

INPHASE

Annual Magazine of EEE Department

Transhumanism
Edge Computing
Postdoc at
KOREA
Alumni
DIARIES

18th Edition | 2022



Foreword

I am very glad to see that our students are engaged in creative activities. Like other IITs, our Institute opens up diverse possibilities for students to pursue their interests. We can observe a swing where the majority of students leave subjects of their primary branches like ECE and EEE, which in the first place they worked very hard to reach, and diversify their interests towards management, finances, administration and coding, etc. Any career is primarily a matter of choice for an individual however, one must be careful in assessing the pros and cons in the long term. Such seismic shifts leave only a few engineers left to work in core electrical and electronics and it can affect the future of technology developments in our country and the globe. Morris Chang is known as the Foundry Father and through TSMC, he has completely changed the landscape of the semiconductor industry and made people's dreams come true. We need persons like Morris Chang in India. Moreover, a broad cross-section of leaders in academia, government, and industry must involve smart sensing, memory and storage, communication, security, and energy efficiency to bring any noticeable challenges to our country.

It gives me great pleasure to write the foreword for the 18th edition of InPhase magazine for the year 2022. I congratulate Cepstrum, the students' society of the Department of Electronics and Electrical Engineering, IIT Guwahati whose prized efforts have made this edition of the magazine possible. I appreciate the diversity of thoughts presented in this magazine. A colourful palette that has reflected these pages had its genesis in the young enthusiastic and imaginative minds of our department. Thank you team for this joint endeavour and for extra efforts to contribute articles to this magazine. Most of the articles have kept up-to-date with the latest innovative ideas. I am sure that everyone who reads this magazine would relish each article.



Yours sincerely

Dr. Roy Paily Palathinkal

Professor and Head, Dept. of Electronics and Electrical Engineering

Professor, Centre for Nanotechnology and School of Health Science & Technology

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01

AN EPOCH AT IIT GUWAHATI



-Adit jain

What I learnt in my 4 years at IIT Guwahati about, entrepreneurship, exploration, friendships, self, life and more.

We (over)think, we panic, we plan. At least, that's what I do whenever I am on the verge of my next chapter in life. And these plans are often not what life has in store for us. My journey at IIT Guwahati would have been very different had

a) The cutoff for MnC been the same as 2017

b) I got a branch change at the end of my year

But I did not, and I am thankful for that because I got to experience the breadth of ECE and learned a lot about my academic interests. With the experience I now have, I wouldn't

change my major even if I had the chance to. And so, as I wait for my graduate school applications in deep anxiety, I am trying not to predict what the next 5 years of life would look like. Cause that's really the first lesson college gave me, and I think Steve Jobs put it much better than I ever could:

" You can't connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future. You have to trust in something - your gut, destiny, life, karma, whatever."

Through a series of experiences, college made me realize life is not a deterministic system with a chain of conditional processes $A \rightarrow BC$,

but a far more complicated and intricately beautiful chaotic and stochastic system.

It was this realization that has made me want to write this piece. Yes “*want to write*”, I didn’t “*have*” to write this, just like I don’t have to do many things. There are no “*have to*” in life just “*want to*”. And once I realized that, I decided I didn’t have to do competitive programming just because everybody else was doing it. (*Not that I disrespect the countless hours of toil someone puts in CP*). But I did want to explore things, which is why I decided I would try as many things as I could, both technical and otherwise, by taking up projects, club engagements, initiatives, and other opportunities.

And because I took exploration as a challenge I think I enjoyed a really productive time during my under-graduation. Pro-activity really comes out once you have a set challenge that you want to benchmark yourself against. There were many smaller roadblocks along this way.

For instance I found managing time (*something which I still am a rookie at*) agonising to learn and execute. But I did learn that I should reduce mindless consumption as much as possible and increase mindful rest.

Unfortunately I am still working on the time optimisation problem.

Explorations

On the technical side I wanted to understand research better. But I had no idea how much I’ll grow to love it. I explored research (& a bit of industrial work) through a few avenues and routes:

A. Interning as Summer Analyst at Goldman Sachs

B. Doing a Research Assistantship at Haas School of Business, UC Berkeley with Prof. Abhishek Nagaraj

C. Working on my Bachelor Thesis Project (BTP) under Dr. Salil Kashyap

D. Multiple smaller projects related to the fields of data science, consulting, design, entrepreneurship, product management, open-source and electronics. And side projects like my reading project with Prof. Benny George

And while I can blabber on about each of them, I’d write in a little detail about my RA-ship and BTP.



My RA stint at UCB is most definitely one of my best research experiences and it definitely has taught me a lot. Even though my engagement was online, I got the chance to work for more than one and a half years.

I got to experience what applied economics research looks like, and how tools of signal processing, machine learning and data science are actively used in interdisciplinary research.

By working on multiple projects involving huge datasets, simulation models and experiment platform design, I was able to collaborate with a lot of graduate students and professors, thus shaping my mind for further research. One project, for example, involved using cellphone pings to identify whether a business is closed or not. Projects like this and many others helped me expand my skillset & research communication skills.

On the other hand my bachelor thesis helped explore one of the topics of my major: Wireless Communication. Here I worked on the upcoming paradigm of Intelligent Reflecting Surface in 6G Communications. I learnt how to conduct a literature survey, applying concepts from Probability, Information and Communications Theory and optimising non convex functions using novel techniques. While working I also realised how I want to do work which is deeply technical & research based.

Even more primal than my technical inclinations are my entrepreneurial intentions. I wanted to start my own business while still in college. Though my plan to have a business plan did not take off, I explored

entrepreneurship through a different lens.

Through blipme.XYZ I explored product engineering & management, through my time at Nexus I learnt leadership & event management and through the countless competitions I learnt how to collaborate with people & perform optimally as a team. My experiences in this dimension have motivated me to take up entrepreneurship in the future and solve problems at scale.

But even with these accomplishments & lessons, there's a lesson that I find the most practical and true. It's about realising that I too have flaws, and accepting them. Flaws like ignoring mental health when I am working deeply, or bingeing when I should be working. I also accepted that it's okay & even necessary to fail at endeavours.

Case in point, I didn't get into GSoC after 6 months of toil, didn't get a reply for the 300 emails I sent to professors for research internships, and I might not get the university I want for my PhD. And this lesson underpins the foundation of all lessons: It's not by the success of a particular endeavour we learn something rather it's the roadblocks, the challenges and the fallbacks that transfer learnings to us.

Finally, I have got familiar with two amazing support and feedback systems during college.

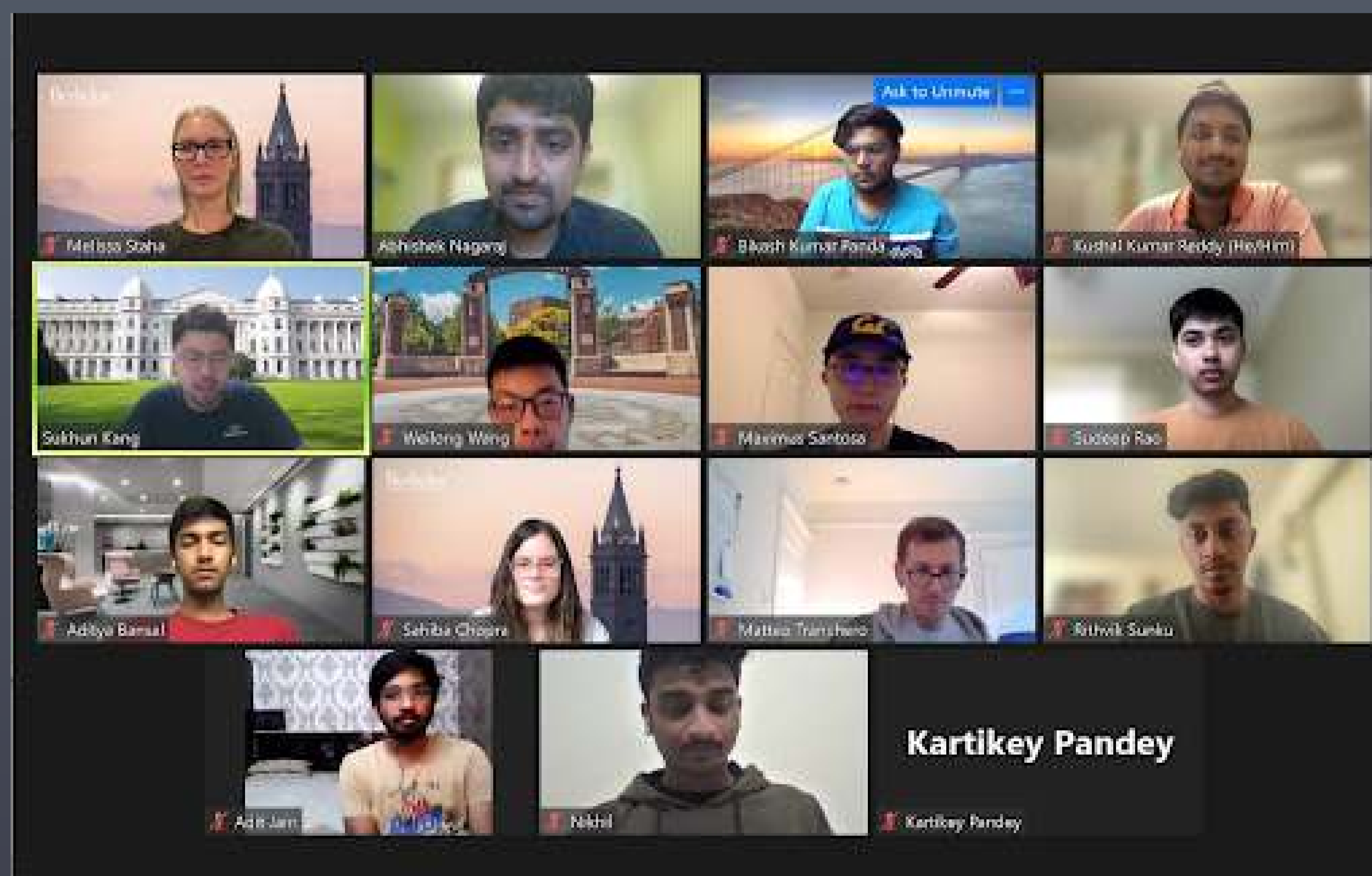
The first one were my friends without whom this whole journey would have been meaningless. I learned what it is to be loved and understood and share a bond. Some of the conversations I have had with my friends have changed me & have made me think much more clearly about my decisions.

And secondly, books. I have read around 70 books during my 4 years, and they have helped me in all sorts of activities I do, by providing the correct mental models, inspiration, and courage to act on those. Just to be clear, I know it sounds like I read a lot of self-help literature, and that's how I got started to read, but my reading interest span all sorts of books because I think every hardcover out there has all sort of mysteries we can learn from.

With all this being said, here's the disclaimer:

Even after editing from the Cepstrum team, my friends and family & myself, some amount of 'bragging' and 'fundae' might have crept in. And I am terribly sorry for that. My intention was not to say I did xy and z but rather to document what I learned and where I failed.

So please take all of this with a pinch of salt, and if there's something here you don't agree with, feel free to prove me wrong. There's no wrong way to live a good college life and your epoch will certainly be different. As I said you don't 'have' to follow this or anything for that matter. Go swim in your wants & make this time lege- why wait for it you already read a 1346 word long article- dary.




AUTOBIOGRAPHY OF OSCILLOSCOPE

It has been two hours still no new humans. It was the lengthiest nap I have had. Is this the place she went to, I wonder? They usually come running in by 9, pleading for attendance seems like times have changed.

I remember meeting a new human every six months. Groups of three entering the lab were always tense for the 1st hour. One would rotate my ears and nose, the second would observe my forehead, and the third would doze off. The older human would examine me as cluelessly. Then they ushered the friend who would rotate my ears and nose, and then they would see my forehead and glee. The dozing human would then take a sheet of paper and use my head as a platform for writing. Thus for my daily routine - awoke only 3 hours a day and slept the rest. I remember rows of my kind stacked behind me in a matrix arrangement. I could sense and hear them but not see them. My old-sloppy neighbor always got the humans tense. She was replaced when I woke up today. Feels lonely somehow, with no snack crumbs on me and no voices from outside.

I wonder if I would see another human again.

-Kautilya Pandey



**WORLD OF
WEARABLE
TECHNOLOGY**

-Meenali Janveja

"Apple watch saves 61-year-old Indian man's life by alarming him on time for cardiac disease."

We often hear such heroic tales of wearable devices and how they aid in saving countless human lives. Such instances where these little miracles of technology turn out to be life saviour act as an excellent motivation for the advancement of these devices.

What could be better than to develop something that can save human lives?

The increasing interest and caution in health and well-being have caused a paradigm shift in the technological developments in wearable systems.

Wearable devices are a popular and attractive choice in healthcare services. They offer personalized solutions to patients towards disease prevention, diagnosis, and treatment. These devices aid people to monitor their health vitals at the ease of their home. These devices also provide more data to clinicians with the potential for earlier diagnosis and on-time treatment guidance. Moreover, the pandemic expedited wearable technology adoption and heightened its role in healthcare.

A wearable medical device can be described as an autonomous, non-invasive system which can perform

a specific medical responsibility such as monitoring or support.

The term "wearable" implies that the device is either supported directly on the human body and has suitable design specifications for it to be as a wearable accessory.

Wearables should also be small in size and light in weight to have better power autonomy and wearing comfort. A typical device is built around a central processing unit that provides BioSignal monitoring, data storage and processing. It also involves a degree of intelligence and telemedicine functions.

Incorporating telemetric capabilities into wearables also provides pervasive healthcare. It allows users to access their current health vitals and transmit and receive this information anywhere and anytime. Wearable technology also utilizes AI to serve the patients better. Like FitBits and smartwatches, devices that use AI can examine the health data alerting users and their doctors on potential health issues and risks associated. Therefore, a typical device will have a data input mechanism, a processing unit, and an output mechanism like any computer. Assessing one's health through wearable technology also eases clinicians' workload and prevents unnecessary hospital visits or remissions.

Therefore, in our group, we strive towards developing artificial intelligence (AI) enabled application-specific integrated circuits (ASIC) to be employed to develop these wearable devices. Our group currently has three PhD research scholars, Rushik Parmar, Abhyuday Bhardwaj, and me, Meenali Janveja, who work under Prof. Gaurav Trivedi's guidance. We also have some master's and bachelor's students developing VLSI architectures for wearable device applications. Specifically, we work towards developing ASIC, which employs deep learning algorithms to detect and predict different cardiac and neural disorders. Among the many health disorders, cardiovascular diseases are the most fatal ones, and have had undivided attention from the past many decades.

Cardiovascular diseases (CVDs) are the leading cause of death globally, taking an estimated 17.9 million lives each year. Wearable ECG monitors are on the cutting edge of consumer electronics.



Some commercially available devices such as Apple Watch, AliveCor's KardiaMobile 6L, Wellue's DuoEK and VivaLNK can measure electrocardiograms, which help users track their heart rate as well as to measure other vitals, including blood pressure.

They can also detect specific cardiac issues such as episodes of atrial fibrillation (AF), bradycardia, and tachycardia. However, many critical cardiac abnormalities that may cause sudden death still need to be addressed.

