for cloud computing in India by 2022. <sup>[6]</sup> CCBD also drives the specializations on Cloud and Big Data for both bachelors and masters, supports the acquisition of hands-or skills and provides a competitive edge for the challenges of a cloud computing/big data job.

 

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# E-Cell

Everybody wants to go out there and achieve the big dream of being the next Steve Jobs, Bill Gates or Mark Zuckerberg and be the one to leave a mark behind on human history. The Entrepreneurship Cell (E-cell) of PES University, makes this possible for enthusiastic students who want to embark upon this challenge and make a statement in this competitive world. E-cell is a student-run organization whose primary purpose is to create a culture of entrepreneurship among the students on campus and build partnerships with organizations from various industries.

E-cell also helps the cultural teams of the university by carrying out their marketing campaigns and bringing in sponsors. In the previous academic year, E-cell was successful in helping the annual techno-cultural fest, AatmaTrisha, and the Samarpana Run which aims to help the families of martyrs by helping them raise funds and create awareness.Some key partners are AIESEC, which is an international non-profit organization, and Under-25 - India's largest youth festival. These organizations have helped the members of E-Cell by putting together various seminars and workshops on personality & skill development.

E-cell conducted its first social-entrepreneurship initiative focused on educating children from economically weaker backgrounds about entrepreneurship and skill development. This initiative also helped the team understand the process of starting an initiative and analyze its impact on the community.

The events for the semester concluded with the Youth Speak Forum (YSF) organized by AIESEC in Bangalore. E-cell assisted with marketing and were fortunate to be the venue partners as well. The YSF aims to create awareness about the 17-Sustainable Development Goals set by the United Nations. The two goals highlighted in this edition were Goal No. 9 - Industry, Innovation, and Infrastructure and Goal No. 11 - Sustainable Cities and Communities. The event was eye-opening and the team witnessed serial entrepreneurs sharing their experiences and the challenges faced on their journey.

Led by Devashish Vaishnav, a final year Computer Science student, E-Cell currently has a team of 40 members who specialize in various domains, namely marketing, sponsorship, design, events, and operations. E-Cell aims to create awareness about what a future in entrepreneurship can hold, while equipping students with various entrepreneurial traits to enable them to maximize their potential and leave the university's portals as a capable and multiskilled graduate.

- By Devashish Vaishnav

# **Indonesian Delegation visit**

An Indonesian delegation comprising 45 senior officials from the Indonesian Oil and Gas industry visited PES University as part of a leadership workshop organized by Deloitte.

Prof. D. Jawahar, the Pro-Chancellor of the University presented an overview covering its history and journey, talent success stories and the establishment of CIE, the Centre for Innovation and Entrepreneurship. The team visited CIE and witnessed first-hand the innovative prototypes students had developed to solve real-world problems. The students also demonstrated the devices they had developed which received a good deal of appreciation from the visiting team. The visitors were also highly appreciative of the efforts by CIE in nurturing the cause of innovation and entrepreneurship in the students

# Students' Corner

Definitely learned a lot during the course. It allowed us to learn how real-world problems are tackled and how businesses can be built around them.

The L1 course has definitely met my expectations. I started reading 'The Lean Startup' and terminologies such as MVP, Value, BMC, etc. mentioned in the book are now clearly understandable, thanks to the L1 course.

I learned new concepts that I did not expect to be taught here.

It was unlike any other course; I wish other courses were taught this way and that instructors are as engaging as you were.

This course was very well structured and covered all the important aspects of business and entrepreneurship. I improved my public speaking skills. The course was very helpful in exploring the different stages of a startup.

Liked how the class was very close to reality and how we did something rather than just read theory about it.

It was a great experience. Informative and extremely fun. Engaging classes with interesting concepts and projects.

The teaching was amazing and it was a pleasure to attend the sessions.

# **Xinova Connected Cars – Prizewinners**

Xinova is a collective of 12,000+ innovators dedicated to turning big problems into even bigger solutions. Xinova works with large companies such as Honda and Pepsi to help them solve their research and product development challenges. The Connected Cars Ideathon sponsored by Honda was conducted in PES University last year to collect innovative ideas for emotion-based personalized services for the connected car. Two ideas by the CIE student teams, "Silent Speak" and "HA-PING," qualified to the "Present to Customer" stage and won the teams a fabulous prize of \$ 500 each.

# **Upcoming Events**

## **GDC I-NCUBATE**

Conducted by GDC, IIT-Madras, I-NCUBATE is their flagship offering which aims to enable faculty, researchers, and entrepreneurs to bring ideas from laboratories to the marketplace. This is the sixth cohort, with only two institutions invited - PES University and IISc, Bangalore.

> Dates : Mid-August to mid-October Location : IISc, Bangalore

> > www.gdc-iitm.org

## **MICROSOFT CODEFUNDO++ 2019**

Microsoft CodeFunDo++ 2019 challenges students from select institutions across India to build a proof-of-concept for secure electronic voting platforms using Azure Blockchain.

Dates : July to August

#### www.codefundo.io

#### INTERNATIONAL CONFERENCE ON CYBERLAW, CYBERCRIME & CYBERSECURITY (ICCC)

The International Conference aims to analyze the emerging cyberlaw, cybercrime and cybersecurity trends and will be attended by various international delegates, speakers and representatives from the national diaspora representing the stakeholders in the digital ecosystem and alive web.

Dates : 20-22 November, 2019 Location : New Delhi

http://cyberlawcybercrime.com/

## **IOT INDIA CONGRESS 2019**

The flagship event of IET India called IoT India Congress, brings together global industry leaders, researchers and technology evangelists, government policy makers and academia under one roof, making it a powerful source shaping the evolving IoT movement in India.

Dates : August 22-23, 2019 Location : Hotel Lalit Ashok, Bengaluru

http://iotindiacongress.com/

Pycon India is the premier conference in India on using and developing the Python programming language. It attracts the best Python programmers from across the country and abroad and is the biggest community-driven event in the country.

> Dates : 12-15 October, 2019 Location : Chennai, Tamil Nadu

> > https://in.pycon.org/2019/

## **DEVCONF BENGALURU**

The DevConf Bengaluru provides a platform to the local FOSS (Free and open-source-software) community participants to come together and engage in the knowledge sharing through technical talks, workshops, panel discussions, hackathon and such activities.

> Dates : 02-03 August, 2019 Location : Bengaluru, Karnataka

PYCON INDIA

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## Contact



Centre for Innovation and Enterpreneurship B Block, 12th Floor, PES University



