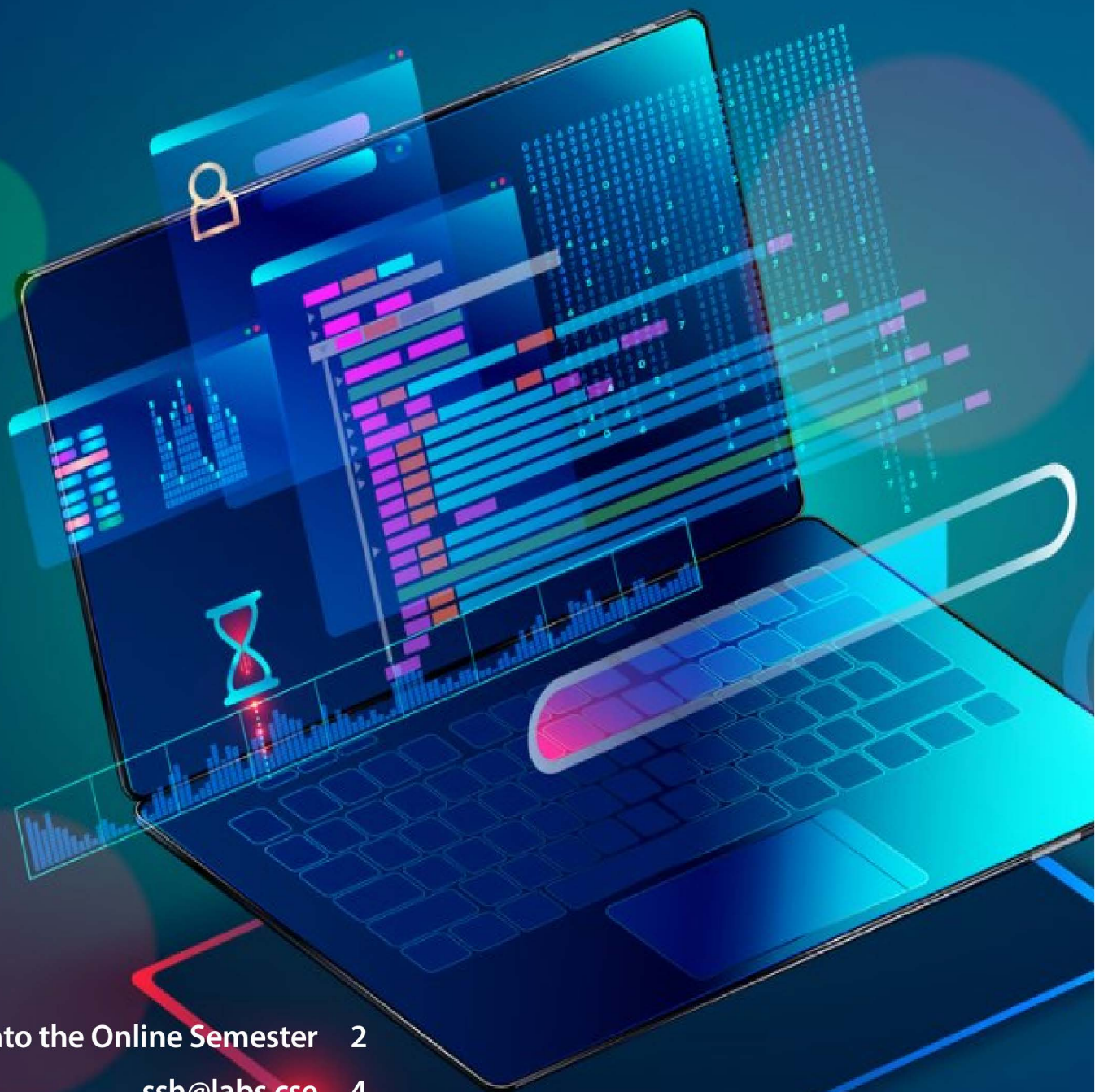


# bitStream

CSE Department Newsletter | 2021 Spring Edition



Zooming into the Online Semester	2
ssh@labs.cse	4
Past meets Future	8
Covid Projects	10
CSEA 2020-21	13
Adieu '21 class	15



# ZOOMING INTO THE ONLINE SEMESTER

PROF. MYTHILI VUTUKURU



Online semester(s) has been a very offbeat experience for all of us, including faculty. To learn more about our professors' teaching experience in the last two semesters, we talked to Prof. Mythili Vutukuru. She taught Operating Systems (and the corresponding lab) course in Autumn and Topics in Virtualization and Cloud Computing in Spring last academic year.

**How did you adapt to this new mode of teaching? Compared to the corresponding offline semesters, what changes did you make?**

At first, it was not fully clear what the difficulties were going to be. In the Autumn semester, many things didn't go as planned; however, it was a new learning experience for all of us. The Spring semester was relatively good.

As far as I'm concerned, the biggest problem was the lack of instant feedback from students as compared to the regular physical class. In a physical class, it is easy to know if students have understood the concept or not through their facial expressions or body language. And then, I could explain it again or ask some questions. Such a feedback mechanism was missing in online classes. And it was pretty challenging to adapt to this. Given the uncertainties, especially around students' internet access, most instructors went with pre-recorded lectures. However, around the middle of the semester, we realised that we are teaching more than the students can grasp.

I noticed that there was bi-modal distribution among the students. There were some excellent questions from some students who could understand the material very well. On the other hand, most students were more confused than they would be in a typical semester. The optimal pace of lecturing was tough to estimate in pre-recorded lectures, as there was no instant feedback. Most of the students don't ask any questions, making it difficult for the instructor to gauge their understanding of the concepts.

The course I taught in the spring semester went much more smoothly. I was able to slow down the pace significantly. We have learned that the traditional semester standards don't work in an online environment through the

last two semesters. We have adapted slowly with time to reduce the content and its difficulty.

**Obviously, the direct, instant feedback was missing. But compared to the physical semester, did you get more or fewer doubts, just after the class or between the classes?**

Some students interacted a lot, and they even found it easier to ask doubts on chat. However, I felt some students had a lot of hesitation in asking doubts. Many students wrote to me that they are shy to ask questions on Moodle. It is easier for them to see their classmates asking doubts or ask their friends in a typical class. Overall, I would say the interaction was lesser on average.

**Do you think the discussion in the public discussion forum was a bit less compared to private chats?**

I had assumed that asking questions on an online discussion forum would be easier than asking doubts in a typical class. But I was wrong, and this surprised me. Also, I felt that students preferred private chat to asking in a public forum.

*The effect of the environment would also be there. When the students are on campus around them, they see people studying and doing academic work. But when they are at home, they probably don't have anyone to look at or compare.*

Correct. Interaction is a must for everyone. The only people interacting have lovely, brilliant questions, and we think everyone understands the concepts. In contrast, there

no interaction from the other side, which is not understanding things well. It was easy for me to comprehend the lack of understanding by looking at blank faces in a regular class. Now I can't see that.

**What changes did you make in your teaching pattern and the course curriculum? And how did you adjust the course load during these online semesters?**

The content was reduced. For example, I didn't teach the internals of the xv6 operating system this time in as much detail as I would have taught in the past. Based on the doubts asked and feedback received, I could probably cut even more content next time.

*Yeah. So the students also have to take the initiative on their own rights.*

Yeah. The silence is not helpful for both the instructor and students. In an online interaction, it is more important to speak up. A student shouldn't be worried that he or she is the only person not getting it.