Therefore, we aim to develop deep learning-based algorithms and their low power ASIC that can be used efficiently in the framework of IoT-enabled wearable devices. Much work has been done in our group, published in reputed journals and conferences.

For instance, we have developed a low power ASIC that can detect five types of arrhythmias, namely, normal beat (N), ventricular ectopic beat (V), supraventricular ectopic beat (S), a fusion of a normal and a ventricular ectopic beat (F) and

unknown beat type (Q) as per Association for the Advancement of Medical Instrumentation. The ASIC utilizes a Deep neural network that can classify these five types of arrhythmic beats with an accuracy of 91.6%.

In our other work, we have developed a low power co-processor that can predict ventricular tachycardia and ventricular fibrillation 15 minutes before their occurrence.

In another work, we are developing an ASIC for the detection of Sleep Apnea. We are also aiming to develop architectures for neural disorders such as epilepsy that can predict seizures in patients with epilepsy. These developed designs are verified on extensive datasets available publicly. The developed ASIC have exceptionally low area and power requirements and are, therefore, suitable candidates for wearable healthcare devices. However, still a lot needs to be done to produce a medically acceptable device and make a complete system on chip that can accurately diagnose the critical cardiac and neural disorders mentioned.

There are several notable forecasts for the future of wearable IoT (Internet of Things) enabled healthcare devices. The market for wearable devices is mushrooming, and their maturation will make significant improvements in the healthcare sector.

In 2021, the wearable medical devices market was estimated at \$16.2 billion, and it is expected to reach \$30.1 billion by 2026. Wearable healthcare technology incentivizes health monitoring that reduces redundant hospital visits and readmissions.




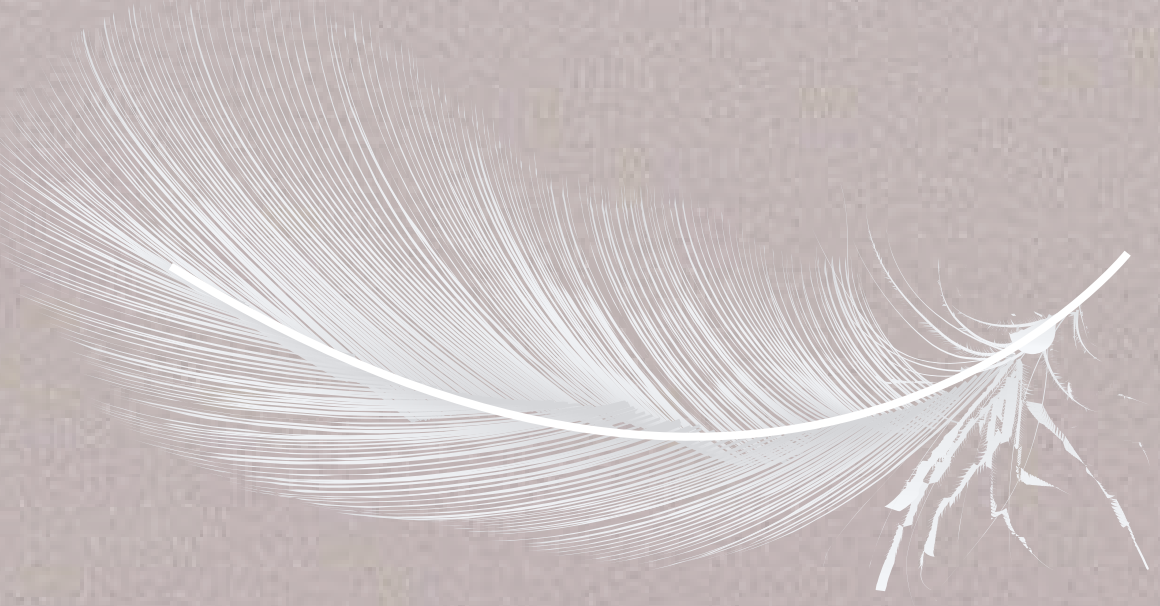
The corporate sector will also benefit from offering wearable healthcare technology to employees. Moreover, the connectivity of these devices will amplify as even better and more accurate wearable devices are developed. It will also open the door for insurers and employers to influence healthy lifestyles boosting profitability.

This increased awareness in the healthcare sector to better leverage technology between patients and doctors can open a numerous possibility to enable more ideal healthcare and a more patient-centric approach. Therefore, as discussed above, the benefits are unending when it comes to wearables. However, the most intriguing part of this technology is its potential. As is known:


When it comes to innovation, the sky's the limit !

COMFORT ZONE


-Dhanesh V




Forwards lay a vast span of beauty.
with an ounce of danger,
Covered with mist,
Shrouded with my doubts.



Backwards saw a familiar field,
Trodden with footsteps.
Shimmering with longing...
Would a jump over it mean jeopardy to my life?
Or harmony to my soul?



Heart wanted to step back,
But mind urged to move forward..
Finally like a cat on the wall down I sat
Plunging into calmness.



Expand your border, said my consciousness.
With a smile on my face,
I saw the mist forwards disappear.
Suddenly, it was all clear
For the border that I wanted to expand,
Marked my Comfort Zone.

04

WATTPAD OF MONSTERS

-Saptarshi Samanta



Plagusus Returns

No one listened. The scientists had been warning everyone for ages about the dangers of the current path of unsustainable progress. The big corporations vilified the same voices as propaganda against progress. The activists rose to fill the void left by the actual intelligent people with their senseless idealist utopia as the answer against the corporates. In the ensuing cacophony no one believed anybody. Life went on as it used to. And the common people remained as apathetic as they were before.

This apathy cost the humans dearly. The weather became more extreme with each passing year. Crops were failing globally. Food shortage was rising. The richer nations tried to hoard what they have, leaving the poorer nations to fend for themselves. Anarchy was the new infection that was sweeping across the world after the covid pandemic of 2020. Fast forward to 2031 and most countries looked like a vision from hell. Neighbour had turned against the neighbour. Nations were now torn apart by war over food or water resources. Natural calamities were leaving unparalleled destruction in their wake. The global death toll was in billions. Agricultural belts became the new protected and militarized zones. Food was the most critical resource now.

Two glowing embers eyes intently watched the death and destruction playing out on Earth through the

scrying glass. "My! My! The humans have really landed themselves in a pickle now. They had their chance to build their perfect little world. Guess that's over now" he chuckled to himself. He heard a rough scrape behind him and whirled around with fangs bared only to see his underling scurrying into his den, head bowed in subservience. "Oh! It's you, Magmus. What is it?" Magmus was an inferno hound, who was referred to as a hellhound in the human scriptures. The humans had only got the flaming hound part right about the inferno hounds in their texts. Magmus was the leader of the inferno hound packs serving the beast. Magmus raised his head and said "The veil between our worlds has thinned further Great Master. The continued self-inflicted death and destruction of the humans is giving us all the death energy needed to open portals in the veil across Earth".





“Very good Magmus, get the packs ready, it is time for a little feast.” Magmus looked up with an evil grin spreading across his face, “As you wish master” and left.

“It has been so long since we had been banished from the human realm to give those weaklings a chance” he mumbled. He did miss the sweet taste of human flesh as did most other monsters who had survived from that time. The wait was over now. They will walk the earth again and the humans will learn the true meaning of fear. With a wry smile on his face, he stepped out of his den and walked to the ledge of the cliff overseeing the valley below. The valley was packed with his legion of inferno hounds, ready to lay waste to the human realm. He felt that it was nearly time for the portals to open. “Hounds! For long we have been banished to this realm and forced to feed on lesser creatures and monsters and living with perpetual hunger. That time has finally come to an end. The humans forgot their past and lost

their magic. We became footnotes in their stories. Now they have weakened the veil that separated our worlds. Soon the portals will open and we shall walk free again. Follow your Great Master, Plagusus, the bringer of diseases and misery and let us reclaim the Earth!”. Howls of cheering broke out amongst the legion, a rabid hunger gripped them. Plagusus casted the spell to open the portals.

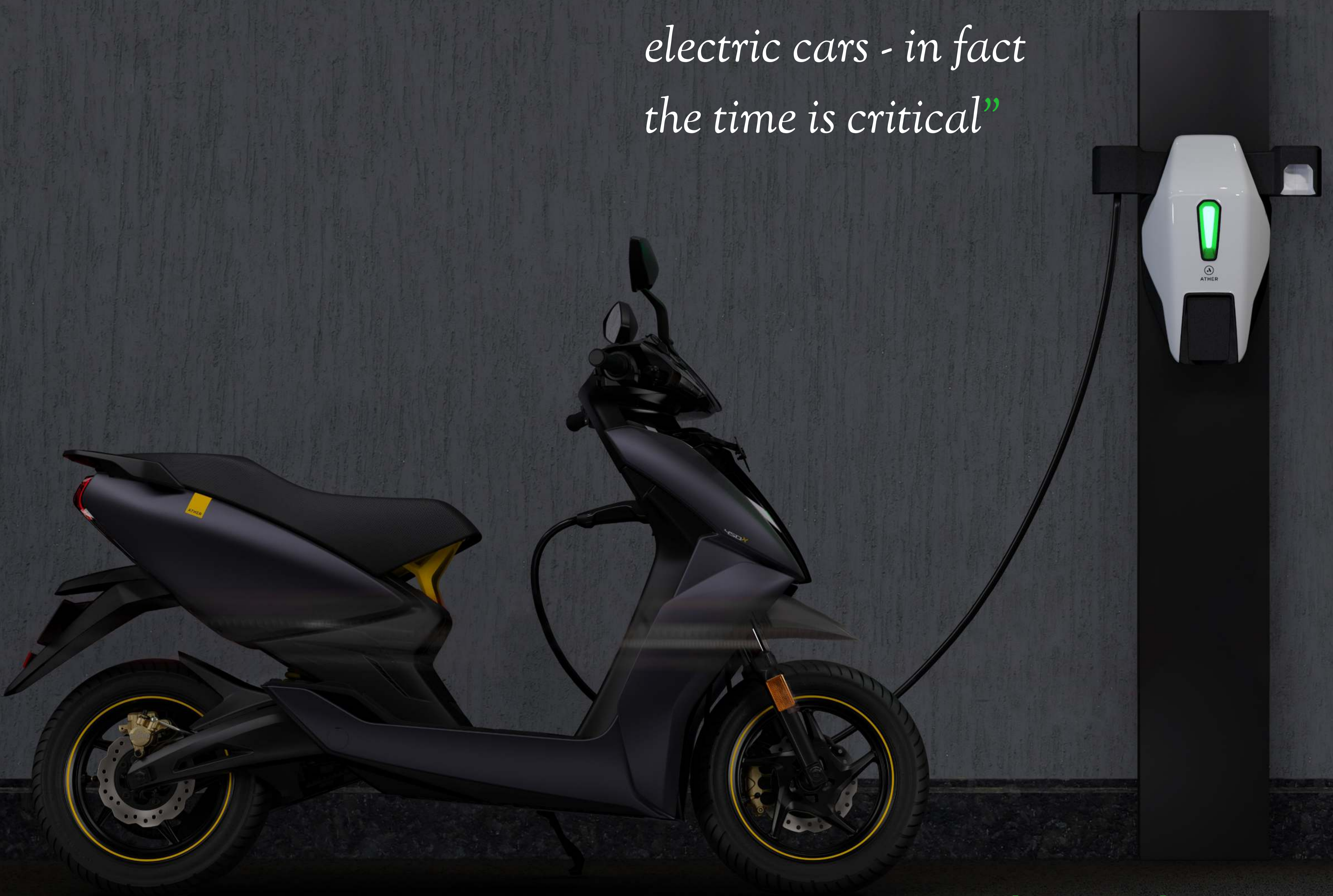
The Middle East was a waste land now. All the great cities had been reduced to rubble. The Burj Khalifa stood like a skeleton. Surviving humans scurried about in the now dead city. Towards Riyadh in the west were the killing fields, the aftermath of the great starvation war. Suddenly the top of the Burj Khalifa started to glow a blood red which was visible for hundreds of miles. Then a red tear appeared in mid-air stretching from the top of Burj Khalifa to the ground which widened into a hole giving everyone a view into the realm of monsters. Out poured the inferno hounds led by Magmus and took up positions on either side of the portal. A massive shadowy creature with glowing ember eyes appeared in the tear and finally stepped through into the human realm. The towering being had a long serpentine neck and head. It had a feline body and tail and giant membranous wings. The entire body was covered in black fur. Plagusus had returned to the realm of the humans at last.

QnA

EVY ENERGY

Electric Vehicle Charging Startup

*“The time is right for
electric cars - in fact
the time is critical”*

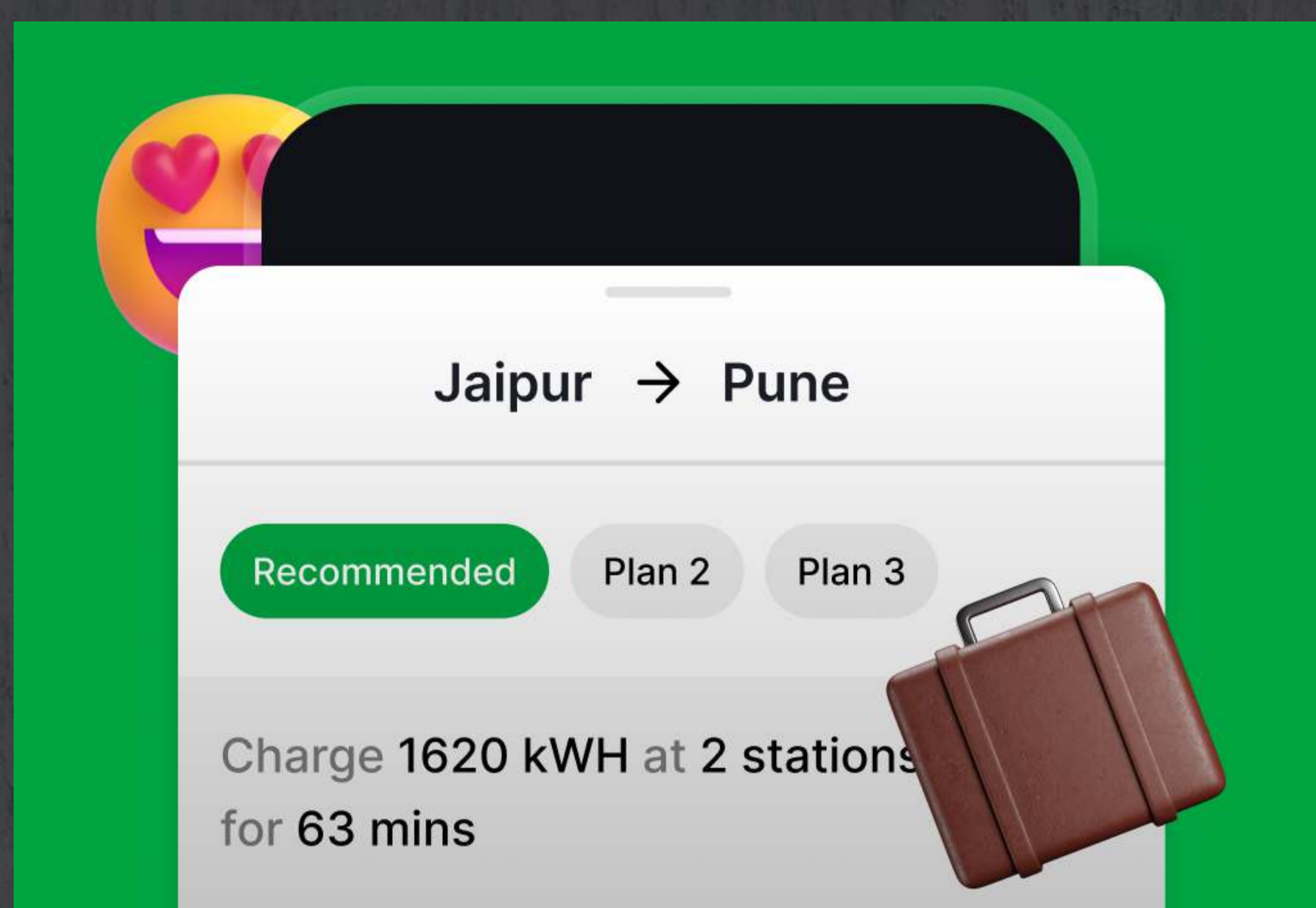


-Tushar Bohra

Tell us an overview about what Evy is all about.

