National Institute of Technology Durgapur

NEWSLETTER: Special issue on COVID-19

Director's message:

Prof. Anupam Basu, Director, NIT Durgapur

The unprecedented outbreak of Covid-19 pandemic has halted normal activities all over the world and severely impacted all spheres including economic, social and cultural sectors. But we have to move on, and the show must go on. I am delighted that our NIT fraternity has lived up to their spirit and kept on completing their scheduled academic activities on time. I take the opportunity to render my gratitude to them for undertaking all assignments via online mode and carrying out responsibilities, apart from strictly adhering to all guidelines and SOP, as issued by the Ministry. I am happy to note that during this lockdown period, several faculty members have undertaken different projects, devised innovative instruments and gadgets (Section I), published articles (Section II), presented invited talks (Section III), organized webinars (Section IV) and eminent alumni lectures (Section V) related to Covid-19. I am also proud to mention that NIT faculty and staff members have donated ₹ 28 lakhs to PM & CM (WB) relief funds, sacrificing their two days salary. The Staff members have also shown their social commitment and concern by distributing food and other essentials to the marginal section of the population of adjacent neighborhood and mess workers, associated with the institute. This Covid-19 Special Edition of our Newsletter presents a brief account of our activities during this lockdown period. We vigorously hope that our highly energetic spirit would enable us to steadily stride against all odds in future.

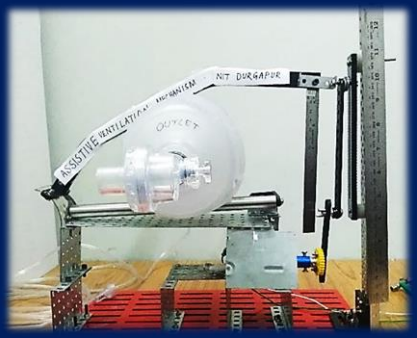
COVID-19 Related Activities

I. Projects ongoing and completed:

Title: Design & Development of "PRANESH - An Automatically Pressurized AMBU Bag - An Economic Healthcare Solution"

Investigators: Dr. Nilanjan Chattaraj, Prof. Nirmal Baran Hui, and Dr. Hardik Rajyaguru (Rajyaguru Foundation);

Objective: To develop an affordable, plug-and-use, and easily maintainable semi-automatic AMBU Bag ventilation system named 'PRANESH'. The system has been tested by agencies prescribed by ICMP and has successfully cleared the tests. The system is now ready for deployment.



Title: Design & Development of "Touch-less Hand Sanitizer/Alcohol Dispenser"

Investigators: Dr. Aniruddha Bhattacharya in coordination with Dr. T.K. Bera, Prof. S.S. Thakur and Prof. C. Koley;

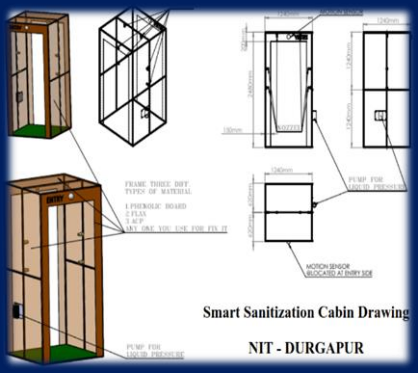
Objective: To develop a dispenser which is touchless and can easily dispense alcohol-based sanitizer, following WHO's guidelines on COVID-19 so that contamination through the sanitizer dispenser can be avoided.

Title: Design & Development of "UV-C based Sanitization Machine to Sanitize Essential Items from nCoV-19 in Day to Day Basis"

Investigators: Dr. Aniruddha Bhattacharya in coordination with Dr. T. K. Bera, Prof. S.S. Thakur and Prof. C. Koley;

Objective: To develop a sanitization machine to sanitize the items inside it from novel corona virus-19 using UV-C rays. The essential items, for daily use, such as mobile, wrist watch, wallet, banknote, keys, spectacles, mask, and gloves having height less than 6 inches and width 2 ft. can be sanitized within 4-5 minutes using this proposed machine and the chain of indirect transmission of coronavirus can be broken.