**Did you use pre-recorded videos or live classes in both semesters, and according to you, which one is better?**

It is a complicated answer. The faculty have debated over this endlessly. Initially, I felt that live classes would be better simply because of the instant feedback. On the other hand, students can watch pre-recorded lectures multiple times and then ask their doubts. In a live online class, there can be many issues, mainly network problems, due to which students may not follow along well enough to ask doubts right away. In that scenario, a live class becomes counterprodu-

-ctive.

So the argument works both ways. That's why I think that a good mix of both is the best option. However, implementing this ideal mix is challenging. If I put up pre-recorded lectures, very few show up for the live classes to ask doubts. I had 130 people in my class this time, and some weeks only about 20-30 showed up in a live discussion. On the contrary, if I teach live, it will be the same few people asking questions, and the rest who are a bit slow in grasping will be lost. In an ideal scenario, everyone watches the pre-recorded lectures. Then everyone shows up in live class and participates in the discussion.

**How were the lab courses taught? Was it more difficult or less complex than the theoretical part? And how different was it compared to the regular lab?**

The lab course was challenging. If it were a P/NP course, it would have been simpler. However, it was tough to assign grades because students can copy code and pass it on, and we have no easy way of knowing. Plagiarism detection is not perfect either, especially for the type of labs needed in some courses. In an offline semester, it was easier to grade. I used to conduct lab exams with no network connection, and students wrote code without help. Take-home assignments were more demanding, whereas these lab exams were more straightforward, and most of the grade would come from these proctored lab exams.

In the online semester, I ended up giving a much larger number of AAs than I usually would. There is no easy way out of it.

**You talked about plagiarism and copying cases in labs or assignments. How did you handle them?**

There were many cases. It was not a pleasant experience interrogating students about this, either for the students or for me. As I have said earlier, it was much better in the offline semesters with lab exams.

**You mentioned the grading was a bit uneven. Do you think someone honest in the lab was penalised unfairly because someone who copied scored better?**

There could have been cases where students who made some silly mistakes missed a few marks and got less marks than those who copied, especially when grading weekly labs in a large class.

In my spring semester course, my TAs did a lot of vivas. It is easy to submit code on Moodle without understanding anything, but

it is harder to give a viva that way. We walked through the entire code and asked the students the logic behind it. All the grading was based on these vivas. This helped us to differentiate between genuine and copied code to some extent. Next time, I'm planning to reduce the number of labs so that vivas can be longer. It takes a lot of time, but that is the only way forward. Or it can be pass-fail labs.

**Won't the pass-fail labs be very rough grading?**

Students may not want it either; they may want some reward for their work. I do not know the correct answer to this question. This semester, I will have more time as compared to last semester where everything was rushed. Also, I know what to expect from online lab evaluations better; therefore, I will probably have a fairer lab evaluation even with letter grades.

**Is there something else that you want to try next time?**

Yeah. I'll have small informal interactions, like low weightage vivas with students. Discussing in small groups of 10-20 students to know how much they understand the concepts. This way, I can have feedback frequently from the students. Last time I had low weightage weekly quizzes. Initially, I could see that for a few questions, many students got them wrong. Therefore, I could discuss them in discussion classes. Then gradually, everyone started copying, and everyone was scoring full marks, making the quizzes meaningless.

It's always about experimenting. Every time there's something to learn. Sometimes your experiment works, and sometimes they don't.

**How were the exams and evaluations in your courses? What degree of proctoring did you use?**

I'm okay with proctoring. I used SAFE and Google Meet for proctoring last time. There were a few minor glitches with SAFE, but overall it was good. There have been a few concerns with Google Meet based proctoring from other instructors, and the institute has recommended using CodeTantra. I may try it in the future too. Overall, video conferencing based proctoring with SAFE seems to be working for me for the theory course. Probably I'll do more vivas if time permits; that will help in evaluation. Also, I have not heard complaints from students, so I think they're happy with the way things are.

**How strict or lenient was the grade distribution compared to the physical semester? What are the reasons for the same?**

Overall, I have been more lenient. I have given more AAs and ABs compared to the physical semester. Everybody was facing a difficult situation, and if someone works hard to get decent marks, I felt they should get a decent grade. I did more of an absolute grading as compared to the relative grading I would generally do in a physical semester. Therefore, even if someone cheated, they did not push other people behind.

**You mentioned there was a bi-modal distribution in the number of doubts students were asking. Do you think it reflected in the grades as well? Do you think students who asked more doubts got better grades?**

There is a correlation between students asking more doubts and good grades. But there was no massive visible impact since the grades are coarse (both 100 and 90 get an AA). However, there was a difference in the quality of doubts asked in the online semester. Students go over the material on their own, read the textbook, search online, think and then ask. This was not the case in a regular semester.

Exams can be easy, and a deep understanding need not necessarily reflect in grades all the time. But the students who have done well in the exams are the ones who asked a lot of questions. And most importantly, students who ask good questions are the ones who understand the concepts well, which is more important than just the grades.

**What message do you want to give to the students?**

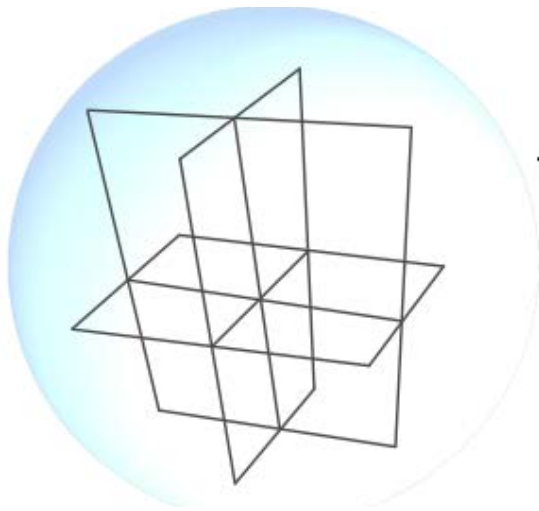
The most important message for the students would be to interact. Show up to live sessions, ask questions. Reach out to instructors, even privately; they will be delighted to help. Some of us may not have friendly faces, but we really want to help. It helps us improve when a student asks a doubt because it lets us know what was missing in our explanation of the concept. The feedback form on ASC is floated at the end of the semester, which doesn't help us fix things this semester. On the contrary, if someone tells us about any issue in between, we can improve it.

We never hear from the students for whom things are not going well. The online semester can pass without these students understanding the concepts and without the instructor knowing this. Therefore, please don't be scared. Instructors are here to help you. This is our job. Given all the craziness going on, it's good to have some sanity in our lives concerning some things going well, and well-run online classes can be one of those things.



# ssh@labs.cse

An informative series about different research labs in our department



**ViGIL**  
VISION, GRAPHICS,  
IMAGING & LEARNING

## INTRODUCTION

ViGIL stands for Vision, Graphics, Imaging and Learning. Located in the Computer Science Department at IIT Bombay, ViGIL lab dabbles with pictures, including technology involving image creation, acquisition, representation, visualization, manipulation, processing, and analysis. This involves principles of computing, mathematics, and science.

It houses various faculty and promising students whose research has featured in top conferences like MICCAI, ICCV and SIGGRAPH.

### *Graphics and Vision Lab*



### History

ViGIL was born as the Graphics and Vision Lab in 1992. Prof. Sharat Chandran started the group and made its first webpage sometime in 1994.