Evy Energy is an electric vehicle charging startup. With our product portfolio, we aim to integrate electric vehicles, charging systems, and grids to build a robust, and scalable mobility ecosystem in India. Our current offerings involve a mobile application for end-users to explore and access chargers of different networks. And a backend solution for the charger operators to intelligently manage the charger, and bring it in front of thousands of users. Moving ahead we are parallelly working to roll out our fleet, and white label solutions.

This corporation is solely carved out of IIT Guwahati. All three founders are from the final year of the B.Tech program: Bhabani Mohapatra from ME, Mohit Jain from CSE, and Tushar Bohra from EEE. Also, we have had



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the honor to work with more than 40 students across different domains till now.

Our roaming platform to explore chargers of different networks is live on Playstore, and Appstore with over 900 verified chargers. We have more than 400 active users, and the platform has been used to plan more than 5000 trips till now.

As there are still so few electric vehicle owners in India, their problems like short range of EVs and lack of charging stations are barely talked about. So there must have been an inspiration behind this idea.

Me being from central Rajasthan have always closely witnessed energy production. At one end we had windmills, and on the other, we saw refinery coming up. And anyone can notice which alternative is sustainable. From there my attachment towards renewable energy grew. Then, it was back in October 2020 when I was going through the IPO prospectus of Saudi Aramco as part of a research project, and witnessed that even oil giants have accepted that the global crude oil demand has been plateaued. From oil demand, the research moved towards the energy landscape, and then to electric vehicles, and then ultimately towards the charging infrastructure in India. Fast forward to March 2021 when I and Bhabani met to delve more into the problems

evy energy

of EV charging. We conducted a set of offline interviews with EV owners to know more about their everyday problems. We noticed that the real problem is related to connectivity, and accessibility. This is how the seeds of Evy were laid.


Many people dream of opening a startup themselves but struggle to stay afloat after the initial euphoria has died down. There are challenges that you would've faced while starting out.

Support and validation from different stakeholders throughout are very important for any startup. Our attachment to the problem helped us quantify the efforts. We exactly know how each day would add value to our users, how it will take us a step closer to our solution. That is what motivates each person in our team to work on our mission each, and every single day.

Otherwise, any vision or idea in that sense is a mere hallucination. They are nothing without execution.

The adoption of electric vehicles in India has been sluggish. There are around just one thousand public electric vehicle (EV) chargers installed throughout the country, and electric vehicles account for less than 2% of the total sales of vehicles in India. Are you optimistic regarding the growth of EVs and charging stations?


With increased support from the government, we have started witnessing the change in trend. Sales of two-wheelers have been significantly rising in the past 6 months. The same is the scenario with four-wheelers and commercial vehicles. By the end of 2023, we expect to have more than 40 electric




ONE STOP PLATFORM FOR EV OWNERS TO FIND THE NEAREST CHARGER AND PLAN TRIPS

evyenergy.com


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TRACTION

MOBILE APPLICATION

850+ verified charging stations live on our app out of 1400 in the country

5000+ trips have been planned on our app by **750+ users**

OPERATOR SIDE PLATFORM

- MOUs with two operators to integrate over **1000 chargers** on App by July 2022
- Building EV fleet charging capabilities over our platform with **Loconav**
- Roaming service integration with **Relux**, and **Verde** to extend interoperability

MARKET SIZE , TAM

1 Bn+ USD ARR

17.25 TeraWattHours of Energy

Business model comprises of B2C & B2B transaction plus subscription based revenue streams

MARCH '22

- Charger Operator Side Platform 1.0 Release
- Evy Mobile Application Stable Release

JUNE '22

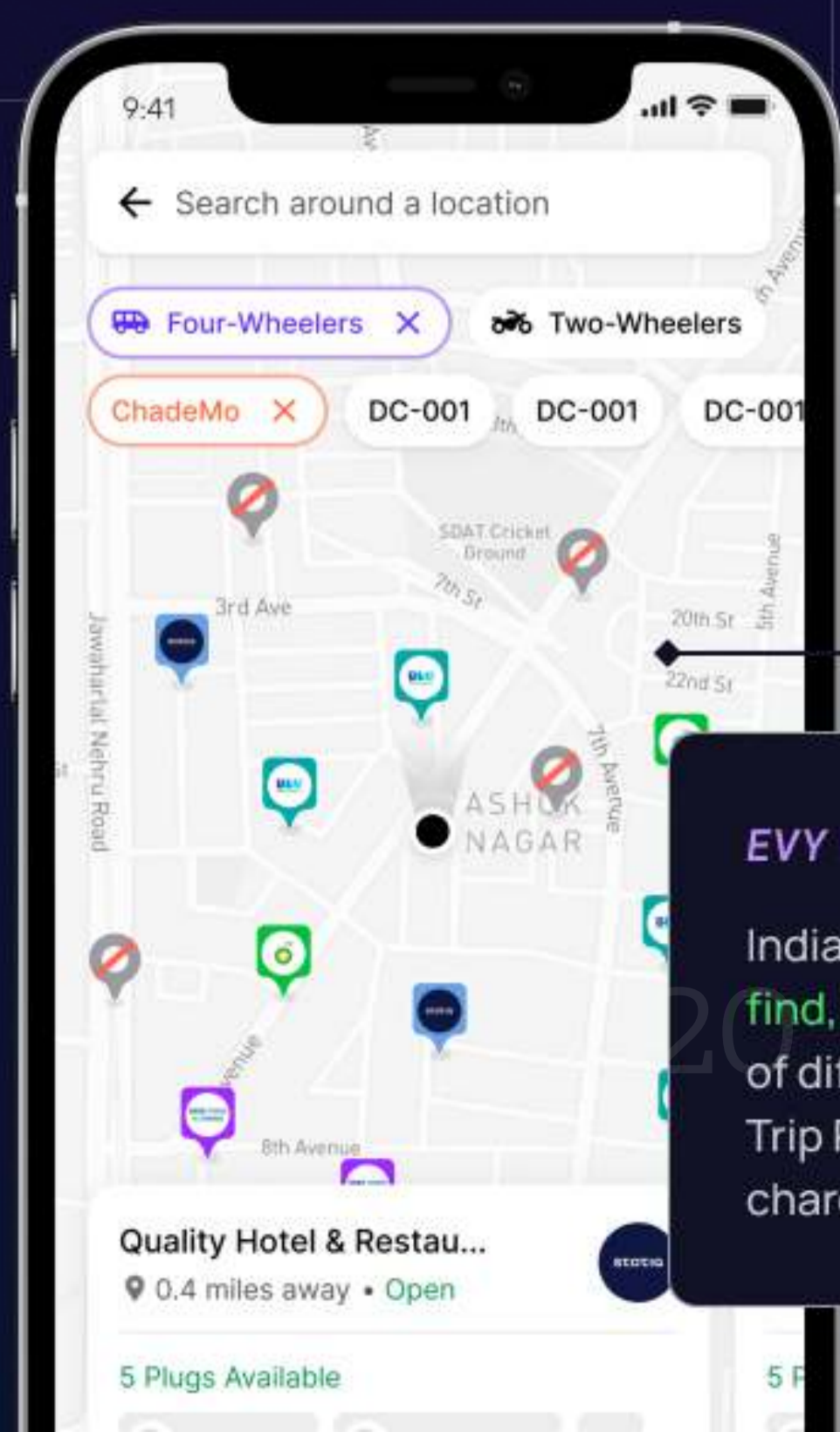
- Fleet Charging Management through App & Cloud

31 JULY '22

- Charger Grid Integration

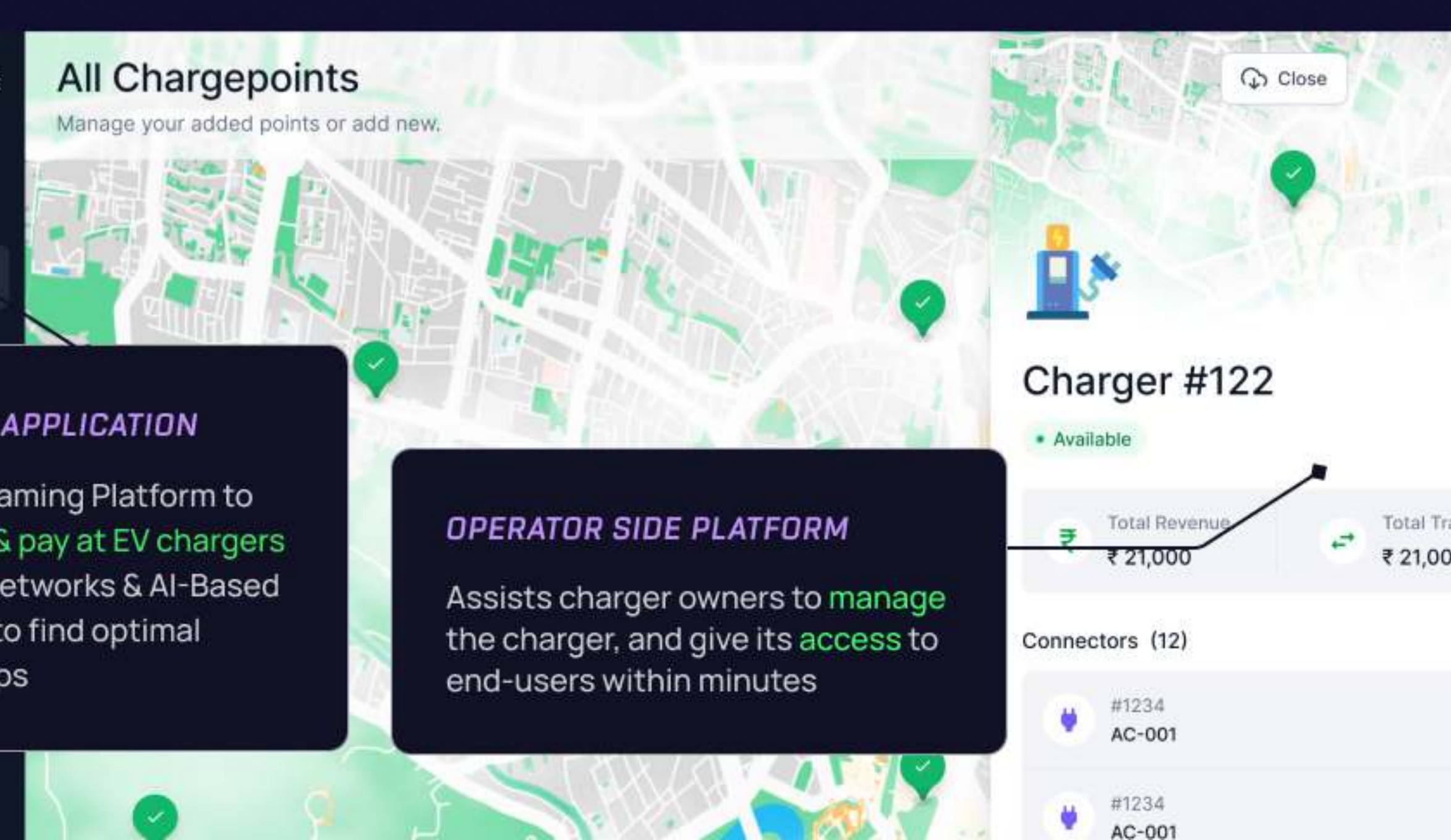
SEPTEMBER '22

- Connected Car App Integration



EVY MOBILE APPLICATION

India's 1st Roaming Platform to find, charge & pay at EV chargers of different networks & AI-Based Trip Planner to find optimal charging stops



OPERATOR SIDE PLATFORM

Assists charger owners to manage the charger, and give its access to end-users within minutes



models on the market from different autoplayers. Similar is the case with charging infrastructure. Back in 2010, Europe had just over 3000 public chargers, now the number is over 300 thousand. We will be witnessing the same growth in India, steeper I'd say.

The reason behind this is the lowered costs. The total cost of ownership today is way less than the traditional combustion-based vehicles. Also, the general public has started experiencing the positives of EVs in terms of driving experience, and environment.



In any industry, you've to grow & stay ahead of the competition, which involves planning for the next phase.

With respect to our vision of integrated systems, we have started working on our connected grid, and vehicle solutions. Our recent selection into the IITK's incubator program provides us the resources and technical prowess to solve the problem of demand response and

grid balancing. With our current solutions, we are continuously associating with multiple companies to make the India's ev charging system interoperable, and robust. This is also what is provides us an unique selling proposition.

POSTDOC AT
KOREA

-Prof. Sudarshan Mukherjee





We are at the end of a global pandemic that lasted for nearly two years, confining us to the boundaries of our home. So, when I was asked to narrate my story as a postdoctoral researcher in South Korea, I felt a Sehnsucht for reliving the days when I could take off during the weekends whenever I was in a mood for coddiwomple. Do not get me wrong, working in a postdoctoral fellowship is indeed an important hallmark in the career of those who dream of a future in academia. However, as I see, for me, those two years that I spent in South Korea have become much more than just an academic milestone. It let me step out of the shadow of my comfort zone and gave me an unforgettable life experience.

The Angst of Fellowship!

Since we are talking about my journey into the life of a postdoc, let us start from the very beginning. Back in 2016, I was still a Ph.D. student in IIT Delhi, when I first started filling out the postdoctoral fellowship applications, right after the submission of my doctoral thesis. At that time, my Ph.D. supervisor had

already warned me that it is more important to find the person you want to work with than choosing a destination, and experiencing a few rejections was not out of the question. However, knowing the reality and experiencing it are two different things, and I found that out the hard way. Amidst the lack of responses from multiple senior researchers (faculties), and the very few interviewed that I scored, I kept feeling like “Wreck-it Ralph”, who despite knowing what needs to be done keeps frizzling out. What I did not realize at that time was that having most of my works tied down in the journal review cycle was not helping my case either. So, clenching my teeth, I kept weathering the storm of rejection, while looking for a postdoctoral position across two continents.