Title: Design & Development of "Automatic Smart Sanitization Chamber"



Investigators: Prof. Shibendu Shekhar Roy, Mr. Suborno Gupta, and Mr. Debargha Ghosh;

Objective: To develop a disinfection tunnel with an integrated, hydraulic system for the atomization of any biocides. The tunnel contains the atomized liquid spray inside to effectively saturate the environment.

Title: Development of "UV-C based Dynamic Sterilizer for large area sanitization"

Investigator: Dr. Aniruddha Bhattacharya;

Objective: To develop a dynamic UV-C based Sterilizer, which is capable of sanitizing large areas. This is a sustainable technology to act as room sanitizer machine to disinfect the room's floor area which come to the direct exposure of UV-C lights. With the use of this feasible technology contamination can also be avoided.

Title: Development of "IR Thermometer"

Investigator: Dr. Aniruddha Bhattacharya;

Objective: To develop an IR based non-contact thermometer, which can detect the body temperature of human beings and is suitable for use in various public places like railway stations, bus stands, public offices, schools and colleges in a very accurate manner with a measurement resolution of 0.02°C.

Title: Design and Development of "Touch-less Water Tap using Solenoid Valve"

Investigators: Dr. Aniruddha Bhattacharya in coordination with Dr. T. K. Bera, Prof. S. S. Thakur and Prof. C. Koley;

Objective: To convert existing water tap of wash basin to touch-less water tap so that one does not require to touch the surface of water tap before or after washing hands

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Title: Proposal for A Multimodal Sanitizing Tunnel (MST);

Investigators: Dr. Tushar Kanti Bera and Dr. Aniruddha Bhattacharya;

Objective: To develop a Multimodal Sanitizing Tunnel (MST) System which will allow a fast and continuous disinfection of people as well as their belongings such as bags, helmets, books, mobiles, purse, pen etc.

Title: 3-D printed protection shield or 3D printed "NRG" mask;

Investigator: Prof. Shibendu Shekhar Roy

Students: Dhrubojyoti Gupta, Amit Kumar Ball, Ananya Nath

Objective: To design and fabricate (in-house) 3D printed reusable "NRG" mask, which can protect the frontline workers and other individuals from Covid-19. It has been in the process of incorporating additional features in basic 3D printed mask to protect Doctor & medical staff. Proposed features might not be available in any such mask available in the public domain.

Title: Computational investigations on drug repurposing and on traditional Indian cold remedies to uncover COVID-19 drug;

Investigators: Dr. Deb Ranjan Banerjee and Dr. Subhas Ghosal;

Objective: To uncover new drug candidates targeting the specific infectious protein of COVID-causing virus from the old drug library (Drug repurposing) and from the traditional Indian cold remedies.

Title: Preparedness and Protection against Pandemic

Investigator: Prof. Partha Pratim Sengupta

Objectives: To conduct field-based project at different places; Siliguri, Raniganj, Varanasi, Birbhum, Assam, Durgapur and adjacent villages regarding preparedness and protection against pandemic.

Title: Hand Sanitizer production

Departments: Department of Chemistry and Chemical Engineering

Objective: To establish indigenous hand-sanitizer production units to become self-sustained on sanitizer manufacturing for the prevention of contamination from COVID-19. The alcohol-based sanitizer will be prepared as per the stringent guidelines of the World Health Organization and monitored by our faculty members of NIT Durgapur. Developed Hand-sanitizer will be distributed to various sections of NIT Durgapur for required sanitation.

II. Publications:

- An article titled "Structural insight to Hyroxychloroquine-3C-like proteinase complexation from SARS-CoV-2: Inhibitor modelling study through molecular docking and MD-simulation study" authored by Soumita Mukherjee, Subrata Dasgupta, Tapasendra Adhikary, Utpal Adhikari, Sujit Sankar Panja is published in Journal of Biomolecular Structure and Dynamics.