In 1992, the lab was started with seed funding from NTT (Nippon Telegraph and Telephone) Data. Thereafter it has received funding grants from BRNS (Board of Research In Nuclear Sciences) Govt. of India, nVIDIA, Dept. of Sciences and Technology (DST) Govt. of India and Qualcomm

# FACULTY



## Sharat Chandran

My current work is in bringing societal transformation such as bringing the hospital to the home in the area of mental health. My PhD student Rahul Bishain has been working on methods of using vision and learning for diagnosing largely unpredictable atypical development in children in lower and middle-income countries.

To have a look at the subset of areas I have worked in, visit <https://www.cse.iitb.ac.in/~sharat/me/areas.html>



## Parag Chaudhuri

I work at the intersection of computer vision and computer graphics. My students use various kinds of camera sensors to understand movements and shapes present in the world around us. Then we use techniques from engineering, physics, animation and visual computing to simulate and recreate characters, natural phenomena and interaction mechanisms for virtual and augmented reality.

## Ajit Rajwade

I work in allied areas of image and signal processing, with an emphasis on applications involving image restoration, image compression and image reconstruction from under-sampled measurements. A major theme in my research is to seek algorithmic techniques to save acquisition resources during the process of image acquisition. Off late, I have been applying many of these techniques for an interesting application that is particularly relevant in the times of this pandemic: pooled testing of CoVID-19 RT-PCR samples.



## Suyash Awate

I work on areas spanning the entire spectrum of quantitative methods in medical image computing and analysis from low-level image processing to high-level image understanding (including image reconstruction, quality enhancement, etc.). It involves machine learning using probabilistic graphical models and deep neural networks, spanning all major medical-imaging modalities and a variety of organ systems and human conditions.



## A PhD's perspective

by Rahul Bishain, CSE

My research interest focuses on a topic that lies at the intersection of machine vision and medical domains. More specifically, I am interested in the exploration of behavioural markers of Autism Spectrum Disorder in children via computer vision and machine learning techniques. For this purpose, we analyze videos and images of children involved in monadic and dyadic interactions in gamified and free play scenarios. The analysis portfolio consists of approaches like eye tracking using deep learning, diagnostic classification using LSTMs on monocular videos, statistical and machine learning analysis of Android sensor input, etc.

I particularly utilize the dedicated and shared clusters of GPUs, Android tablets and input devices like Kinect sensors for my research work. A plethora of diverse research topics being pursued by an easily approachable faculty and enthusiastic colleagues provide for a highly collaborative and encouraging work environment.



## An M.Tech's Feedback

by Hrishikesh Dixit, CSE

My current research topic is "Hand pose estimation and Shape Reconstruction using RGB images". Hand estimation, if done accurately, can find its application in Virtual/Augmented Reality, Activity Recognition, Human-Computer Interaction, etc. Estimating a 3D hand pose from an RGB image is not an easy task as an Image constitutes a 2D object. Hence in order to predict a 3D joint location from its 2D point in the image a Convolutional neural network is used. Overall it has been a great experience working in the VIGIL lab, which has provided me with the opportunity to work hands on my research.







## EQUIPMENT

- The voxel compute servers are jointly shared by students in the group - each machine has an nVIDIA 1070 class GPU and above, with multi-core Xeon/Threadripper/i7 CPUs
- Dedicated compute and rendering workstations
- Multiple Microsoft Kinect cameras
- HTC VIVE and Oculus Quest VR headsets
- Camera-projector setup, Drone mounted cameras

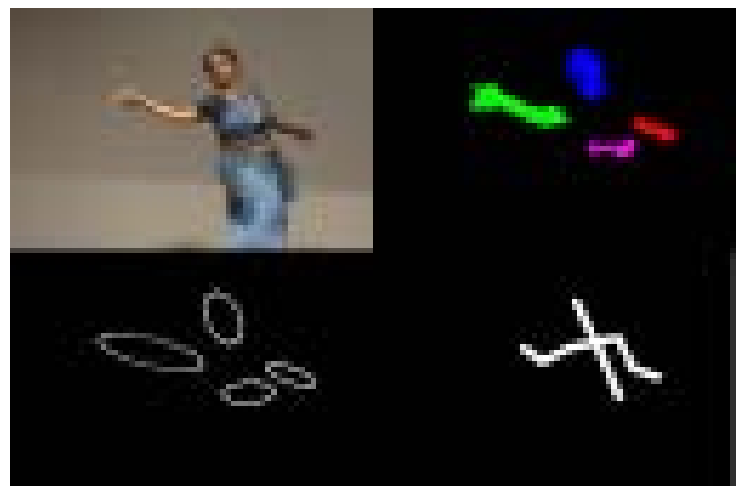
## ACCOLADES

- Work done in the lab featured in leading conferences in all areas of Visual Computing like ICCV (Computer Vision), MICCAI (Medical Imaging/Medical Vision), IEEE International Symposium on Biomedical Imaging (ISBI) and SIGGRAPH (Computer Graphics), and leading journals like IEEE Transactions on Image Processing, IEEE Transactions on Visualization and Computer Graphics, among many others.
- Recently, the work "Tapestry: A Single-Round Smart Pooling Technique for COVID-19 Testing" has featured in recent news articles for the smart use of compressive sensing principles to improve COVID-19 techniques.
- Two PhD students from the group have won the Qualcomm India Innovation Fellowship in the past five years.
- Faculty in the group have also won excellence in teaching awards at IIT Bombay.

## TEACHING

ViGIL offers courses on,

- Computer Vision (theory and lab course)
- Image Processing (basic and advanced)
- Medical Image processing
- Computer Graphics (basics and advanced)
- Mathematics for Visual Computing



# Past meets Future

## AN IMAGINARY CONVERSATION BETWEEN FRESHIES AND FOURTHIES

**DISCLAIMER:** ALL THE CHARACTERS DEPICTED ARE FICTITIOUS. ANY RESEMBLANCE TO A PERSON LIVING OR DEAD IS PURELY COINCIDENTAL.

Aastha, Devansh and Saiteja are freshie characters (batch of '24). Mudit, Parth and Sakshi are fourthie characters (batch of '21).

\*\*\*\*\*

**Devansh:** Almost two sems are over, and I don't know what our department or college has to offer to us; it feels so wrong.

**Saiteja:** Same here.

**Aastha:** I recall this senior Mudit in the department orientation, who seemed like a helpful person. Maybe we can ask him if he is free for a meeting and get to know more, what say?

**Saiteja:** Nice, then ask him for the meeting.

**Devansh:** Also, ask if he can get some of his friends too!

\*\*\*\*\*

**Mudit:** Hi guys! Meet my friends Sakshi and Parth.

**Parth:** Hello guys!

**Sakshi:** Hello juniors! How are you doing?

**Devansh:** Hi! We're good.

**Saiteja:** You guys lived on the campus for about three years. Can you tell us something crazy about that place?

**Mudit:** You know, I once confronted the king of the campus?

**Saiteja:** There is a king?

**Mudit:** Yeah! After all, it's a jungle.

**Aastha:** So who is the king?

**Parth:** Leopard(s). What do you think about them?

**Devansh:** It must be scary; the admin should make a zoo for all these wild creatures.

**Aastha:** lol. They're just yellow cats. Overhyped.

**Saiteja:** That must have been a pretty cool experience to have these unusual visitors on campus.

**Sakshi:** I hope you soon get to experience what it feels like in reality :)

**Aastha:** What's the one thing one should do in the first year?

**Sakshi:** A lot, actually.

**Parth:** Everyone is overwhelmed at first, seeing all the different people from different regions of the country. Talk to strangers, make new friends! Don't feel left out; break the ice!