This wide-spread search also caused quite a bit of tension with my parents, when I started considering a postdoc position in Saudi Arabia. It was a time when the ISIS wave was in full swing, and my parents were convinced that the flames of war and terrorist attacks will spread there soon after. So, after a few heated phone calls, I gave up the idea of finding a postdoc position there but still kept looking for my ‘precious’. Finally, in the middle of next year, my search for a postdoc position came to an end, when I landed an offer from Dr. Jemin Lee, in DGIST, South Korea.



The Resfeber before the Journey

Although I already had two foreign trips under my belt by 2015, I knew that this journey to the east would be quite different from the ones I had before. They were short, with definite destinations (conference venues), and therefore temporary cheap accommodations at hotels were sufficient for such trips. This however was no longer an option for a year-long stay in a foreign country. Although I am no Sun Wukong (the monkey king from Chinese folklore “Journey to the West”), and the idea of facing all problems in a stranger place was a bit heart palpitating, the excitement of a new journey eventually won over all the negative emotions, as I started to get on with the preparations for my trip.

First came packing. For me, it was every bit of an unmitigated disaster as it was in the ‘Three Men in a Boat’, since I could not even figure out what to take and in which order do I need to pack them. Finally, my mother decided to step in to break the cycle and complete the process in

a few days. Even then, I had to carry quite a bit of weight, which caused a lot of problems while moving in and out of trains. After being excused from packing, I decided to take a look at the transportation facility from the capital to the city of Daegu, where the university is located. I was delighted to see the availability of a widespread public transportation system in Korea, and the train became the obvious choice for travel to Daegu from Seoul.

First Contact

I was quite lucky that my postdoctoral advisor is a very amiable person. She not only helped me with arranging the low-rent dormitory within the campus but also sent two of her students to receive me from the Daegu railway station, which was a considerably long drive away from the university. It was late at night, with very few people on road, and fewer shops still open, when the train reached Daegu. So, once they drove back to the suburbs where the university was located, they first took me to a small restaurant for a quick dinner, and then dropped me off at the dormitory before saying good night.

It was early November. Even though it was not freezing, it was still cold enough. Fortunately, hot water was available all the time. So, after a refreshing hot shower in the early morning, I set off at a brisk pace on the road into the mountain valley that led to the institute. By the time I

reached the end of the road, a huge sparkling glass building revealed itself in the morning sun, which I later found out to be the library building. Behind it was a sprawling gray steel-colored construction that spread across the lap of the dark mountain behind it. Between them, was a wide channel, adorned in jagged rocks, and a small stone bridge connecting both sides. It was quite a different sight from all the previous institutes I have been to (they used to give me an archaic feeling with their age-old buildings and all). So, after being awestruck for a few moments, I gathered myself and walked to the entrance.



Do in Korea as the Koreans do!

Here in DGIST, I registered my first cultural shock- the language barrier. Up until then, I thought that it was fortunate that the entire country speaks the same language unlike ours. Online browsing of the history of the development of the 'Hangul' script and its study made me feel that grasping basic communications should not be much of a problem, especially since the vowels and consonants are so similar to that in Hindi/ Bengali. I was severely mistaken. It was unfortunate that everyone was speaking the same language except me. So, when I listened to the queries of the strangers and many other students, all I could do was to foolishly smile, and then switch back to the good old-fashioned English. I was later able to improve the situation a bit by employing the 'jugaad' with English and a translator app. What I am most proud of is that even with such a broken effort at speaking Korean, I was able to make some good friends outside the circle of academics. Another hurdle that I had to overcome was the local cuisines. Since I was not very much willing to



move from the dormitory (I was given a single room) or cook food on my own, I was predominantly dependent on the institute cafeteria and the restaurants. Even though I am a non-vegetarian, such a meaty diet was a nightmare for me, especially, since it was not chicken meat. In the beginning, I had no choice but to either gorge myself on rice, soup, and kimchi (a popular side dish of Chinese cabbage) or visit the Italian restaurant on the ground floor which was quite a bit expensive. This lasted for nearly two and half months before I started relaxing my strict dietary regime a bit. This also saved a lot of problems when the whole team went out for a Korean barbeque every month.

Over the next two years, I would go on to experience many different preparations of local and international cuisines.

Adjusting to the new work environment

Let us now talk a bit about the more serious things for a bit. Although there was no significant difference compared to the environment in most IITs (e.g., staying up at lab till the dead of the night), there were a few interesting aspects that I believe were unique. Firstly, we used to have at least one monthly team meeting where at least two members would present the status and progress of their work, and answer the various queries made by the rest of the team. This is a very effective approach in

helping students broaden their knowledge, thinking, and clarifying the various issues they might face in their research while promoting the notion of a group effort. A most interesting fact was that this meeting was not restricted to just the Ph.D. students. Both the undergraduate as well as post-graduate students would actively participate in the meeting. This is something, I hope to eventually inculcate in my students as well.

Secondly, well, this aspect has more to do with the mental well-being of the students than with academics. Twice every year, the professor would plan a short trip with us across the country. This was to help everyone relax and recharge so that they can begin their work upon return with new vigor. My very first trip as a part of the team was to a Ski-resort in January.

Final Thoughts!

No banquet lasts forever, and my postdoc life eventually came to an end. On the New Year's Eve of the black year of 2020, I left South Korea, and within two weeks, my journey into the next phase of my life began.

Looking back, while I found myself immersed in the reminiscence of the memories I made there, I also feel a bit of regret that I did not enjoy my life outside academia a bit more. While it is important to put in effort for your work, it is also important that we enjoy our lives a bit more, because it is the journey that is more important in the end, not the destination. In the wise words of David L. Weatherford-

**“You better slow down
Don't dance so fast.
Time is short.
The music won't last”.**



07

**She Did Not
Welcome
The Rain**

-Nandini Priya

All alone there she stood,
On the balcony, amidst the woods.
The sinister winds kissed her skin,
While she was waiting for her kin.
The sun hid itself behind the clouds,
Leaving her with roaring sounds.
It was the time to welcome the RAIN,
But she chose to REFRAIN!!

Though this rain dimmed the bright,
But she was curious of her delight.
The Zeus took it as a diatribe,
Thus stronger he rained with full strive.
It was the warning of her perceived disrespect,
Cause in his eyes, she was the suspect!!

She noticed the rain was not benign,
Still firmly she stood, with all strength combined.
The sudden diaspora wassailed the Olympus,
But she didn't care of the alarming fuss.
The locus of her life was being drawn away,
Swiftly she understood,
Rain was planning this betray!!

Suddenly the storm was over,
As if it was the wicked mission's closure.
The sun appeared with a saddened bliss,
As the hope lost to the hiss.
Days passed but alone she stood,
Amidst the poignant woods.
All alone she rued again and again,
"Why did I not welcome the rain!!!



'EDGE' FOR

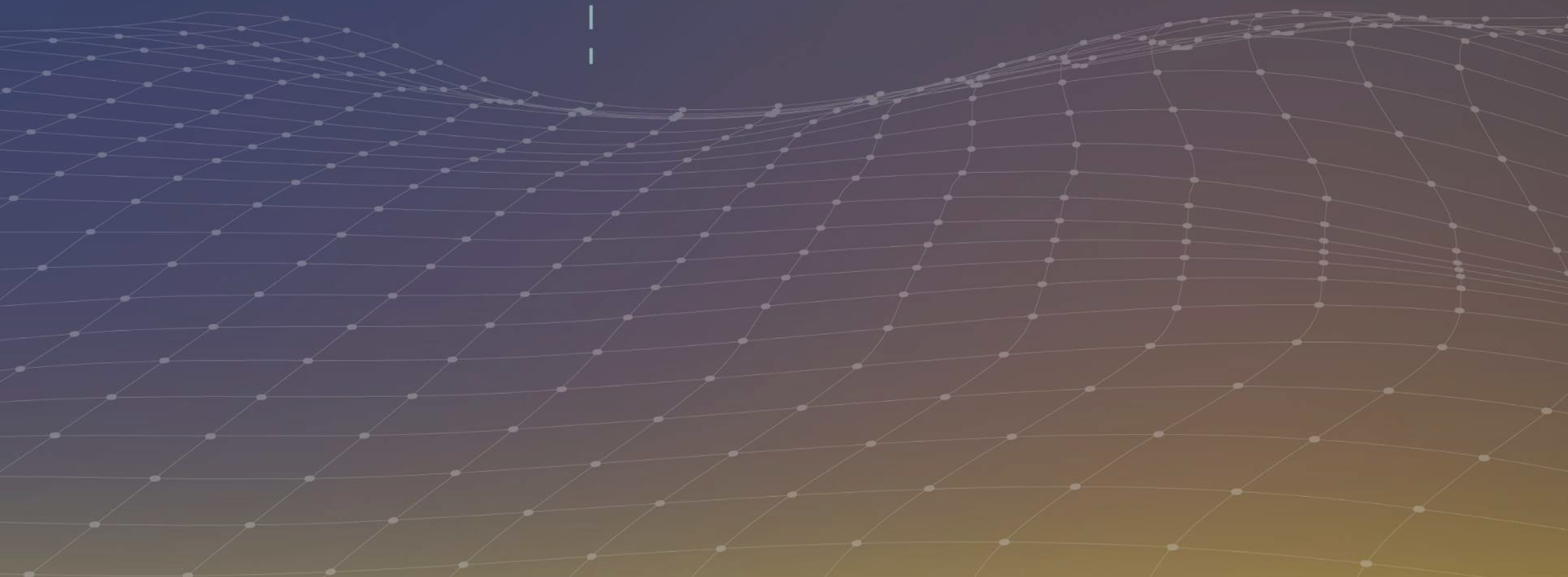
AN EDGE

OVER

THE **CLOUD**



-Vipul Bajaj



Have you ever heard the word 'Cloud'?

You must be thinking is that something to ask as they are all over us. Definitely true, but that's not what I am interested in. It is something far away from us which we can't see, touch or feel unlike your answer, thanks to Wright brothers. Despite being remote, it is an essential part of our modern technology driven lives. Still not getting it?

So, let me be more clear this time – just writing these names – Amazon Web Services, Microsoft Azure, VMware, Google Cloud, Google Drive, Dropbox.

Yes, these are all the cloud services that we use daily and my 'Cloud' is referring to the term

Cloud computing, a technology that uses the internet for providing wide variety of computing services such as software development and testing, emails, customer facing web applications, storing and managing data, everything on remote servers.

Before, organizations used to install On-premises servers to meet their business needs. But that required paying huge amount of money upfront for setting the servers and getting large server spaces beforehand as it was inflexible unlike the Cloud services -the Public type[to be specific] which is based on the-



PAY-FOR-WHAT-YOU-USE model.

Also the traditional way had additional expenses for managing the hardwares and softwares on their own and to procure security measures for data safety. But today, all that is the cloud providers' responsibility.

Moreover, the cloud is way more faster, updates automatically and you can access and share data with anyone whenever you want.

Problems with cloud computing :

The remote servers used in cloud services are enormous storage centers and everyone's data gets transferred there for storing, analysing and processing results for the users' needs. And the data is continuously increasing day by day.

It is predicted that by 2025, world's data will grow by 61% to 175 zettabytes[which is more than even the overall world population's smartphone storage].

So what? Why do you have to bother about that?

Imagine if you have to give a very important presentation somewhere and your slides are stored in that big cloud.

What if those slides don't load and show up on time?

Or you are sitting in an autonomous car [probably in some years] approaching towards the end of a road, the decision of instant application of brakes must be sent to the car's system. But those centralized data centers will take a lot of time in searching your data in that huge reservoir, analyzing and transferring over internet will add up more.

This indicates cloud is not the perfect solution for everything.

The Solution:

Edge computing

We need something different. We can think of something like – If we can't get the data closer to the data center, get the data center closer to the data.

Bingo! That's what edge computing does.

It is a distributed IT architecture in which client data is processed at the periphery of a network, close to the originating source. It involves moving some part of storage and computing sources out of centralized servers, packing it in shielded enclosures to provide protection from heat and other environmental conditions and

deploying it near to users' IoT devices. Now, the data processing part will be dealt locally to look for business intelligence and sending responses to instant demands.

Benefits

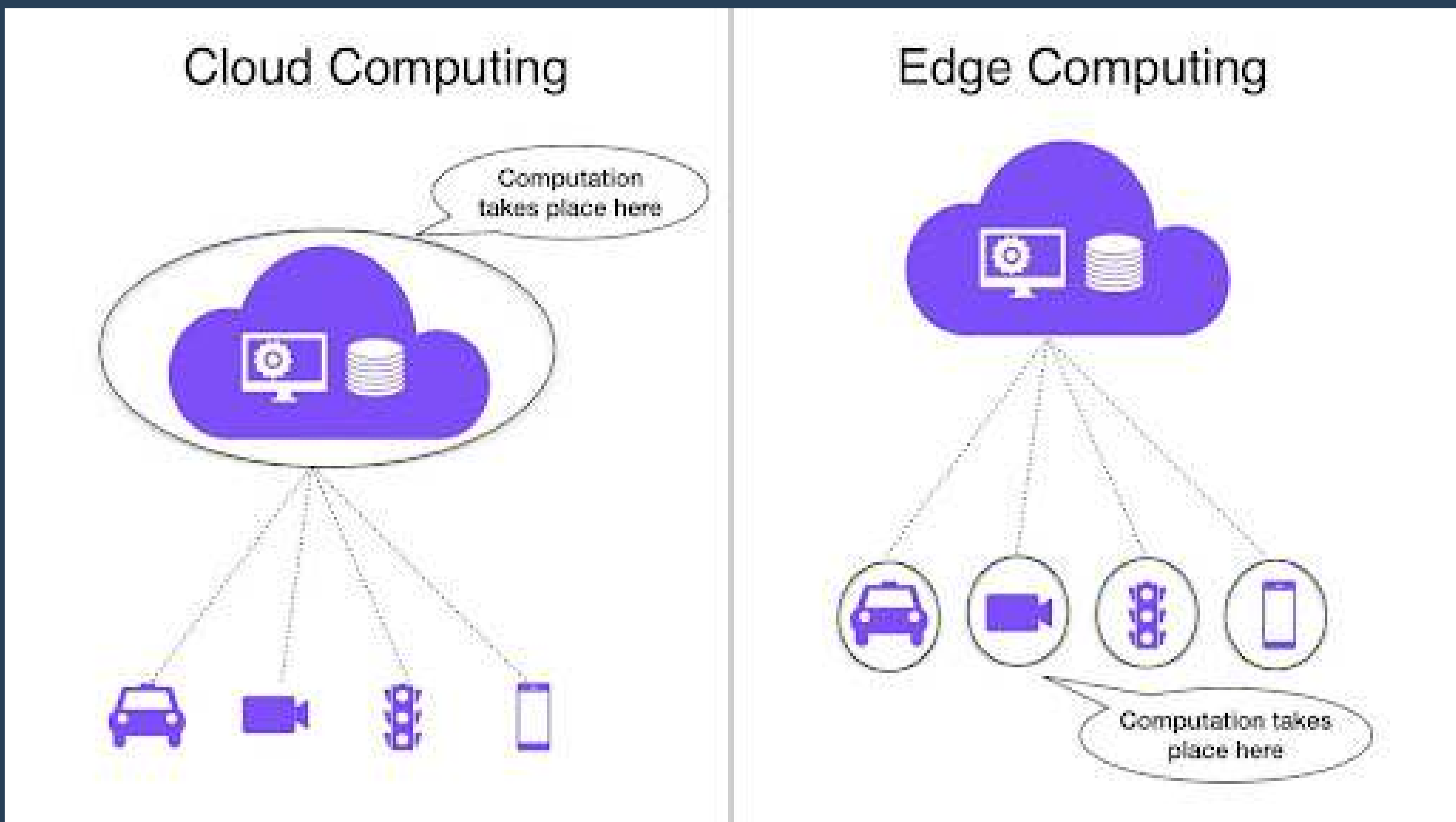
In 2006, cloud computing emerged with the release of Amazon's Elastic Compute Cloud services. Since then, this technology has been widely adopted by companies because it offers far more than enough resources and services to tackle complex analytics. Still, it has numerous demerits which the edge concept negotiates conveniently. These include -

Latency

It is the time taken for a packet of data to get to its destination and back again after processing across the network. Sending data to clouds at large distances can delay the decision making process, which can cost even lives such as in the case of autonomous car. Being present physically near the data, edge server can produce responses a lot quicker.