- Dr. Sayantari Ghosh, Assistant Professor, Department of Physics, has received communication for two papers on predictive modeling of COVID dynamics. Title: 1) Computational model on COVID-19 Pandemic using Probabilistic Cellular Automata 2) Sequential Genetic Algorithm Based Probabilistic Cellular Automata to model COVID-19 Dynamics.

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies, published an article entitled "India's proactive response to the Corona Virus crisis and the way forward" in MyIndMakers, on April 18, 2020.

- An article entitled "Predicting 'COVID-19' Mortality: An Indian Scenario" by Prof. Partha Pratim Sengupta (Professor. Department of Humanities and Social Sciences) was published in The Telegraph on April 17, 2020.

PREDICTING 'COVID-19' MORTALITY : AN INDIAN SCENARIO

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies, published an editorial column "দেশের পরিসরেই পর্যটন কে চাঙ্গা করা সম্ভব", Uttar Banga Sambad, (Bengali daily), May 14, 2020.

- Dr. Sayantari Ghosh has started Blog and Vlog for everyone in Bengali as well as in English to explain the disease and the effects of mitigation measures using simple simulations. These have around 1200 views in total.

Blog: https://saumikb.github.io/epidemiology101/

Vlog: https://youtu.be/DMaT-jOApQ0

- Prof. Anupam Basu, Director, NIT Durgapur published an article titled "Robots may be helpful to industry, only if used selectively" in Trade Promotion Council of India on April 24, 2020.
https://www.tpci.in/blogs/robots-may-be-helpful-to-industry-only-if-used-selectively/

- An article entitled "Last-mile connectivity still a block for online learning" by Prof. Anupam Basu, Director, NIT Durgapur was published in The Telegraph on April 09, 2020

III. Invited Talks:

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies, was invited by a TV news channel CN Television Network, on April 11, 2020, as an expert panel to discuss the economic impact of Covid-19 (live).

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies,delivered a live webinar session on "Post Covid19: Indian Economy", organized by the MBA students' batch 2018-2020 on April 28 and May 01, 2020.

- Prof. Anupam Basu, Director, NIT Durgapur delivered an expert lecture on "E-Learning: Prospects and Perspectives" on May 07, 2020 in a webinar series on "Engaging Academia Online: Issues, Opportunities, Challenges".

- Prof. Anupam Basu, Director, NIT Durgapur delivered an expert lecture on “Engineering tomorrow: New fields, Newer prospects” in a webinar organized by ABP Education.

- Dr. Sutanuka Banerjee, Assistant Professor, Department of Humanities and Social Sciences, delivered an expert lecture in a TEQIP-III Sponsored webinar on “Humanism and Empathy in the Time of COVID-19 pandemic” during May 14-16 in the department of Basic Science and Humanities at Chaibasa Engineering College, Jharkhand.

- Dr. Suvamoy Changder delivered an invited talk at Express News TV Channel, Durgapur on the topic "অনলাইন শিক্ষা কতটা সফল?" (How far Online Education is successful) on May 16, 2020. link: https://youtu.be/0EISBFbzZgA

- Prof. Anupam Basu, Director, NIT Durgapur delivered an expert lecture on the topic entitled “Governance in Higher Education during Lockdown: Learnings for Future” at Raniganj Chamber of Commerce on May 19, 2020.

- Dr. Anupam De, Associate Professor, Department of Management Studies, delivered an invited lecture on “Managing the Challenges and Opportunities in Times of Pandemic: The Indian Perspective” on May 23, 2020 at the Department of Management Studies, Bodoland University, Assam.

- Dr. Ujjwal Paul, Assistant Professor, Department of Management Studies delivered a lecture in a webinar on “Surviving and Thriving in the Pandemic Era and Beyond” on June 09, 2020 at East Calcutta Girls' College, Lake Town, Kolkata.