**Mudit:** Learn something new. Maybe sports or some club activities. Freshie year is the best time to explore.

**Sakshi:** In short, socialise and explore!

**Parth:** What do you think about the ragging in IITB?

**Aastha:** I had a chance to interact with a decent count of seniors; I found most of them friendly and willing to help!! So I guess ragging is non-existent, as long as it is a casual conversation.

**Saiteja:** I agree with Aastha; seniors, especially in the department, are really helpful. Before joining IITB, I had a misconception that seniors might enjoy troubling the freshies, but it turns out they are the peeps who make our life in the insti smooth. Cheers to all the seniors who got our back.

**Mudit:** Ohh, great!

**Sakshi:** You made me emotional!

**Devansh:** We need to have ragging; otherwise, we won't get a chance to tease juniors :/

**Parth:** Okay, we can fulfil at least one part of your wish.

**Saiteja:** Is there anything that you could have done differently in college?

**Parth:** Nothing, if this pandemic didn't happen. I kept many things for my final year, which was unfortunately spent far away from my friends. Also, there was a phase in my college life where I didn't take acads seriously, although I amended it.

**Mudit:** Maybe I could've made more connections, especially in my first year, when I rarely talked to people outside of my bubble.

**Sakshi:** No regrets at all. I fully lived my college life :)

**Sakshi:** What are your thoughts on the academic load in the department?

**Devansh:** This much academic load is expected and necessary for our knowledge curve to be steep, in my opinion.

-spective towards programming and lots of new things to learn.

**Sakshi:** I'm more inclined towards ML, so I enjoyed Theoretical Machine Learning by Prof. Nutan and Foundations of Intelligent and Learning Agents by Prof. Shivaram. Two very different yet fantastic courses.

**Mudit:** I enjoyed Computer Graphics by Prof. Parag and Automatic Speech Recognition by Prof. Preethi. Apart from these, I also enjoyed the blockchain course, an excellent course for current trends.

**Parth:** So we have been talking about our department, but do you know about the haunted place in our department?

**Devansh:** Bhaskar sir's office?

**Sakshi:** lol, why?

**Aastha:** You won't understand.

**Mudit:** Initially, I thought CS labs were haunted.

**Saiteja:** Well, then a Gengar better be there.

**Devansh:** Gotta catch 'em all!

**Saiteja:** Is there anything one should definitely do once they are on campus?

**Devansh:** You still think we will live on campus?

**Sakshi:** I seriously hope you guys do!

**Mudit:** I believe everyone should go to Sameer hill once during the rainy season.

**Sakshi:** Yeah. Also, don't miss sunrise at Sameer hill and sunset at the boathouse.

**Mudit:** One should also try different clubs and activities of his/her interest.

**Parth:** Once you're on campus, you can also go out for some night outs or trips like cycling to Marine Drive or trekking in the Western Ghats.

**Mudit:** Since we're talking about our campus, what's the weirdest thing you heard about campus or our department?

**Devansh:** IITB is actually a wild-life sanctuary.

**Parth:** I guess that's why you're here.

**Sakshi:** Mudit already calls IITB a jungle, so I won't deny that.

**Aastha:** Yeah, I have even seen pictures of bulls in hostels and classrooms.

**Saiteja:** There's a hill and a lake, with a boathouse in IITB. Outlandish, yet delightful.

**Mudit:** Yeah, those two are probably the best places on campus.

**Aastha:** The campus is vast, and late-night walks are great.

**Parth:** I miss riding my bicycle at night on the campus roads, especially the slope near the convo hall.

**Mudit:** Also, about the least cared about part of campus, the hostels. What do you think of them? Has someone told you anything about them?

**Aastha:** As if dreaming about the campus was not enough...

**Devansh:** I don't think they are more than average. It must be messy, given that IITians are one of the dirtiest people on the planet.

**Sakshi:** Who said that?

**Parth:** Come on, the kid is joking. Right?

**Devansh:** (ironically) Yeah!

**Saiteja:** Who cares about hostels? I am going to roam around the campus at night and



**Aastha:** I believe it's more like a necessary evil, something you can't escape no matter what. Pain doesn't hurt when it's all you got...

**Saiteja:** It's overwhelming tbh, no time for anything else :( I guess I'm kind of too poor at managing my work.

**Mudit:** Don't worry, kid, you'll figure it out.

**Devansh:** Any CS topics you suggest to learn apart from the curriculum.

**Sakshi:** Try out cryptography, competitive programming. While it's not necessary at all, you can also participate in some CTFs and hackathons.

**Parth:** Web development or competitive programming. However, I would strongly suggest you try cybersecurity. It's a crucial topic for the future, and you can start as early as internships.

**Mudit:** You might have learned some functional programming in your DIC, so I'd highly recommend learning a new functional language like Haskell. I bet it'll open your mind!

**Saiteja:** Which courses from our department you liked apart from the core curriculum?

**Sakshi:** It's all personal preference.

**Parth:** Yeah, a person can like one course. Another might not.

**Aastha:** Oh, come on! Tell us, please.

**Mudit:** I enjoyed the Functional Programming course by Prof. Sanyal. A different per-



maybe at the library during the day.

**Mudit:** That's why I said the least cared about part of campus.

**Aastha:** Something is better than nothing for us.

**Devansh:** How to get an intern or a research project of our choice?

**Parth:** Apping is the key. Learn from your seniors' experiences and start early.

**Mudit:** I agree with Parth. Also, don't forget that you're in the best engineering college in the country. The IITB tag helps you for sure, given that you apply to as many companies/universities as possible.

**Sakshi:** While mailing for the internships, be honest and clear. No faking, no self-doubts. Also, always have a plan B in case things don't go the way you planned. And, never have too much stress. Believe in yourself and keep trying.

**Sakshi:** Anyone of you interested in research? What do you think about the availability of opportunities for research in our department?

**Saiteja:** I am not sure if the department offers sufficient research opportunities.

**Devansh:** No idea; let's see what the future holds.

**Aastha:** I have clearly no idea about this; it would be great if some of you could provide more insight on this.

**Sakshi:** Well, it's better to understand the different research groups in the department, each of which works on various domains of computer science.

**Parth:** You can check about this in the last edition of bitStream.

**Aastha:** What are your views on the current B.Tech curriculum or the general course structure in the department?

**Mudit:** I believe that the curriculum is more on the theoretical side and lags inclination towards research. Try out various projects, hackathons etc., to get a hands-on feel.

**Sakshi:** The curriculum is good, but I feel the core curriculum can be shorter. For example, DLD and architecture courses can be merged.

**Parth:** Also, some electives like distributed systems and kernel designs should be offered regularly.

**Sakshi:** While the curriculum is sufficient in its way, it also provides time for extra. You can always look out for MOOCs or extra courses within our institute.