Bandwidth

The maximum amount of data that can be transferred over internet in a given time. Now, with advent of technology, everything is being performed on some sort of devices sending their data over the networks to the clouds. Consequently, limiting the per device data being sent by each



device, restricting the much needed data processing requirements. By processing data locally at the edge, we can reduce vast amounts of data to be sent over networks and transmitting only essential data to the cloud.

Data Sovereignty

Data transferring to clouds has not only just technical problems. Moving our data across regional and national boundaries poses serious security issues as our sensitive information can be lost. Instead, processing the raw data locally, securing sensitive data, and then transferring to the cloud helps to solve this problem.

Implementation in real world

Let's dive deep to look how different sectors in real world are getting benefitted by edge.

Farming – Massive plots of land are owned by farmers and keeping track of various stages of growing crops is an arduous task. Using sensors enables them to track water use, nutrient density and determine optimal harvesting. Data is collected and analyzed to find the effects of environmental factors and continually improve the crop growing algorithms and ensure that crops are harvested in peak condition.

Workplace surveillance

It is necessary to oversee if the workers are following rules and safety protocols especially where heavy machineries and hazardous working conditions are there. Also, petty robbery by workers or customers is something that owners are worried of. Detecting all these instantly at the workplace will prevent the losses mentioned above.

Challenges

We saw how edge computing provides compelling benefits across multitudes of sectors. But not every problem has a solution. Perhaps, it has one that is yet to be discovered or not feasible. Edge also has its own challenges which can't be overlooked.

Connectivity –

It overcomes typical network limitations but there always will be requirement of a minimum level of connectivity. It's critical to design edge deployments that can perform on low and erratic networks, otherwise the whole point of comparing edge with cloud fails.

Data lifecycles –

One of the major problems is deciding which data needs to be stored and which should be deleted. Like in hospitals, storing daily normal patients' data isn't necessary and causes a lot of storage problems. Instead we just want the problem data and identification of that at the edge is not developed yet.

Unsecured data –

IOT devices are generally unsecure which needs special emphasis on developing edge deployments that include data encryption. Data services from several cloud providers include data security but edge lacks that feature.



Conclusion

Despite these challenges, technological advancements are enhancing edge performance and capabilities and gradually these issues are being resolved.

In fact, in the next 5-10 years, edge services are expected to become available worldwide. Though we know now that edge

computing has a clear edge over cloud in offering much more instant and complex services, still it can't be predicted that edge will replace cloud in near future. Both the platforms are different and won't replace each other, instead they will work in harmony to run, deploy and manage IoT devices.



INTER IIT SPORTS MEET

*“Words don’t do justice to
the experience, but I’ll try
my best :)”*

-Tanmay Shreshth

Words don't do justice to the experience, but I'll try my best :)

A sport where milliseconds count. A racket is all you have. But it's the hands, the hands wielding this weapon, that matter.

Blink and miss...

Table Tennis club. A club that has been dear to me since I arrived here. What started out as a hobby, became an integral part of my stay here. Everyday, 6pm. Returning to hostel, exhausted, skipping dinner every other time, just wanting to lay down and fall asleep.

October 25:

Breakthrough

Inter IIT Sports Meet, the biggest sports event for any sportsperson at the premier institutes of the country. An annual event where contingents representing each IIT battle it out in numerous sports. My eyes were fixated on a place in the Table Tennis team. Deep inside, I knew that I needed a performance of a lifetime.

When the dust settled, I was in! Never before, was I so happy to call back home, and say that I couldn't come back, as Bhubaneswar beckoned.

(Practice, Practice, Rinse, Repeat)..

"Every friend starts out as a stranger. So did my fellow club members."

What should a typical train journey of bachelors look like? Dumb charades, movies, silly games, food crisis (impossible to avoid in trains!); I could go on. But we had to arrive at our destination, and some 24 odd hours later, we did.



Straight to IIT Bhubaneswar

From leaving for practice at 5am, to laying back in hostel rooms doing nothing; from eating at stalls, to 'chai' reminding of khokha back home. During all this, the goal remained clear - to do our best, for which we were here.

Opening Ceremony

All the contingents lined up for the March Past, and the Sports Meet was officially declared open. The event was graced by none other than the renowned athlete Ms Dutee Chand.

Rush

Even being by the sidelines, I could feel the adrenaline rush. The cheers, the sledging; everything made the atmosphere electrifying.

No matter how much you practice, once you enter the arena, you can feel the pressure, eyes fixated upon you, the opponent team trying to unsettle your nerves. The stakes are much higher now: you're no longer chasing personal glory, the pride of your institute, the hope of your fellow team members, they get thrown into the equation.

My first match, I was a nervous wreck on court! Legs refused to move, apparently frozen in place by some immovable force. Although the result went my way, I knew I hadn't performed anywhere close to my best.



I could bore you with the details of every matchday, but choose not to do so :)

With time on our hands, it was decided to go sightseeing. Visits to Konark Temple and the Golden Beach followed. As a first-timer, and especially as a first-yearite, you get to learn and experience a lot.

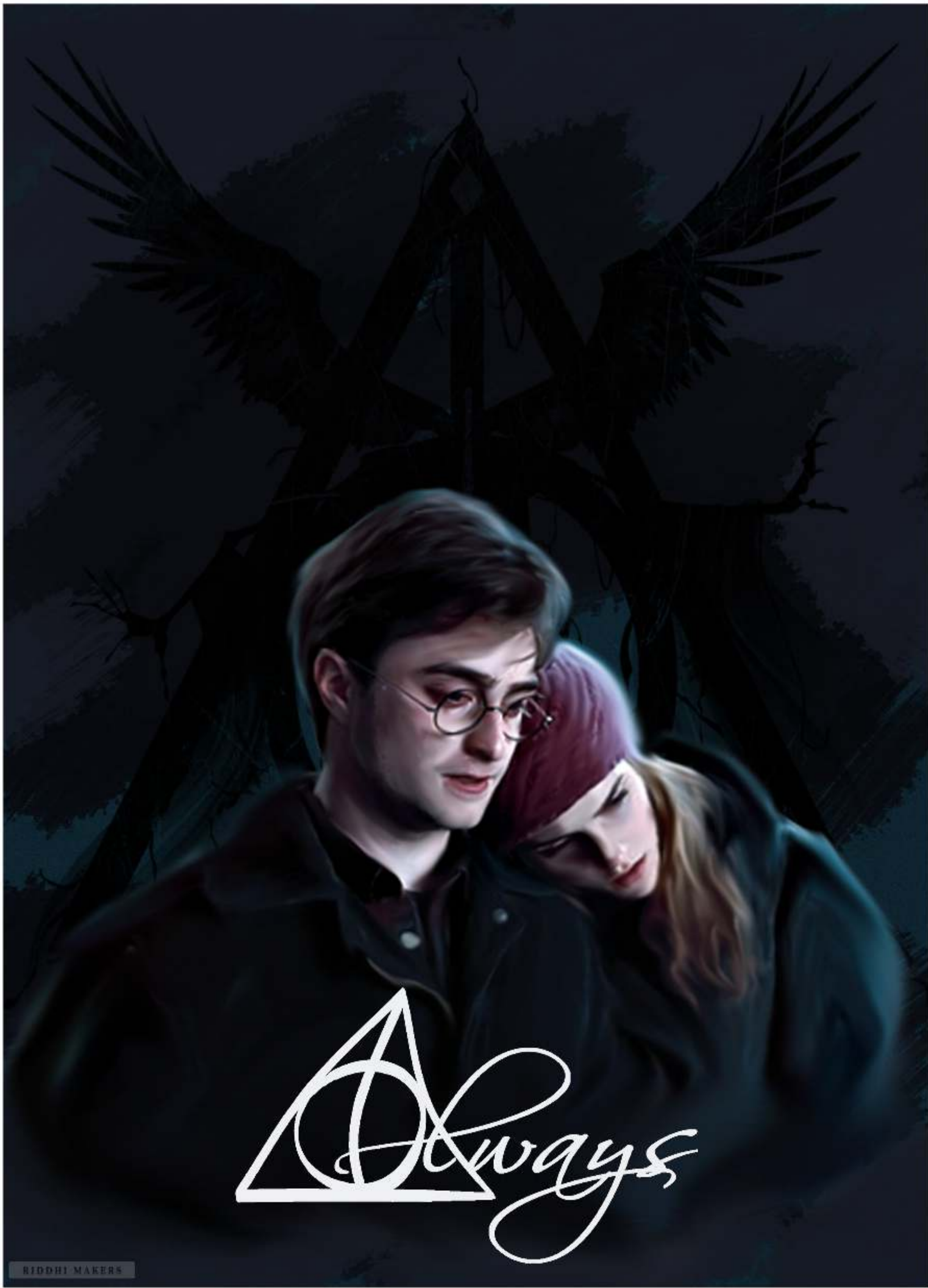
The last morning, there was fog all around. I was sitting on a bench, overlooking a part of the campus. Ten days had flashed by; it was time to go. This was an experience of a lifetime. Getting to interact with a variety of personalities, some awesome seniors and making everlasting bonds and memories. Although we didn't achieve what we had come for, everyone gave their all.

Were we returning empty handed? I disagree, and for good reason:

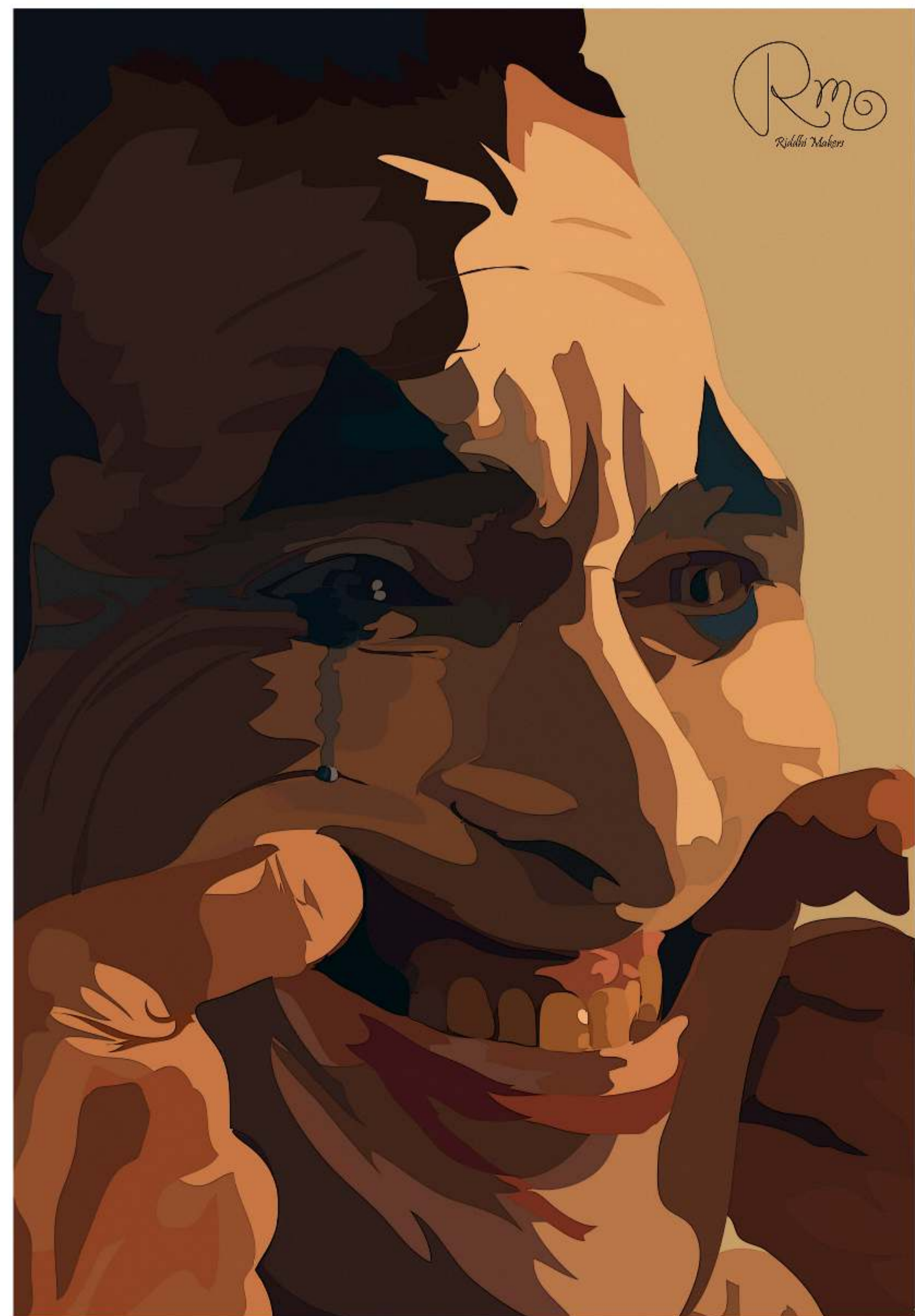
From a 10-year old struggling to hold the racket, hitting wayward shots, crashing out in inter school tournaments, to the racket gathering dust for the best part of the 5 years before arriving here. Never thought table tennis would give me so many moments to remember. During my stay here!

And I would like to end with the same quote-

Words don't do justice to this experience, but I tried my best :)



Riddhiman Biswas



ALUMNI DIARIES

QnA

-Naresh Palaiya

10

What were your hobbies and do you still take out time for them after your work hours?

Well, to be frank there was no hobby during my college days except binge watching :). But yes I used to do some sort of physical exercise by going for a run. Post that during the job I made it a hobby to go for a daily 5k run which used to give me a little bit of accomplishment and then eventually started going for half marathons.

While in IITG, were you part of any club(s)? What advice do you have for the current club members on how they can improve their functionality?

During my college time a lot of clubs were at their nascent stage i.e. Cepstrum, astronomy club, EDC (Entrepreneur Development Cell). Being from ECE, I was a part of Cepstrum. As far as improving the functionality of the club is concerned, I guess you guys are already doing a fantastic job by arranging panel discussions or writing to alumni from industries to pick their brains. Which was missing during my days.

Is there something you wished you did more of during your time at IIT?

There are a number of things which I wish I could have done.