- Dr. Sayantari Ghosh, delivered an Invited talk on “Epidemiological prediction modeling” at the International Webinar, organized by the Department of Physics, B.B.College, Asansol, West Bengal on June 20, 2020. Available at: https://youtu.be/PO2yD2LrkBI

- Dr. Sutanuka Banerjee, Assistant Professor, Department of Humanities and Social Sciences, delivered an expert lecture in a TEQIP-III Sponsored National Webinar on “Philosophies of Life to Cope with COVID-19” during June 25-27, 2020 at Ramgarh Engineering College, Jharkhand.

- Dr. Sutanuka Banerjee, Assistant Professor, Department of Humanities and Social Sciences, delivered an invited talk on “Culture and Communication in Post-COVID Times” at Dr. B. C. Roy Engineering College, Durgapur, on July 07, 2020

- Dr Diptesh Das, Associate Professor, Department of Civil Engineering delivered an invited talk on “Future of Construction Sector Post COVID-19 in India”, organized by NSQF Cell, Govt of West Bengal in association with L&T Construction on July 18, 2020.

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies, was invited as the Resource Person in a Two Days National e-Conclave 2020 on June 28 and 29, 2020. He delivered a lecture on the topic “Future Tourism Development Strategies”.

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies was invited to act as a Resource Person to deliver lecture on “Post Covid19 strategy to survive the Tourism industry: Indian Perspective” at the two days International e-Symposium 2020 (webinar) organized by the Department of Management, University of North Bengal on July 18 & 19, 2020.

- Dr. Deb Ranjan Banerjee, Assistant Professor, Department of Chemistry will give an invited talk in a National webinar on “Scientific approaches towards COVID19 pandemic” on Aug 2, 2020.

- Dr. Durba Pal, Associate Professor, Department of Management Studies, delivered an Invited talk in a webinar, as a Resource Person on the topic “Coping with COVID-19: Tools to Build Resilience for Students” on 18th July, 2020 at NSHM School of Business and Management Studies, NSHM Knowledge Campus, Durgapur.

IV. Webinars organized:

- Dr. Amlan Ghosh, Associate Professor, Department of Management Studies, organized a special live webinar on "Post Covid19 Public Policy: India" on May 13 with Prof. Mukul Asher, NUS, Singapore.
- Department of Biotechnology organised a webinar on "Sustainable beer brewing post Covid-19". The talk was delivered by Mr. Jaydeep Chatterjee, Sr. Application Specialist- Brewing, ASPAC & SA Health and Bioscience, Du Pont Nutrition (Thailand) Limited on 2th July 2020.

V. Eminent Alumni Lectures:

- Mr. Subrata Dutta (Alumnus, B.E., Civil Engineering, Batch of 1991), presently Vice President (Marketing), Everest Industries, delivered a talk on the topic "Reset-Reshape-Ramp Up Post COVID-19" on May 23, 2020, organized by SAI Cell, CAAIR, NIT Durgapur.
- Dr. Poulami Das (Alumna, B. Tech, ECE, Gold Medalist, Batch of 2012), presently Graduate Teaching Assistant, Georgia Tech, Research Intern, Microsoft USA, delivered an online lecture on the topic "Post COVID Career Opportunity, Threats and Remedies" on May 23, 2020, organized by SAI Cell, CAAIR, NIT Durgapur.
- Mr. Rajib Ghosh (Aumnus, 1997, Mech Engg.), presently Co-Founder and CRO at KornChain Limited, London, Greater London, United Kingdom, delivered a talk on "COVID Impact on Employment and Remedies: Large Enterprises VS Startups" on May 31, 2020.