**Parth:** "Know something of everything and everything of something", a friend told me this wise saying.

**Parth:** Which semester do you think is the toughest in terms of academic load?

**Saiteja:** Maybe one in the third year, or both.

**Aastha:** The semester where you don't feel like studying.

**Devansh:** Why do you expect us to know that :(

**Mudit:** Testing your general knowledge :)

**Sakshi:** What do you think about seniors in our department?

**Devansh:** It would be not very smart to generalise them.

**Aastha:** Some of them are least bothered.

**Saiteja:** And some of them are very friendly and helpful.

**Aastha:** But most of them are fantastic! 'Machau', as you call them.

**Mudit:** I wouldn't say I like that ridiculous word.

**Aastha:** Okayy!

**Parth:** How do you feel about calling seniors by their name and not 'respectfully' calling them bhaiya/didi?

**Aastha:** Cool, it doesn't matter.

**Devansh:** Disrespectful, bhaiya.

**Parth:** Call me Parth.

**Devansh:** Okay, Parth bhaiya.

**Sakshi:** Stop it, you two.

**Saiteja:** It's great for future endeavours :)

**Mudit:** Don't get your hopes high.

**Saiteja:** :(

**Devansh:** Who is the most popular fourthie in our department?

**Sakshi:** Obviously me, haha.

**Parth:** jaa jaa away!

**Mudit:** Honestly, no one cares.

**Parth:** jaa jaa away! I'm the most famous person in the batch. Never underestimate yourself.

**Sakshi:** depends 'popular' where. No one cares about social media, and after four years, you pretty much know everyone.

**Sakshi:** How good do you think our Inter-IIT players are?

**Mudit:** Wait, do you guys know about Inter-IIT?

**Saiteja:** Yes, señor.

**Aastha:** They are IITB's Inter-IIT players. They must be excellent.

**Devansh:** Not so good; IITB hasn't won much in recent Inter-IIT tournaments.

**Aastha:** Did any of you participate in Inter-IIT?

**Parth:** One of my friends was part of Inter-IIT at KGP. He was the athletics champion and won a medal in every sport he participated in. And players at IITB do go through vigorous training most of the time before the tournament. So, saying that they're not good might not be true entirely.

**Devansh:** Cool. I'm a hockey player and will lead IITB someday.

**Mudit:** Glorious!

**Aastha:** Did you pursue any extra-curricular activity? How did you strike a balance between acads and extra-currics?

**Sakshi:** My time, apart from academic work, was primarily spent playing FIFA, watching shows on Netflix and Prime Video (you should check out **Mr Robot** on that), and hanging out with friends. I guess there is no rule for it. You learn when you try.

**Mudit:** Well, there is one rule, maybe one more...

**Sakshi:** What?

**Mudit:** Time management and getting enough sleep.

**Parth:** Yeah, sleep. How can we forget that aspect about you? Our early to bed, early to rise legend.

**Mudit:** Ohh, come on!

**Parth:** I tried some sports like badminton and football, apart from a couple of PoRs. I'll say to try out new things, but don't be obliged to do so.

**Mudit:** I like to go to the gym and do some strength training. I was also part of some plays. However, don't waste time on your phone, scrolling your feed on social media or playing addictive online games.

**Devansh:** As a computer science engineer, which is your favourite operating system?

**Mudit:** Here begins the fanboyism!

**Sakshi:** Android :)

**Devansh:** Arre, I meant for computers...

**Parth:** Obviously Linux. It's open-source, easy to use, highly customisable and tons of resources are available.

**Sakshi:** Well, Mac is excellent too! And the new M1 chips are killing it!

**Mudit:** I have a different opinion. I prefer Windows, which has now got WSL. Windows is the number one OS in the consumer desktop market; therefore, you can get almost every software for Windows (plus the games)! Plus, it has now got WSL, which is constantly improving. Best of both worlds.

**Mudit:** I'm feeling so content to ask you this... (pause)

**Mudit:** What do you think is the average placement package of students in our depa-

-rtment?

(Sakshi and Parth burst into laughter)

**Aastha:** 30 lpa

**Devansh:** 50 lpa

**Saiteja:** 1 crore pa

(Mudit guffawed)

**Saiteja:** (naively) Why do you people laugh at innocent creatures like us? You people only tell. All we know are the flashy news we see about placements in IIT.

**Devansh:** And I guess that's why about 90 per cent of students are in IITs.

**Sakshi:** Well, all of you're mistaken.

**Parth:** Yes. The figures you read in the news are exaggerations at their best. First of all, there are a handful of students who receive such offers.

**Mudit:** And, these figures are mostly cost-to-company (CTC) which include various one-time bonuses. Actual pay is relatively less than that.

**Sakshi:** The offer matters, but don't fall for these extravagant figures. In the end, you should accept the offer after analysing the work and working conditions. And, I'm sure many of you will go for research and higher studies instead of placements.

**Parth:** So, rather than running behind higher packages, you should explore, set your goals and focus on achieving them.

**Mudit:** I guess that's quite a lot of gyaan!

**Aastha:** Before we end this meet, is there any final advice you would like to give us as freshers?

**Mudit:** When I was a fresher, I was always overwhelmed by the fact that I had cracked IIT. Therefore, I was in a dilemma all the time, should I enjoy more or work hard for the future.

**Parth:** And you were always stressed...

**Mudit:** Correct. Lately, I realised that I could enjoy as well as work hard. It's all about freedom and balance in college life.

**Sakshi:** Also, we all know that you're going through a worse phase of this online semester. But, everyone is in a similar situation. It all comes down to your attitude about this. So keep a positive approach and start this life as fresh as ever!

**Parth:** Once you're on the campus, make the most of your time. Enjoy the peaceful environment, make friends, reduce your only time and keep exploring. Don't leave anything for the future. I had many plans for the final year, which were unfortunately cancelled. But do not get lost in it.

**Mudit:** Also, talk to the professors you like. They can be pretty good guides, and I'm sure they will also like to share their experiences with the students.