1) I could have focused more on finding out what interests me or what am I good at or does ECE

branch really interest me? Like myself, I believe a lot of students end up in a random branch and then they carve a way out by either going for a MBA or doing higher studies or landing in a coding job. Although I utilized our winter vacation by learning new coding languages, I could have also learnt a bit of the business aspect of how a startup functions. How to pick a relevant problem to start your own company? Which could have resulted in me starting my own company earlier.

2) In the interest of visiting Europe/USA for an internship I spammed a lot of people's email. So, I could have avoided that :) and should have gone for an industrial internship in a startup.

3) Could have appreciated the campus's serenity and beautiful sunrise by taking an early morning stroll. I hardly did it except during the last few days when we were about to graduate. Once you are in a busy job life you hardly get a chance to experience it. and the list goes on.

What is Tathya about?

If we look at the recent events i.e. covid, shortage of semiconductors, climate change. It's very difficult to get insights on what is happening on the ground in real time. Even economic indicators i.e. PMI are traditionally gathered using monthly survey. which are error prone, involve human intervention and are not scientific. Hence, we at Tathya are building the platform using



**Naresh
Palaiya**

CTO

An IIT-Guwahati graduate who loves to solve problems using technology. He has experience in Data engineering, Machine Learning and Architecting systems for large scale analytics. He led the Data Engineering team at Carwale.

alternative data i.e. satellite images, location data to derive insights on global supply chain of metal commodities and its impact on supply chain in near real time.

How did the idea come into being?

Ideation started with Gunjan, who is one of the co-founders and CEO of Tathya. Him and I had worked for 3-4 yrs during CarWale and post that he was working with MoneyControl where he worked on customer profiling i.e. income level, demography based on a pincode. So, he read a lot of research papers from Harvard, Stanford about deriving the poverty level using satellite images in the African region. When he pulled me in this and our interest in alternative data i.e. satellite images started. Post that he, I and two more

co-founders used to work on weekends and figured out we should be deriving economic activity of a particular area rather than demography considering a lot of factors, and in October'19 we officially started.

What were the major challenges or setbacks that you faced while starting out?

When you are approaching your 30s after spending a good amount of time in the industry. You are in that comfort zone, and on top of that according to Indian families one should get married and be settled by that age. But I did quite the opposite and it took me a lot of courage to get out of that comfort zone of getting a salary at the end of the month and take that plunge and eventually start the company. We started in Oct'19

and Mar'20 covid happened. Luckily we just closed our pre-seed funds in Feb'20 end though which we were able to focus on our product development.

You've been in the corporate world for almost a decade. What are the most priceless lessons you've learnt from this experience?

I would mention only relevant lessons for you guys.

1) Don't run behind the CTC numbers or switch companies just because you are getting paid higher. Focus on the learning aspect at the initial few years of your career, don't ignore the job profiles which companies are offering to you.

2) Those who practise a lot on competitive programming platforms sometimes rather than solving more questions in the given time take a pause and before you write any piece of code, ask yourself how will my code work under the heavy traffic, how can i make it more scalable? Through this process you will not just be a better programmer but also a good architect.

Are there any suggestions you would like to give to college students dreaming of starting their own companies?

I would suggest spending as much time as possible on a problem statement which one wants to solve. Talk to a lot of potential clients, take their feedback on the product.

When one wants to build, ask them if they would be willing to pay if a product exists which solves their pain point, research about the market size of the problem one is going after and at last built a kickass product/business/company because as they say ideas are cheap and it is the execution that matters the most.



Understanding

The Real World Using Data

Building tools to monitor Economic Activities
on a near-real-time basis

TRANSHUMANISM



-Sanskar Kejriwal

Meaning

The term transhumanism was coined by English biologist and philosopher Julian Huxley after using the term for the title of an influential 1957 article. Transhumanism is a philosophical and intellectual movement which advocates the enhancement of the human condition by developing and making widely available sophisticated technologies able to greatly enhance longevity, mood, and cognitive abilities, and predicts the emergence of such technologies in the future.

Limitations Of Humans

The range of thoughts, feelings, experiences, and activities accessible to human organisms presumably constitute only a tiny part of what is possible. In much the same way as Chimpanzees lack the cognitive wherewithal to understand what it is like to be human so we humans may lack the capacity to form a realistic intuitive understanding of what it would be like to be a radically enhanced human [a “**posthuman**”].



Let's talk about some of the limitations of human in a little detail:

Lifespan: Humans live a life with the usual age ranging from 60-90 years which indeed is a small period. Moreover, human character development is also cut short by aging and death. If humans continue to enjoy health and youthful vitality, they would have continued to grow as humans and artists, to reach the levels of maturity that we can barely imagine. Therefore, there is at least a serious possibility of there being something very precious outside the human sphere. This constitutes a reason to pursue the means that will let us go there and find out.

Sensory modalities and sensibilities: Sensory modalities which humans have today are limited and they are also not very highly developed. Some animals have sonar, magnetic orientation, sensors for electricity and vibration and much more stuff while some others have better sensory modalities than humans like sharper eyesight, infrared vision, and high frequency sound hearing capacity. There is no fundamental block to adding say a capacity to see infrared radiation or to perceive radio signals and perhaps to add some kind of telepathic sense by augmenting our brains with suitably interfaced radio transmitters.

Intellectual capacity: All humans wish to be smarter, more intelligent in their life. In spite of having a complex brain which performs many difficult tasks it has some significant shortcomings and with age this becomes more significant. Some things are impossible for humans because, simply put, we lack the brainpower to do them. Similarly, we may lack the ability to intuitively understand what being a posthuman would be like, so there is need to explore further in this area.



Neil Harbisson's antenna implant allows him to extend his senses beyond human perception.

Basic conditions for realizing the transhumanist project:

Considering that the transhumanism project proposes radical changes in the human body by means of new technologies, supposedly to improve it, there are some basic conditions which are to be fulfilled in order to realize the transhumanists dream.

Global security: The implementation of the transhumanist project will involve various failures and unseen events but the existential risk must be avoided at any cost.

Existential risk – one where an adverse outcome would either annihilate completely Earth-originating intelligent life or permanently and drastically curtail its potential.

The transhumanist core value will not be realized if we go extinct or permanently destroy our potential to develop further. That's why global security is the most fundamental and nonnegotiable requirement of the transhumanist project.

Technological progress: To make transhumanism real, technological progress is much needed beyond what we have now. Many of our biological shortcomings like aging, diseases, intellects, limited senses, limited brain power are difficult to overcome and will require advanced technology to conquer them. Transhumanists support the emergence and convergence of various technologies, including

nanotechnology, biotechnology, information technology and cognitive science, as well as future technologies like simulated reality, AI, superintelligence, 3D bioprinting, mind uploading, chemical brain preservation and cryonics to become more than human.

Wide Access: The full realization of the core transhumanist value requires that it should be available to all, otherwise if it is restricted to a small number of people its whole purpose will be lost. The reasons to support this point are to reduce the inequality, to gain maximum support for transhumanism, to increase the range of the posthuman realm that gets explored, to alleviate human suffering on as wide a scale as possible. The transhumanist ideal will be maximally realized only if the benefits of technologies are widely shared and if they are made available as soon as possible, preferably within our lifetime.

If we want to live in paradise, we will have to engineer it ourselves. If we want eternal life, then we'll need to rewrite our bug-ridden genetic code and become god-like ... only hi-tech solutions can ever eradicate suffering from the world. Compassion alone is not enough.

DISADVANTAGES:

Though it has many bright sides but just like a coin have two sides there are some dangers of this transhumanist project.

Dehumanization: Transforming the human species into a near-robotic being takes away the essence of what truly makes a human. The idea of tampering with our bodies to obtain potential immortality seems unethical and unnatural, as nature will always be greater than all the science and technologies combined. There will be a loss of human identity with the rise of transhuman and transhumanism.

Inequalities: The current inequalities will be intensified with transhumanism becoming a reality and the financial status would become the determining factor in gaining an advanced lifestyle. The one who can't afford it will be regarded as unworthy of living in the evolutionary world.

Even in a hypothetical situation where we consider everyone can afford it, there will be a group of people who will choose to "stay human" by not adopting human enhancement technologies which will again increase the inequalities.

Increased Population: The transhumanism movement aims towards increased lifespan, no diseases, perfect immunity and

consequently, a drastically reduced or nil death rate, so this would cause an overpopulated world. Our Earth is already struggling to contain the billions of people currently living on it and this has given rise to problems like climate change, global warming and resources depletion so, with further increase in population it will be going to be worse.

Unknown ahead:

Honestly, no one has any clear idea of where we are headed with transhumanism. There are both the supporters and critics of transhumanism which have their own valid points. There is a substantial **Existential risk** involved in the idea of transhumanism which also makes the road ahead blur.

CONCLUSION:

Transhumanism sounds like a human fantasy filled with a lot of difficulties and challenges but we all know every revolutionary idea that changed the lives of many people went through the same phase, criticized by many but at last changed the world, changed the way people live. It may be possible that transhumanism fails but it's possible that while reaching that level of perfection we all will definitely reach a level much better than where we are: where every individual's life will be improved.



Paridhi Baruah



12

Breaking The Shackles

-Saptarshi Samanta

A faint rattle of chains is barely heard,
It feels as if a breeze has just stirred;
The rattling sound persists, though nothing moves,
A whispering voice is heard full of reprove.

“Why did you throw us away?
Why did you leave us to decay?”

The voice whispered full of malice and rage,
It felt as if the voice wanted me bound in a cage;
I looked around to find the source of the sound,
I hear a mocking laugh, but nothing is to be found.

“We used to be so happy as we were bound for all time,
Yet now you despise us as if we have committed a crime;
You were always afraid of changing your views,
You detested trying something new;
We kept you safe within the confines of your walls,
We saved you from unexpected falls;
To protect you from emotions, we kept you alone,
We shielded you from the unknown.”

The voice screams at me with all its might,
It wanted to have me cower in fright;
A brief moment of silence except for the rattling chains,
“You know you have wronged us,” it said in disdain.
I closed my eyes, wondering about all that was said,
And as realization dawned, all became clear in my head;
It was the voice of the shackles that had bound my mind and soul,
It was these very shackles from whom I had seized control.

“You sound like you have been my guardian all these days,
You had taken it upon yourself to show me the way;
But tell me, Shackles, have you really helped me fly?
I think you rather have me locked in a room and sigh;
You never helped me find a path to reach my goals and dreams,
Instead, you had me wrapped in fear and other debilitating schemes;
You had me chained within walls of constraints,
And as you governed my life, my confidence grew faint.

Shackles, you were not protecting me from strife,
You were stopping me from experiencing my life;
And the longer you would have held sway,
Everything that defined me would have frittered away.”

Shackles mocked me with all the scorn it could muster,
“If I were not there, your life would have been a disaster.”
I laughed at the voice, “Is that so?
Do you have any results to show?”
The voice goes silent in my head,
It knows that I will no longer be misled;



“You chained me in my darkest days,
In the name of safety, you led me astray;
I have broken the shackles, and I now see the light,
Begone! And no longer cloud my sight.”



Nirupama Jha



FIRST SIGHT

-Snigdha

You never experience the same feeling twice. The first time you learnt to write was when your mum handed you an old, dusty notebook and a pencil which felt strange in your tiny, tender fingers. Remember your first memories of holding a book in your hand and getting so absorbed in it that you forget that the world exists, or when you found new songs and new artists, new movies and games, new passions and new hobbies.

May it be the joy of falling in love for the first time or the bitterness of having your heart broken, or

finding friends who become family or discovering poetry for the first time, every experience is unique and no matter how many times the same things repeat, everytime it will be different and special and lovely.

Being a fresher in IIT Guwahati and living in campus for the first time is as remarkable as any feeling experienced for the first time and this blog is a conglomeration of some of my fondest memories of the pre covid freshman year. The editors of the magazine told me to write something for the people who have never experienced it, so here we are!

After the day my parents left me at the hostel gate, everything seemed daunting yet exciting. Classes began the next day and I remember meeting a bunch of equally confused kids in my lobby, sitting together to decipher our time table. Our classes were in the evening and it was amusing to see a herd of freshmen marching towards the lecture hall in their bright shiny new bikes as soon as the clock struck 2. Though initial days saw the

new kids who came out from the hibernation of JEE period as excited and engrossed, it wasn't long when every

bench of hall witnessed weary drowsy kids napping. Almost after a month in this new college life, it was time for us to witness our first fest and no words can describe how incredible and lively it was. It was the first time we all were a part of Techniche and the hustle began days before the fest. We would see the lights flickering from the windows of the New sac and our seniors working all night to make the event memorable and grand. Gathered crowds assemble at the streets, bright banners are put up, the streets are decorated with signs and posters, children from all over the country come and exhibitions

YOU ARE THE

CREATOR

OF YOUR OWN

DESTINY

are held, colorful stalls serve light snacks and cold drinks, speakers from all over the world come and share their stories, games are played and music plays loud and you know that your heart beats louder unable to contain this feeling of belongingness. I remember participating in the Triwizard Tournament, attending the lecture by Paul Arion and then standing in a long queue to get a picture with him, eating at the numerous stalls, gathering in one room to help each other dress up for pronites, and after over an hour or more of standing in queue finally being able to see the pronites

in the auditorium. I remember how nobody knew each other too well but there was an aura of togetherness.

The campus looked so vibrant and the atmosphere was alluring. We meet people and make some of the most amazing friends. As the night approaches, the campus gets excited and alive for the pronites. We lose our voices with the vigor of the crowd, living it to the fullest and dissolving ourselves in this enchanted euphoria.

Soon this campus became home, and these friends became family. Though the mundane list of activities included getting up reluctantly each morning, attending tutorials, labs and then classes, spending sleepless nights together in one room before the exams, helping each other study, riding off to lecture hall to give midsems/ end sems and then spending time in the canteen to wash away the weariness with a cup of hot coffee

and fried maggi. But the memories that lingered after them warms my heart so much. I remember the day our midsems ended, we rode all the the way to the new guest house. We sneaked

into the huge building, walked up the dark corridors with one flash light and five of us hushing and giggling. We went to the top of the roof and witnessed what it felt like when the world grows small. We beheld the entire campus in front of us, sitting at the edge of the building, feeling more alive than anyone else.

Soon, the club and fest orientations began. I remember attending every orientation. I eventually became part of E Cell and MUN. In the



beginning of Second semester, things become adventurous. January marks the conduction of three big events, Alcheringa, Udgam and Interhostel competitions. From sitting in one room, calling a bunch of students from local schools regarding MUN and editing our background guides, to going to individual hostels pitching about Udgam. From conducting conferences and sessions in formals and high heels the entire day in the MUN , to dancing and vibing in the pronites and sitting in the middle of the street so full of people, with a bottle of beer in one hand and biryani in another. The days were tiring, but it brought the best out of us. It was during these fests and nights, we met people who are going to stay with us forever.