VI. NIT Durgapur in News:

- An article titled, "Young Innovators from IIT Kharagpur, Jadavpur University, NIT Develops low-cost PPE Masks for Everyone" is published in News Sense:
  https://newssense.in/2020/04/26/young-innovators-from-iit-kharagpur-jadavpur-university-nit-develops-low-cost-ppe-masks-for-everyone/
- An article titled, "Coronavirus: NIT-Durgapur builds artificial breathing device" is published in Hindustan times:
  https://www.hindustantimes.com/education/coronavirus-nit-durgapur-builds-artificial-breathing-device/story-iBmEwXa7NZXDVe4M3EfxOJ.html
- An article titled, "Focus on tech upgrade to fight virus" is published in The Telegraph:
  https://www.telegraphindia.com/west-bengal/coronavirus-outbreak-focus-on-tech-upgrade-to-fight-coronavirus/cid/1762688
- An article titled, "NIT teacher uploads lecture videos" is published in The Telegraph.
- Several articles on "Pranesh: An indigenous automated AMBU Bag system, a quick and temporary substitute for ventilators" are published in different leading newspapers.
- Details of donation to PM and CM relief funds have been published.

করোনা যুদ্ধ

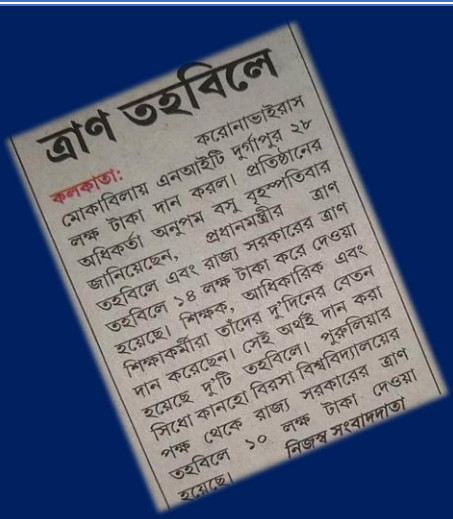
কম খরচে প্রাথমিক স্তরের ভেন্টিলেটর বার্প

তৈরি করে নজির দুর্গাপুর এনআইটির

চরম আর্থিক সঙ্কটে রেল, ভরসা শুধু পার্সেল

ভেন্টিলেটরের বিকল্প যন্ত্র তৈরি, দাবি এনআইটি-র

উপচে পড়ল ভিড়, ধৃত ১৬ জন


ত্রাণ তহবিলে

কলকাতা:

করোনাভাইরাস মোকাবিলায় এনআইটি দুর্গাপুর ২৮ লক্ষ টাকা দান করল। প্রতিষ্ঠানের অধিকর্তা অনুপম বসু বৃহস্পতিবার জানিয়েছেন, প্রধানমন্ত্রীর ত্রাণ তহবিলে এবং রাজ্য সরকারের ত্রাণ তহবিলে ১৪ লক্ষ টাকা করে দেওয়া হয়েছে। শিক্ষক, আধিকারিক এবং শিক্ষাকর্মীরা তাঁদের দু'দিনের বেতন দান করেছেন। সেই অর্থই দান করা হয়েছে দু'টি তহবিলে। পুরুলিয়ার সিধো কানহো বিরসা বিশ্ববিদ্যালয়ের পক্ষ থেকে রাজ্য সরকারের ত্রাণ তহবিলে ১০ লক্ষ টাকা দেওয়া হয়েছে।

নিজস্ব সংবাদদাতা

NIT teacher uploads lecture videos

ABHIJEET CHATTERJEE

Durgapur: An assistant professor of the National Institute of Technology, Durgapur, has found a way to reach his students amid the coronavirus outbreak. The professor of the NIT — he is sharing videos of his lectures by circulating them on WhatsApp and Facebook.

Subhamoy Changder, who teaches computer science at NIT, has also uploaded the video clippings on YouTube so that they reach a wider audience, including students of other institutes.

The purpose of my initiative is to help students continue with their studies even while they are at home. This will keep them abreast with the coursework in the absence of regular classes because of the novel coronavirus outbreak," Changder said.

On Wednesday he uploaded a video clip on design and analysis of algorithms for fourth semester BTech computer science students on Wednesday.