**Sakshi:** Alright, guys, it's time to say good-bye.

**Mudit:** It was so lovely to meet you all. Hope you all have an incredible college journey.

**Parth:** Don't take unnecessary stress, guys. And never lose hope! All the best. And never hesitate to contact us.

**Sakshi:** We would glad to help.

**Aastha:** Thank you, everyone!

**Saiteja:** Thanks, guys!

**Devansh:** Goodbye!

\*\*\*\*\*

**Saiteja:** Hey guys, have you submitted the third assignment?

**Aastha:** Nope, I'm halfway there. Also, there's a quiz next Monday.

**Devansh:** Did you guys miss the moodle notification? Assignment 4 is out!

**Saiteja:** Oh man! Lots of work to do.

**Aastha:** Bye, guys!

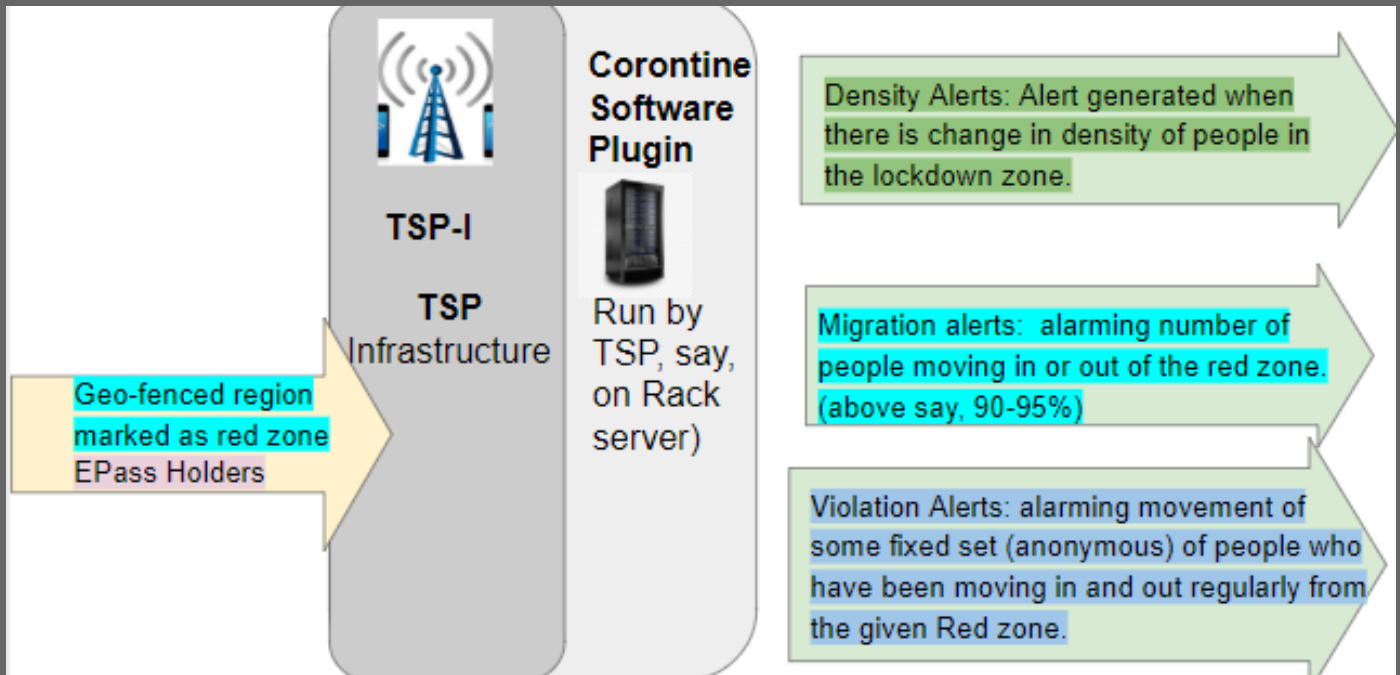
**Devansh:** Bye!

# COVID PROJECTS

INFO ABOUT SOME PROJECTS RELATED TO COVID IN CSE DEPARTMENT

## CORONTINE

*FACULTY IN-CHARGE : PROF. GANESH RAMAKRISHNAN*

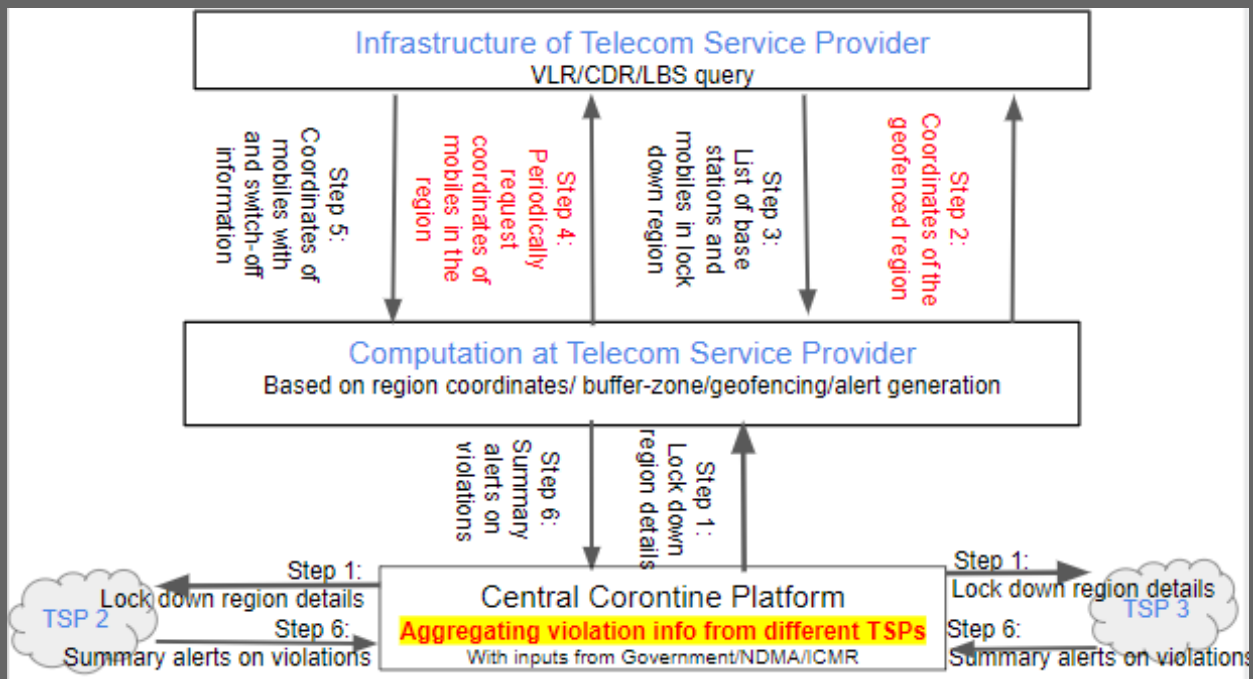


An evolved common logic for Red Zone violation detection and a flowchart based on VLR/CDR within Telecom Service Providers (TSPs) is developed. AI/ML-based algorithms were developed for detection of (anomalous) red zone violation at Telecom Service Providers (TSPs) based on their internal VLR (Visitor Location Register)/CDR (Call Detail Records) logs, on the request from NITI Aayog. The application was used successfully in Meghalaya, and part of the solution was adapted in Odisha and Mumbai. In Mumbai, a large volunteer team was set up from the campus and outside (of the order 30- 40) to help MCGM track patients and their status. Further, CORONTINE has been integrated with IoT to increase its utilization. It is flexible, comprehensive, scalable and ready-to-use. CORONTINE creates a geo-fence and automatically generates alerts, including text messages and emails if users move out of the quarantine zone.

## Working

The CORONTINE project takes the latitude and longitude of the corners of the red zone, assumed as a polygon since polygon is a generalization of the circle. From this area, output from TSP's infrastructure, the aggregate counts of MSISDNs (Mobile Station Integrated Services Digital Network), is collected at a fixed time-frequency with a time-lag of identification being as small as possible. Central CORONTINE Platform (CP) will aggregate violation information across TSPs. If required by a TSP, we can also help perform aggregation within the TSP. The output provided is the list of MSISDNs inside the perimeter and outside the perimeter. The CORONTINE platform provisions for organising zones into regions and identifies MSISDNs violating the lockdown. This is done by 1) Collecting data from TSPs at a particular frequency, from ISPs. To avoid identifying anomalies as valid data, data from TSPs is filtered by AI, and 2) Applying logic for red zone violation detection on the data obtained.

## High level of model structure for data filtering



The objective is to use an autoencoder model trained to minimize the reconstruction error between the input and the generated output. The model is trained to reconstruct non-anomalous data; therefore, low reconstruction error indicates that the data is normal, and high reconstruction error indicates that the data is abnormal (anomalous).