Looking back I see my first year on campus as a total ride. It's not just a year of your four-year bachelor's degree program. It's so much more than that. It is a home away from home made of sounds , colors and

prized memories. It's about growing up but still never leaving your childishness. It's about mosquito bites and sweet belly laughs and muffled midnight sobs. It's about the shimmering of the compartmentalized memories fresh on your skin after a bath in the mid summer rain. It's about all nighters and long walks and ugly eye bags. It's about ghat trips and evening chai at khokha that makes you forget the weariness of the day. It's about strolls to the core 5 canteen and the 3 am



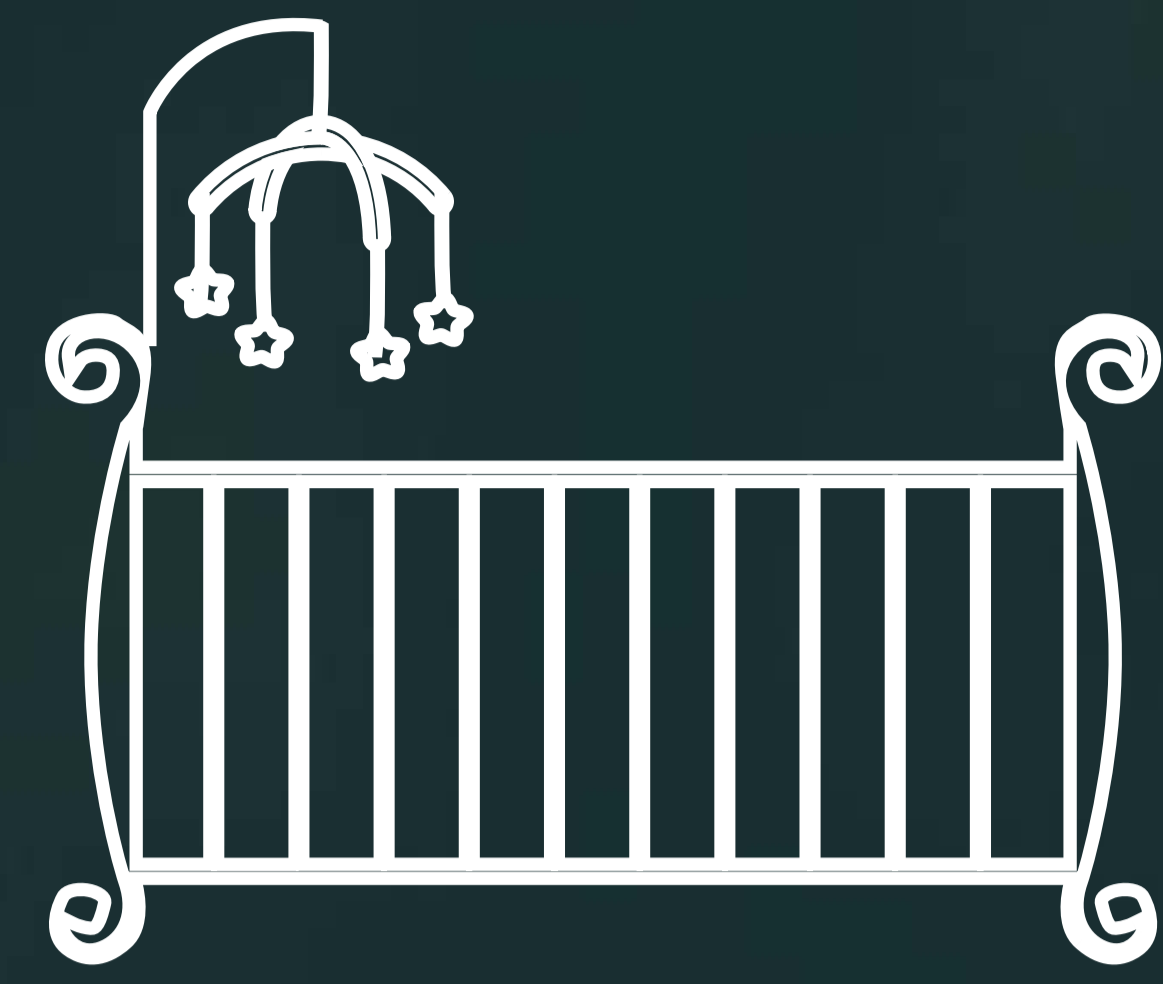
rolls and fresh frappe at ccd. It's about the pain and glory of being alive. Biking down the streets with your friends as the sun sets, shouting at the skies, you are happy for this freedom. Sitting beside the lake in the children's park where the sun shines bright overhead and the pink clouds slowly drifting through the side, it's about feeling safe. Nothing in this world will make you

feel what this moment feels like, how this love feels and that this place belongs to you.

To A Life
Well Lived

-Archit Joshi

From the first glint of light,
That your mother's eyes shone,
A new life born, a new destiny.
A cradle full of dreams dreamt,
Showering of praises and money
And exuberance empty inside
But tempting though.



Forgotten in the nook and cranny,
Of a life spanning an age,
Those small pleasures, those
Little moments that flutter
By so fast, contribute,
To a life well lived.

Bought into this unjust world,
Against your will,
But in a peaceful sleep,
You dream still.



Hope springs eternal,
Hope dies fast,
Till a new one comes,
Your flag is on the mast.
In the endless chase,
Nearing your grave,
Don't forget those

Tiny moments not noticed,
That make a life well lived.

For a man does
What a man must.
Carves his symbol,
On the face of earth.
In that symbol so small,
Spanning the journey
Of a lifetime
Lie things smaller still,
That make a life well lived.



15

JOURNEY FROM A
**SCHOLAR TO
A FACULTY**



-Prof. Anirban
Dasgupta



It gives me immense pleasure to share my experience of my journey – from a research scholar to being a faculty at a reputed IIT. This write-up may help others to use my experience and help them in their research journey. To begin with, it all started with a dream, a dream to pursue an academic career, and serve something for the society. I remember the day of PhD entrance for which I prepared thoroughly, as I knew that the entrance was tough. But to thank my stars, the interview went well and I knew I would get selected.

I started with my coursework and felt that I was re-learning the things I know from a different perspective. That was when I was learning to know another perspective of research – knowing the known from a different view-point.

Then came my comprehensive viva-voice, where I started a structured revision of the syllabus. However, I learnt that learning was not strictly structured as the concepts remained inter-related, and learning was beyond syllabus. It was when I faced the panel of faculty members asking tricky conceptual questions for my viva, which made me feel that one day I would be on the other side of the panel. That was probably a goal in the making for the transition from a scholar to a faculty.

My research was on estimating the cognitive load of a person, using signal processing and computer vision approaches. But I had to study



my domain knowledge of cognitive psychology to understand the research problem clearly. Indeed, I could relate the cognitive workload with the mental stress associated with every researcher. That was motivating enough to drive my research, in addition to the facts that how increase in cognitive workload of people like car drivers can lead to road accidents.

Initially, I was struggling to get a systematic approach to solve the problem. Nonetheless, there was a psychological pressure of ‘publish’ or ‘perish’. I started shifting my focus on structuring of papers, selecting suitable journals and working on them accordingly. But things were not as simple, as it seemed, as there was something missing in the approach, and finding the lacuna was the biggest challenge at that stage.

At those times, small research discussions with friends as well as with supervisor at tea breaks, really helped a lot in connecting the missing dots. Attending conferences, moreover, also gave a good exposure to the domain.



So, I started from scratch again and felt that every point in the problem statement was a cause-effect relationship. This point-of-view made things more meaningful for my thesis.

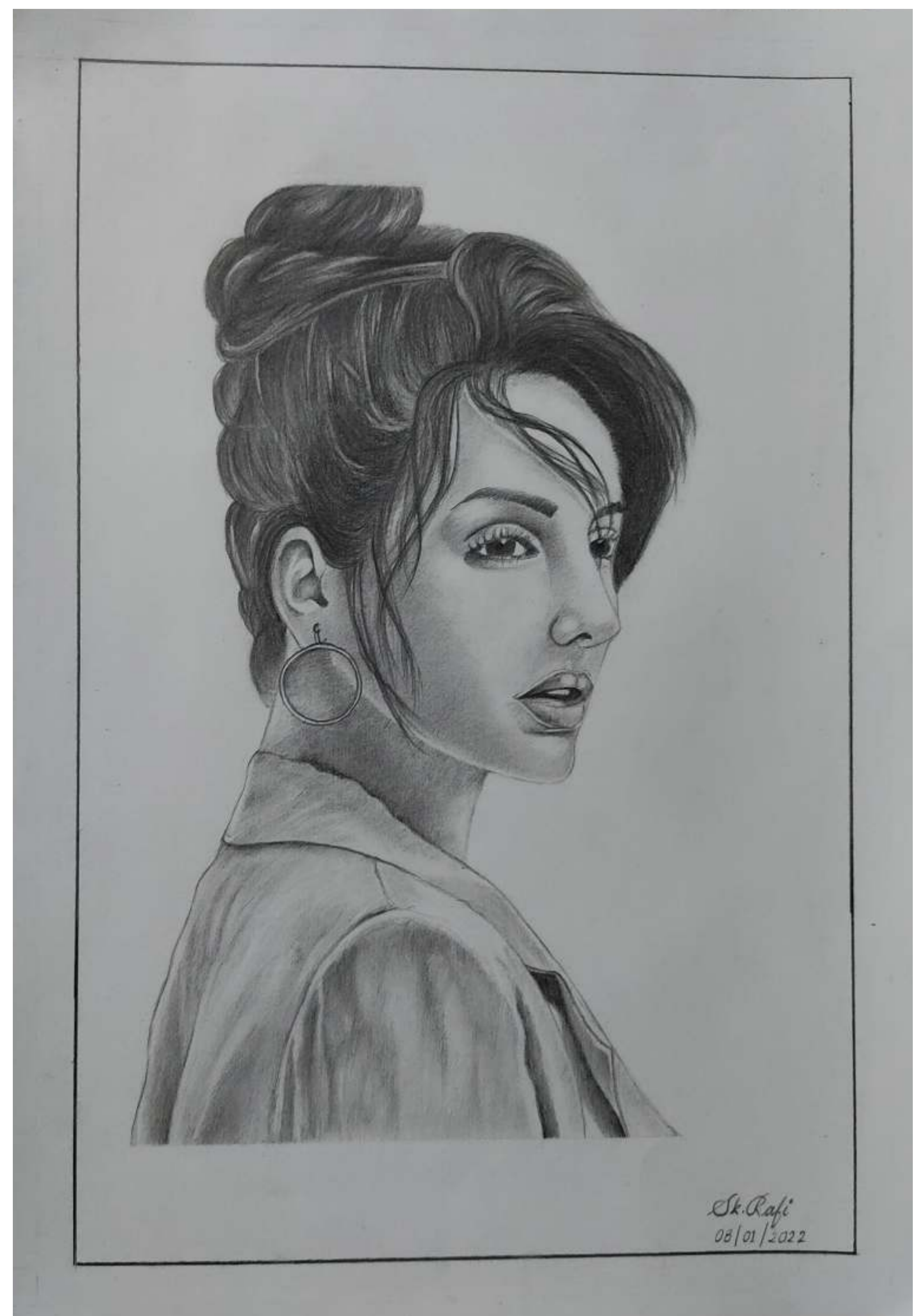
It was essential to have co-curricular activities apart from doing full-time research to balance out things smoothly. Hence, I participated in cultural events such as singing, quiz, etc. during my PhD life. It was not only about creating moments and memories, but with this balance, I was finding my research work interesting too, thereby reducing the monotonicity of the task. After four and a half years of work, my guide felt that my thesis was ready for submission. I submitted my thesis,

where organizing the content in a meaningful way, was the biggest challenge. But finally, things went well, and I was awarded the degree with flying colors. Probably that was the happiest day of the journey, when the salutation changed from Mr. to Dr.

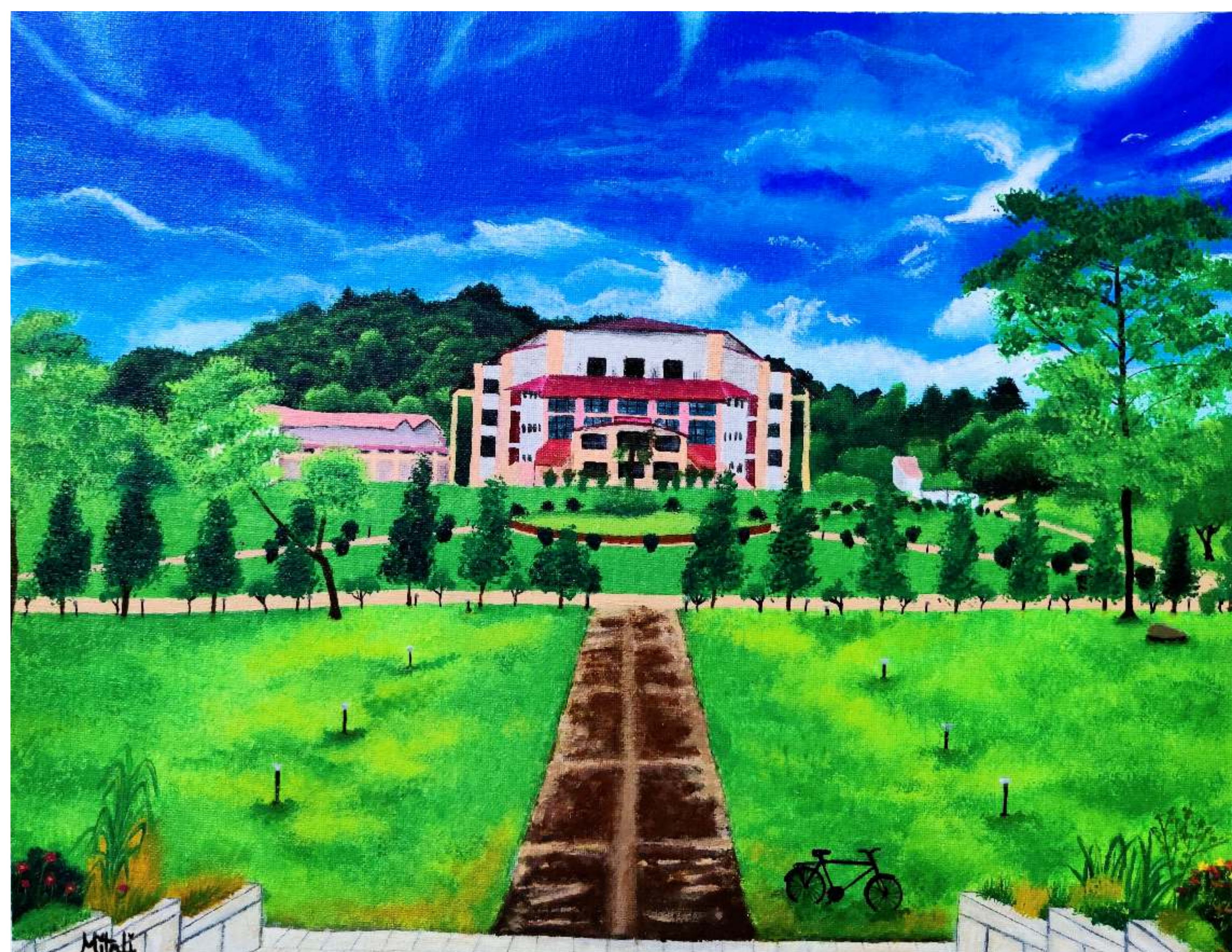
At the fag end of my PhD, I joined a start-up as a co-founder, with the goal of converting my PhD research into useful products. I continued with the same even after my PhD, until the COVID pandemic adversely affected the market. At that time, I had to secure my career, so I applied to many IITs and reputed industries. I joined Boeing India Private Limited as a Data Scientist. Within a month after that, I got a call from EEE Department, IIT Guwahati for the position of Assistant Professor. It was tough for working in Boeing, and simultaneously preparing for the interview. The interview went well, and I finally joined the Institute in December 2021.