"I have uploaded the video in a WhatsApp group that had all students of my section. I have advised them to circulate the clip among other students. I have also uploaded the video on YouTube so that students of other institutes can also have access to it," the teacher said.

Changder is now preparing a video of a lecture on machine learning for MCA students.

The NIT on Saturday suspended classes and all academic activities, including examinations, workshops and seminars, at least till March31 in view of the coronavirus pandemic.

However, regular official work will continue and faculty members will take teaching/ employees lending duty.

"The forced closure has been declared at a time classes were on in full swing. I am trying to save wastage of time," Changder said.

The NIT authorities on Thursday issued a notice to all faculty members to emulate Changder.

"I have issued a notice to all faculty members of my institute to send lectures through emails, social media and also use the in-house programme to communicate with students. They can do it in multiple ways. Our aim is to save students from being out of touch with studies," said Anupam Basu, the director of NIT, Durgapur.

Last-mile connectivity still a block for online learning

ANUPAM BASU

How will it affect the employment scenario?

The employment scenario may undergo some immediate turbulence. However, new opportunities will gradually show up in different areas. I assume that biology and bio-technology will get a boost, along with material science and rapid prototyping technologies. Data analytics will play a very major role; while more data will be accessed by the government for predictive measures, data privacy will also gain importance consequentially

সম্পাদকীয়

দেশের পরিসরেই পর্যটনকে চাঙ্গা করা সম্ভব

এনআইটি দুর্গাপুরের তোর, ক্লীনকাল ট্রায়ালে সাফল্য

ভেন্টিলেটরের অভাব মেটাবে 'প্রাণেশ'

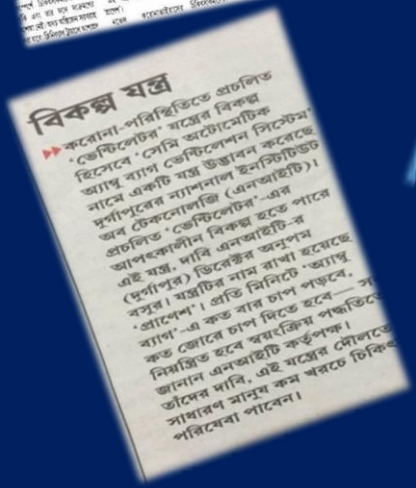
Director NIT Durgapur

27 Apr ·

Anupam Basu

27 Apr ·

3D printed protection shield or 3D printed "NRG" mask has been designed and fabricated (in-house) by three students Dhrubojyoti Gupta, Amit Kumar Ball, Ananya Nath of NIT Durgapur under the advice & guidance of Prof. S.S.Roy.


বিকল্প যন্ত্র

করোনা-পরিস্থিতিতে প্রচলিত 'ভেন্টিলেটর' যন্ত্রের বিকল্প হিসেবে 'সেমি অটোমেটিক অ্যাম্বু ব্যাগ ভেন্টিলেশন সিস্টেম' নামে একটি যন্ত্র উদ্ভাবন করেছে দুর্গাপুরের ন্যাশনাল ইনস্টিটিউট অব টেকনোলজি (এনআইটি)। প্রচলিত 'ভেন্টিলেটর'-এর আপৎকালীন বিকল্প হতে পারে এই যন্ত্র, দাবি এনআইটি-র (দুর্গাপুর) ডিরেক্টর অনুপম বসুর। যন্ত্রটির নাম রাখা হয়েছে 'প্রাণেশ'। প্রতি মিনিটে 'অ্যাম্বু ব্যাগ'-এ কত বার চাপ পড়বে, কত জোরে চাপ দিতে হবে— সব নিয়ন্ত্রিত হবে স্বয়ংক্রিয় পদ্ধতিতে। জানান এনআইটি কর্তৃপক্ষ। তাঁদের দাবি, এই যন্ত্রের দৌলতে সাধারণ মানুষ কম খরচে চিকিৎসা পরিষেবা পাবেন।

Dr Ramesh Pokhriyal Nishank

@DrRPNishank

Proud to announce that NIT-Durgapur has innovated an indigenously-built Artificial Manual Breathing Unit (AMBU).
The AMBU will perform automated pumping of oxygen for patients.
#COVID19
Kudos to the team led by Anupam Basu, Director - NIT Durgapur.