## Caveats

- MSISDN location is determined based on the associated tower location (1.5 km buffer around the perimeter to account for this)
- Data collected from CDRs (call and data records), so cell ids and geographic locations should be mapped internally.
- A potential challenge in using CDRs: Difficulty in mapping cell-ids to lat-longs (Normalization required on the dataset to go from CDR → Cell ID → Tower → MSISDN ) but catching even 30-40% of violators will be a significant deterrent for others.

# TAPESTRY

**FACULTY: PROF. AJIT RAJWADE**    **PHD STUDENT: SABYASACHI GHOSH**

With the first red flag of COVID-19, the globe had been warned to be prepared for the pandemic. Testing the population was the only way to identify the areas of COVID-19 infection and isolate them to break the virus spreading chain. Protecting such a large population with limited production of scientific kits and machinery was a very challenging task. Along with the rapid increase in production facilities rapid and smart testing techniques needed to be found.

Tapestry is the smart pool testing technique that is backed by mathematical modelling.

The aim behind it was to save up on testing resources, time and increase the testing speed and accuracy. Pool testing techniques have been the hot area of research around the world and a team at IIT Bombay have come to rescue India to devise a pooling strategy.



Prof. Manoj Gopalkrishnan (associate professor, Department of Electrical Engineering, Indian Institute of Technology, Bombay), his colleague and mathematician Prof. Ajit Rajwade (associate Professor in the Department of Computer Science and Engineering, IIT Bombay) and with the help of his PhD student Sabyasachi Ghosh and several other volunteer students have contributed to this project.

A popular pooling method called the Dorfman technique is a widely used adaptive testing method for testing samples. In this strategy, an equal number of samples are pooled and tested in the first phase. If the pool test is negative then all samples in the pool are negative. But if the pool is tested positive then every sample in that group is retested in the next phase. Since the RT-qPCR test requires 3-4 hours to complete, the second round is delayed. Tapestry pooling is a non-adaptive pooling strategy that overcomes this limitation by providing accurate results with only a single round of testing. Under tapestry pooling, the sample of the person is mixed in different pools and tested simultaneously. Pool results are fed into a Tapestry recovery algorithm that solves and obtains results for every sample.

Tapestry pooling has been tested by conducting pilot studies at the Harvard Medical School and InStem Bangalore using synthetic RNA. The results show that Tapestry accurately identifies the status of each individual sample with a single round of testing in fewer tests than simple two-round pooling. A web application and an android application has been developed for the labs for implementing Tapestry protocols.

IIIT Hyderabad was the first institution to approve Tapestry pooling and it saved the campus from the pandemic in comparison to other colleges struck hard by the crisis

# WWH

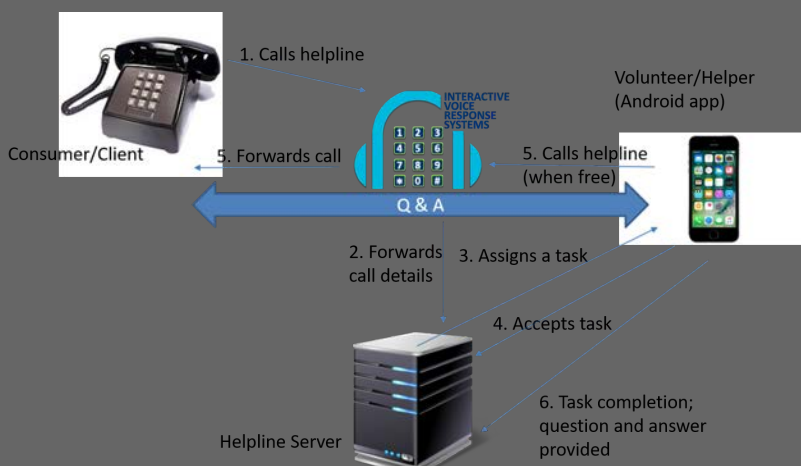
## FACULTY IN-CHARGE : PROF. KAMESWARI CHEBROLU

WWH stands for World Wide Help, modelled after the World Wide Web to provide easy and cost-effective information access via phone calls/messaging. WWH works in any domain and can help any community, but it has been specially designed to cater to the bottom of the pyramid. It is similar in functionality with helplines/call-centres, but the same is achieved at significantly low cost (leveraging mobile phones) and better scalability (work from anywhere).

WWH requires no central infrastructure. It supports sophisticated IVR/messaging/Google-form-based surveys and comes with a dashboard to monitor day-to-day operations. WWH provides sophisticated task scheduling, intelligent task management/reallocation, task tagging/notes-taking etc. For helpers, WWH protects their privacy, offers local language support and calendaring to help manage their availability

Survey feature: Helps conduct surveys over the phone from anywhere

- Recruit helpers, install the WWH app
- Admin uploads file with phone numbers of people to call; specifies survey form URL
- WWH server distributes work as tasks to helpers
- Helpers call people and fill survey forms simultaneously
- Admin downloads form spreadsheet for analysis



Help feature: Helps connect people requiring help with those that can provide help

1. Recruit helpers, install the WWH app
2. Public request help via phone call or message
3. WWH server converts request to task assigns to helper
4. Helpers when free, call back and provide help/advice

Sample Helplines:

Agriculture : BAIF Expert Feedback

Career Counselling : Student Helpline and Career Guidance

Health advice

# REVISITING CSEA

by Ritik Roongta, CSEA GSec 2020-21

CSEA is a department's student body that caters to all the extracurricular and community-building activities in the CSE department. Given the CoVID-19 outbreak and the online semester being declared, I knew that my role as CSEA GSec would definitely be challenging. It was the endsem that we, as student representatives, didn't prepare for. My core job was to lead a team of MAD people, a pack that could Make A Difference.

At the start of the academic year, everyone was not in the same boat, but we were definitely in the same storm. COVID-19 had hit us either physically or mentally or both. CSEA's first job was to address these issues and help students on a holistic level. Stress Management Session was one step in this direction to sensitize students about the priority of mental and physical well-being in these trying times. This was an event well perceived by students as well as the professors.

The online semester meant that we could not organize any physical events, which were the most preferred means to enhance interaction among batches. But as Albert Einstein said, "In the middle of difficulty lies opportunity". We brainstormed various ways through which we can keep the students engaged and revitalize the feeling of belongingness to the department among the students. The online semester provided us with the opportunity to organize different new events like panel discussions that could not be conducted earlier due to the emphasis on the physical presence of the speakers in a webinar setup. From Bytes to Megabytes was one such event wherein the CSE alumni from the class of 1995/96 shared their insights on various aspects of post IITB life.

It is needless to mention that given the accommodative setting of our hostels, the students often develop friendships with students from other departments. "People are moving from sharing to cooperation to collective action", says Clay Shirky. Imbibing values from this fact, despite being a department body, we made it a priority to honor this camaraderie by conducting an inter-departmental CSGO event with the students from the Civil and Chemical departments. I want to extend my gratitude to the respective department councils for their support and help.

Due to the remote setup, it was evident that we will have to discover new communication channels. In modern times, Every action has an equal and opposite reaction, plus a social media overreaction. We had to harness this power of social media and the internet to reach out to the students for disseminating information. We launched csea.iitb on Instagram and became the first department to reach the 500 followers mark. We also revamped our CSEA website to make it more user-friendly and graphically appealing.

Successful events are never about an individual. It was the concerted effort of all the CSEA student representatives that made them possible. I want to thank Umesh Sir (HOD, CSE), CSE office, Kameswari Mam and Ganesh Sir (CSEA faculty members). They were always available and ensured that there were no administrative hurdles in the process. Someone wise once said, "You cannot make everybody happy unless you are a Nutella jar :)". We understand that in the last year, we did make some mistakes along with different accomplishments. Do ping me for sharing your thoughts about CSEA at ritikroongta@gmail.com.