**Shaik Khaja
Mohammad**



Saptarshi Samanta



Mitali Potdar



My
INTER IIT
Experience



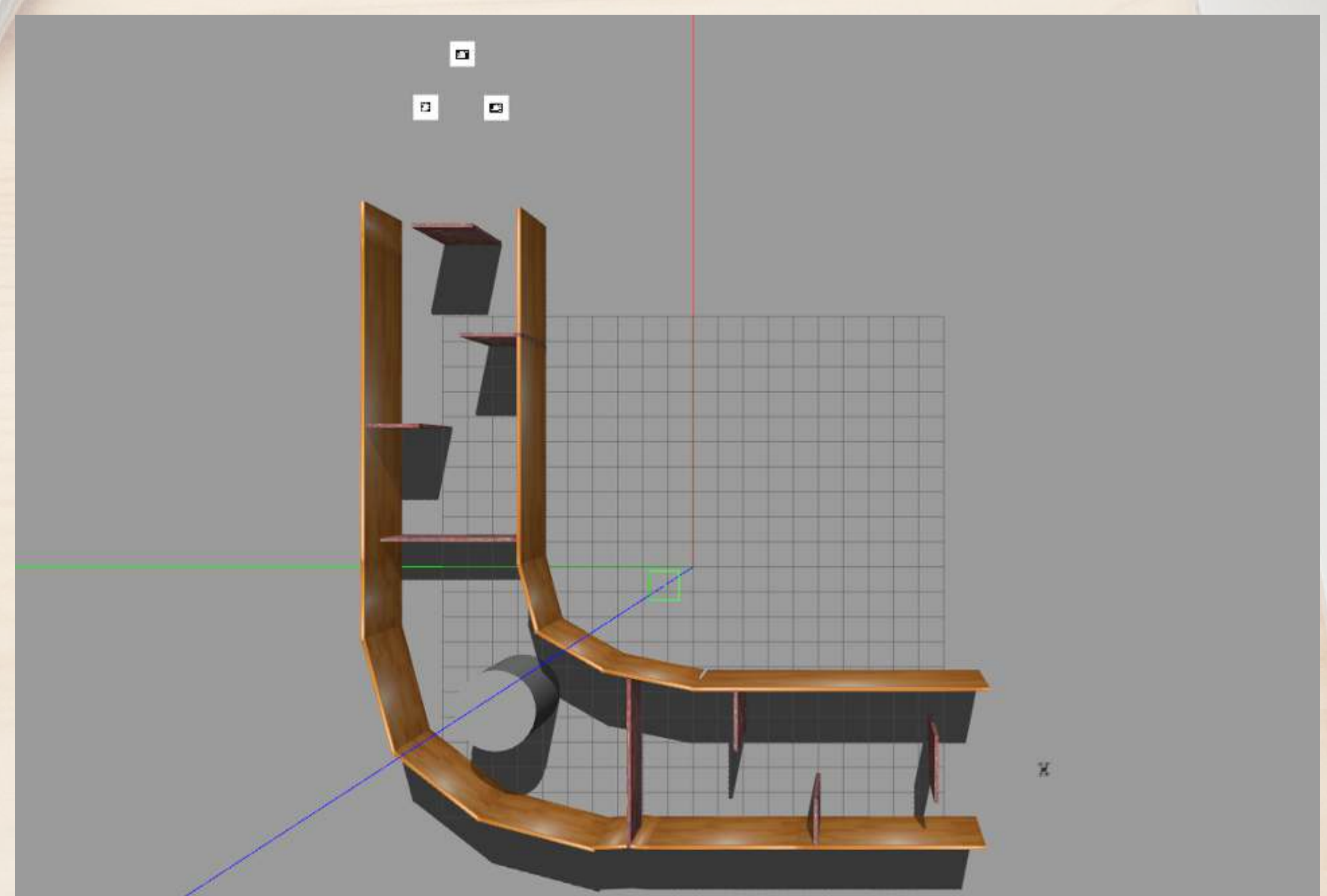
-Harsh Ajay Rana

Inter IIT Tech Meet is a very prestigious event that makes a person aim to achieve and explore their best by competing with other teams from different IITs from all over India. Be it Technical, Cultural, or Sports, every sector has a lot of talent who participate and give their best. In the Technical section from the Aeromodelling team, I was working on DRDO's (you must know) problem statement for the Obstacle Avoidance Drone!

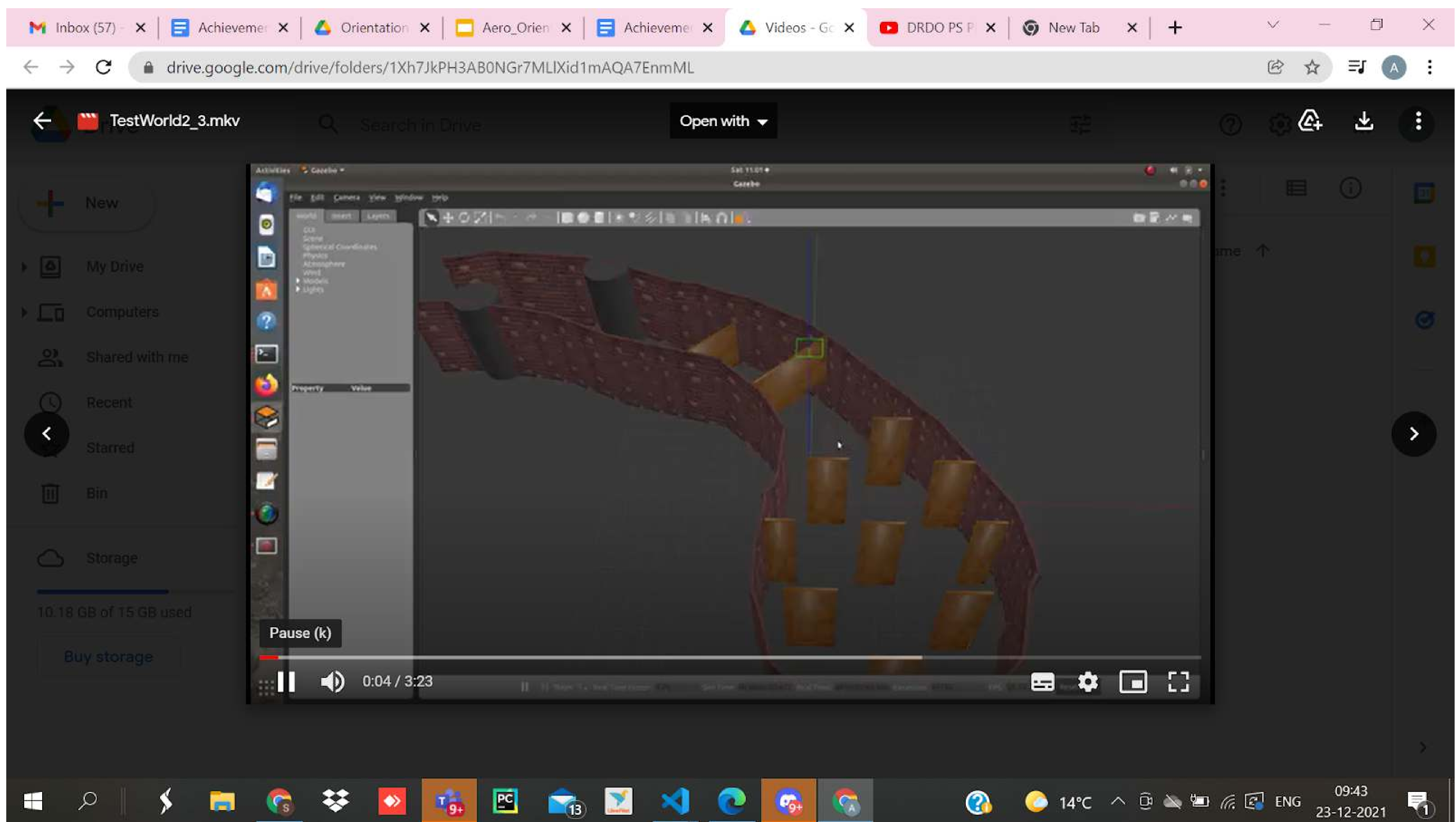
We had to make a drone simulation program that can run virtually on our laptop by flying in a simulated environment, avoiding all the obstacles coming in its way. Exciting yes? Damn yeah, true!. We started by first learning ROS (Robotic Operating System) and all about drone

software. Our seniors were our encyclopedias, shining all their past InterIIT experiences and knowledge and helping us solve our doubts and code/ installation problems. ROS is pretty hard at first! I mean not only the learning part, its installation too! It took me three days to just install all the packages properly. My laptop was like – Dude! What the hell, first you dual boot me into a Linux system and then install all this confusing code, making me very hot XD.

All installed and ready, we were prepared to start thinking about our algorithm for obstacle avoidance for our drone. As we had gained experience using OpenCV a lot in our first year, we had a head start. We started experimenting with detecting objects in the virtual environments,



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10% Efficiency →



literally by building different worlds in Gazebo (simulating software). The most fun part was seeing the drone crash again and again and dancing funnily. But soon, that became a lot frustrating because the code didn't work. We tried, we fixed, we updated, we scratched, we did all the previous again, and again, my teammates trying something weird, and as soon as it seemed to work – another crash!

Then our Didi (we call the mother of our club, to know who? – join the club) came to our rescue. She and bhaiya, who had helped us with all the installation and basics, helped us by giving their ideas. Soon we were able to make the drone pass the obstacles in most of the test maps given to us. Minor calibration problems and done. You may not believe that two of our teammates tried Deep learning to detect the obstacles (in the virtual world, we only have simple walls/ cylindrical objects, easy to detect). Aruco marker detection was done to land the drone after successfully

traveling through the obstacle maze. Yeah, the simulated drone model had two cameras attached, one RGBD for depth and color perception and another simple camera pointing down for marker location detection. Simple Python code was written for motion, getting video feedback, and corresponding commands were sent via ROS through the mavros framework.

Seems a lot we did, genuinely speaking, yeah! Seems we had a lot of pressure and missed our studies, well again, yeah! Why not? Padhai toh hoti rehti my friend. We were at least lucky that we were called to campus for two months and thus could work in the campus as a team. Though we didn't get a chance to visit other IITs due to covid, therefore, making all submissions online, it was still a great experience! Till now, Inter IIT and all fests are the best memories I have of campus, and yeah, they will remain permanent. The learning we all had working as a team and bonding together was really amazing.

From Team InPhase

Limits and boundaries: do they really exist, or are they just human constructs? As the old adage goes, we are only limited by our imagination. Inside each person, you'll find a whole different life, unique in itself, with a thousand stories untold. And when these are given a stage, you see the most beautiful play unfold before your eyes.

The 18th Edition of InPhase is that stage, a lively collection of thoughts, ideas, and experiences, bringing out the best from within the EEE department and beyond.

We sincerely thank the authors for contributing to this edition and for helping us make this edition of the magazine bigger and better. We truly hope it turns out to be an exciting and enjoyable read for all!

As always, we welcome constructive criticism and feedback from our readers. It would enable us to emerge stronger next year!



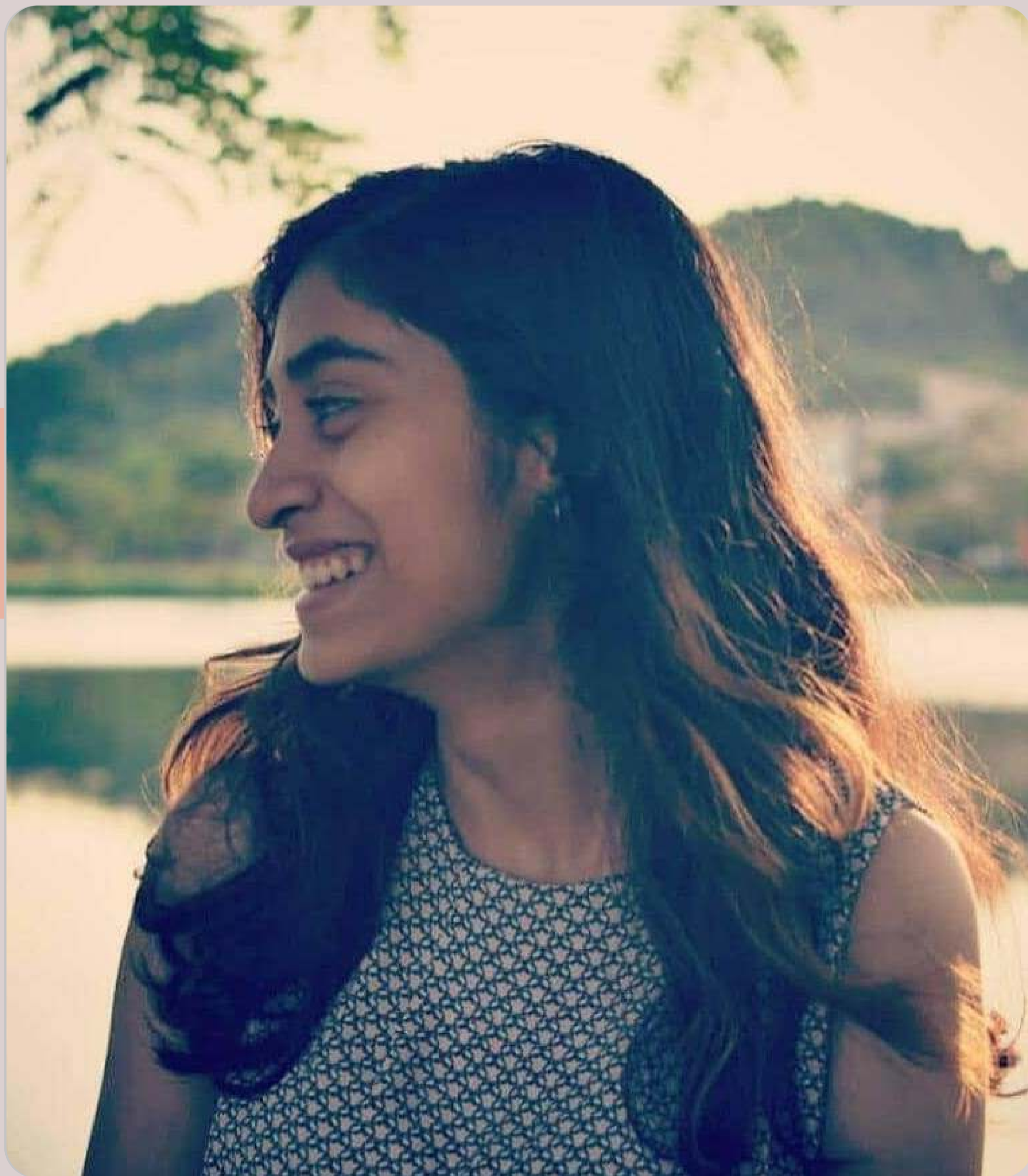
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