MHRD Ministry of Human Resource Development

#COVID19

NIT Durgapur

innovated an

Artificial Manual Breathing Unit

that automatically pumps oxygen for patients

Narendra Modi and 9 others

10:49 am · 22 Apr 20 · Twitter for Android

64 Retweets 265 Likes

VII. Special Blog on "Robots may be helpful to industry, only if used selectively":

TPCI (Trade Promotion Council of India): The workplace is expected to witness a number of changes in the Covid-19 era, particularly the emphasis on social distancing and minimum human intervention. How is this expected to propel the adoption of AI across industries?

Prof Anupam Basu: There are two aspects to this question, because Covid-19 itself will bring in a lot of unemployment. From that point of view, I think the use of AI should be made very judiciously. I would vote for deployment of AI without displacement of manpower. We can utilise the manpower and have much better services given and enhance productivity using AI and other technologies and have new revenue generation paths. AI can help in numerous ways. First, acquiring and analysing data will be of primary importance in the days to come; not only the pandemic and virological data but also the data of the business, agriculture, infrastructure and human behaviour. We will see that once the restart button is pressed (*the reset button has already been pressed*), and we start again, the nature of the demand and market may also change. We cannot continue the way we have done in the past. AI will be important in identifying the recent market trends and hotspots that have the biggest opportunities. We will need the help of technology, including AI, to understand what is the trend and what people are looking for – basically the common people. This is because the market now will be for the common people and I think that industries will have to tune to them. Till now, consumer demands were mostly generated as there was always an affluent market to sustain the demand. Now possibly, it will have to be bottom up and discovery of what is needed will be more important. As we will be going ahead, we will need to analyse logs of business transactions, people, tweets, social networks, articles, etc. To reach to a larger segment, the common mass, AI-based language tools will be important, and so will be data analytics.

TPCI: What are the industry segments where you see potential for immediate deployment of AI and robotics?

Prof Anupam Basu: If selectively used, robots will be helpful, since we have to maintain production, maintaining social distancing. Robots will also be helpful in carrying out routine jobs under precarious conditions, such as handling bio-hazardous material. I foresee that in the automobile sector there will be more demand for low cost electric vehicles, with more cyber control and safety measures, where AI will be of importance. As social distancing is there to stay at least for a while, caregivers for the aged and the disabled must be assisted with special intelligent tools. In healthcare, robots can be used to perform routine monitoring tasks including sensory data collection and health parameter checkups, when a regular doctor or paramedic is inaccessible. Education sector will open up a lot of opportunities. Stable and affordable internet to every household, intelligent management of bandwidth sharing, multilingual content creation, machine translation, speech to text and text to speech technologies should gain more importance in near short term, in India. AI should also play a role for creating an inclusive society where the need of every socio-cultural and socio-economic clusters can be properly identified and addressed. One of the primary reasons why this has not been adopted aggressively in India, is because large-scale deployment of robots and AI will create lot of unemployment. However, I believe if it is judiciously used, additional revenues can be generated, which in turn must be circulated to welfare for the deprived. However, I would like to raise an important cautionary flag to the use of AI. Presently, machine learning is at the core of the modern AI systems. Such algorithms are non-transparent as of date. Consequently, bias can be inbuilt, which raises ethical questions. It should be very strongly audited.

TPCI: How can AI help in controlling the spread and helping in treatment of the Covid-19 infection?