## CSEA EVENTS TIMELINE

# 2020-21

### STRESS MGMT SESSION

PowerPoint ppt and a talk on stress management, followed by exercises

CSEA IG PAGE & WEBSITE LAUNCH

08/20

09/20

### INTER DEPT CSGO

CSEA, CEA and CHEA bring you an inter department CSGO tournament

### CHESS & POKER TOURNAMENT

Intra department poker and chess tournaments on student-friendly platforms

09/20

### FRESHIE ORIENTATION

A social event for the freshmen to familiarize them with the department and seniors

12/20

### 2.0 CHESS & POKER TOURNAMENT

Intra department poker and chess tournaments on student-friendly platforms

01/21

### FROM BYTES TO MEGABYTES

A panel discussion among our alumni who've spent 20-25 years in the industry, in diverse career backgrounds

03/21

### HOODIE DISTRIBUTION

Designing and distributing department centric merchandize for the dept.

03/21

### T-SHIRTS DISTRIBUTION

Designing and distributing department centric merchandize for the dept. and passing out batches

06/21

For more details, you may visit [www.cse.iitb.ac.in/csea/](http://www.cse.iitb.ac.in/csea/)



# ADIEU '21 CLASS



The feeblest contemplation of knowing that this is the end and the phase has come to step out and face this colossal world on your own; you will ace it all like a pro! Still, after all, what remains are the memories. Memories of the beautiful moments spent together, the fights with friends, getting up late for the morning lectures, going with friends to SDA for brunch, preparing for exams a night before, and whatnot. Thank you, the batch of '21, for sharing your unforgettable tales!

We wish you all the best for your bright future! All hail the CS Junta!



**SURAJ**

The insti experience was completely new, unique and amazing! I am already missing the time spent with friends - general talks, mess, games, birthdays (GPLs), lecture halls and [a lot of] assignment discussions. I would suggest everyone connect socially. A morning trek to Sameer Hill gives you the perfect view! Something unique about dept - KReSIT canteen's samosas, SL3 and Prof. Ajit Diwan's exams :)



**AKAMETTA ENLING**

It has been a hell of a ride academically. I must tell you CS courses are not a joke and don't get me started on Prof. Diwan and his level of exams. But despite all the struggles, I have enjoyed my academics thoroughly. One of the most exciting and absurd activities I found was the GPL. If you are a newbie here in IITB, you better start training yourself to hold your umbrella horizontally. And enjoy your college life to the fullest.



**SAKSHAM GOEL**

Some of my best memories are the night-outs a day before the project submission deadlines. Although I didn't think of them this fondly back then, they taught me teamwork, system design, and actual software engineering, all in a night's work. And nothing beats the satisfaction of seeing it all come together in the morning! CS 207 brought me down to earth. That said, Prof. Diwan is hands down the most sincere prof that I have come across.



**ARPIT MENARIA**

I have infamously called this college a 'jungle' because of its wildness and exotic ambience. I won't commemorate these four years; however, I won't forget them. Thanks to a few great friends, I don't lead a life of a recluse anymore. Thanks to a few not-so-good friends, I have learnt a few important life lessons. Thanks to the special one, I had some exquisite emotional experiences. Thanks to the coding, I fear none. Thanks to the jungle, I know myself wholeheartedly.



**SOUMYA CHATTERJEE**

The peer group is the one thing I will miss the most. Having people around you, each excelling in different aspects and having qualities worth emulating, a lot of their attributes inevitably rubs off on you. I probably spent most of my time outside of classes at SL3. The SSL project was the most memorable - days and nights spent almost entirely at SL3 with hardly any sleep and topped off with a mini-pizza feast at a place I would never have imagined.



**CHAITHANYA NAIK**

Insti. It is the people, a feeling and an emotion. When I reminisce about the memories at insti, I see a clueless yet enthusiastic guy trying to fit in an entirely new environment. Ranging from PoRs, Dept. treks, highly varying academics, night walks after endsems, random road trips, weird conversations, night-outs and very unique online semester experience, it was a well satisfying journey. With friends around, big decisions didn't seem big anymore.



**AKSHAY YADAV**

Insti life has created some of the best moments of my life. From night-outs and Marine Drive trips in winter, to playing football in the beautiful rains of Powai. There are many more. However, I will leave you with just two pointers to make the most out of your insti life. First, focus on your studies. Take it from someone who did not. Second, don't spend your time watching movies and series. Insti has so much to offer. Explore and enjoy!



**NIRMAL RAJPUT**

From being a carefree teenager to being a conscious adult, what a thrilling journey it was! The fear of Kalavantin Durg still gives me goosebumps. IITB has taught me a lot of lessons - one of the most important ones is "You may not always get what you want, instead grab what you got and move on". To sum it up, the journey was horribly beautiful, the one which I would've never expected.



**MILIND NIRANJAN**

My insti life has been somewhat 'bittersweet'. I've had equally good and bad memories, which helped me grow as a human. I will fondly remember playing FIFA, watching cricket with wingies and going on treats with my hometown friends.



**AASHISH WAIKAR**

The past 4 years have been an amazing ride. First year was the craziest; late-night movies and 4 AM marine drive plans after midsems. Once I and my friend got bored at night, walked out of the main gate without any plans and ended up reaching Renaissance. Coming to the must do's, H18, H12-13-14 rooftops, lakeside, Sameer hill. Most difficult course: CS207, without a doubt. Best CSE prof: hard to choose one. Prof Sanyal, Prof Sunita, Prof Shivaram, Prof Ganesh are all amazing.



**RANJANA KASANGARI**

Organising the badminton tournament was the first event I directly handled, which turned out to be very overwhelming but finally satisfying. The event helped me build new friendships, re-instill my confidence and learn a few things. Also, to mention, one of the moments I could to boss over people.

# bitStream Team

---

Dear readers,

We hope that you and your loved ones are safe and healthy.

We are delighted to bring you the second edition of our department's student newsletter, bitStream, for the academic year 2020-21. The feedback we received for the earlier edition was warming and encouraging, motivating the team to work tirelessly to make the current edition possible.

In this edition, we have tried to cover different aspects of the online semester, right from the general experience of the professors to the CoVID research projects in the department. We have covered ViGIL as part of the Department Lab Series introduced in this edition. We have also included a playful yet insightful conversation between freshies and fourthies. We have a keynote by the CSEA GSec highlighting the different events that CSEA organised to keep the student community engaged. Towards the end, we have included some of the memoirs of the graduating batch to celebrate their life in this prestigious institute.

We want to thank every one of you who has contributed to this edition in any capacity. We would also like to extend our gratitude to the faculty and students who graciously volunteered for the interviews and helped us document their experiences and achievements. Do share your thoughts and suggestions on this edition by writing to us at [editor@cse.iitb.ac.in](mailto:editor@cse.iitb.ac.in).

Team bitStream 2020-21

---



Arpit Menaria



Atla Tharun Teja



Liza Dahiya



Lovesh Gupta



Tanu Goyal



Onkar Deshpande



Shivam Mhaskar



Parth Laturia



Sasmit Vaidya



Sarvesh Pandey



Ritik Roongta



Rajdeep Yadav

## Editors