Prof Anupam Basu: The COVID-19 infection is new to us, but there is a company in Canada, Bluedot, which predicted the onset of this pandemic well in advance of WHO. They used machine learning and data analytics to

identify a cluster of "unusual pneumonia cases" happening around a market in Wuhan, China and flagged it. When it comes to data analytics and machine learning, it opens up a big opportunity in the Indian context – in the healthcare system. The Covid-19 pandemic has exposed the limitation of our health infrastructure. In our hospitals, we face shortage of both infrastructure and manpower. Addressing this deficit will take time. Artificial intelligence can play a major role in taking off the routine workload from doctors. This is from the days of Good Old Fashioned AI days in the '80s, when the expert system MYCIN showed that the initial screening and treatment of bacterial infections could be handled by a paramedic with the help of a computer. Only the specific cases would be forwarded to the doctor, and the workload of the doctors would be reduced. But this has not been adopted in India so far. In a country where government hospitals are flooded with people, we can use a mix of AI and human intervention. I think this will be beneficial. The doctors often get tied up with routine work. However, it is important to state that such systems should be developed with enough rigour. We carry out a lot of research and feel shy of the last mile translation as that is often denied credit. Industry must make long-term investments in these areas and make them reach the ground.

TPCI: You mentioned that AI must not impact the employment situation. What kind of unique roadmap for the deployment of AI in India?

Prof Anupam Basu: We have enough manpower, but there are a few shortcomings of human beings. Two major shortcomings are getting tired and possibility of what we call 'human error'. Thirdly, there are some dangerous surroundings where we would not want human beings entering and getting affected. For example, there could be a routine activity that is going on and on. Human beings may be doing the routine work to some extent, but beyond that we can take the help of robots. The onus should be on the person – when he wants to get himself involved and when he wants something to be done by robots. The primary objective being non-layoff, we can multiply the hours of production by a mix of machines and humans and generate more revenue. It is like a teacher asking a student to write something for her, while she does something else. She then checks it later. The point is that it is not an activity that she could not do, but the student is assisting her and taking out her labour. However, she is controlling the process and outcome. The approach should be to use robots to assist people and not to replace them. The second area is where we can make errors. For example, there could be an old doctor who is very experienced and knowledgeable, but his hand is no longer steady. He knows exactly what to do, and he can make the robot do it in an error free manner. These are the critical points where a robot should come in. I would like to add another thing – providing information to the people. Another important aspect of AI is understanding people – their strengths, weaknesses, etc. For example in the field of online education, AI can analyse an answer provided by a student to see where he is lagging – spelling, calculation, etc. and teachers can tune the content in accordance with the needs of the student. So far, in online education we are approaching the students as a community or a batch, where everyone is treated in a uniform manner, but the same size does not fit all.

TPCI: Where do you see Indian innovation in AI in the coming years, and what kind of transformations we can expect in the coming decade?

Prof Anupam Basu: There is an essential problem to be understood. A number of hackathons are held across the country. Even if 2% of them are useful, how many are actually taken forward for utilisation in the industry? There are very few that are taken forward to be made a product. My point is we have to be more cognisant of the needs of our country in the innovation process rather than following the West, and translate the innovations to affordable products. In the midst of Covid-19, I can see a lot of Indian students and faculty attempting a lot of innovation. Some really fantastic products are coming up. We do not have an *effective* system in place that can help in translation to products and take it to the people even at this hour of need. But we never did it until our back was to the wall. So I think that the Covid-19 episode is also an eye opener. India should now think of the real demands of the people. The demands are often generated by the industry that makes sophisticated feature rich systems and a segment of the population will consume them. But it can be bottom up as well, where we identify latent demands for a better life for all, and that can be solved by proper innovation and industrial participation. Innovation should be promoted not by words but by deeds. Innovators should be connected to the industry and new products will come. That is very important in general. AI is of course a part to make the tools more adaptive, flexible and powerful.

VIII. Students' endeavors during pandemic:

IX. Campus during lockdown:

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PC: Prof. Partha Pratim Sengupta

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PC: Mr. Deepak Kumar

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