

Report on the SERB-INAE Hackathon 2022



1. Introduction

The SERB-INAE Hackathon 2022 was organized jointly by SERB, INAE and Jadavpur University during 3-4 September 2022 at Jadavpur University, Kolkata. The event was financially supported by SERB and INAE. The objective of the event was to bring out the innovation and creative mindset amongst the undergraduate and postgraduate students from different engineering and science institutions of the country through their participation in this national-level, theme-based hackathon. This hackathon was a 30-hour non-stop event on four thematic areas and was housed in the School of Mobile Computing and IT Department in the SMCC Building of the Salt Lake Campus of Jadavpur University, which is located in a serene and quieter part of the city of Kolkata.

2. Thematic areas

Participants were assigned cutting-edge problems related to four thematic areas:

- a) Artificial Intelligence and Machine Learning (AI/ML)
- b) Big Data Computation
- c) Cyber Security
- d) Data Driven Finance

The sessions in all four thematic areas ran in parallel in separate rooms. Each session was continuously monitored and mentored by a panel of jury and their associates.

3. Call for participation

Call for participation document was widely circulated among academic institutions and research institutions. A webpage (<https://www.serb-inae-hackathon2022.com>) was specially designed for this purpose and an organizing committee was formed with members from the academia, industry and INAE. Students were asked to select one thematic area and prepare a brief concept note within 500 words. Students were further instructed to submit their proof of bona-fide studentship and registration details into the submission portal of website by filling up the registration form. Each participating team comprised of maximum upto three student members.

An initial deadline of 10th July was set for submission of the concept notes. Initially 50 submissions were received. Subsequently, as per the requests obtained from different participating teams, committee members felt the necessity of extension of submission dates. Subsequently, the submission date was extended to 8th August, 2022. An impressive figure of 99 concept notes was received by this deadline from a wide spectrum of engineering and science institutes.

4. Adjudication Process :

The distribution of entries was:

- a) AI ML : 74
- b) Big Data computation : 5
- c) Cyber security : 16
- d) Data Driven Finance : 4

Eminent faculty and industry professionals were invited to act as Jury members for the first round short-listing the candidates. The documents with the concept notes were distributed among the Jury members for short-listing of teams, who finally took part in the hackathon. The merit of the write-up was judged on the following basis:

- a) Innovativeness
- b) Social relevance
- c) Implementability

Accordingly, thirty seven teams were shortlisted for the final round of physical participation in the hackathon in the four theme areas as detailed below:

- a) AI/ML :20 teams
- b) Big Data Computation :3 teams
- c) Cyber Security : 10 teams
- d) Data Driven Finance : 4 teams

The number of invited participants was 98. The following table provides a detailed account of their numbers and affiliations:

Institution-wise Participation

| Institution | No of teams |
|--|-------------|
| IIT Jammu | 1 |
| Vidyasagar University, West Bengal | 1 |
| P S R Engg College, Tamil Nadu | 1 |
| Institute of Engineering and Management, Kolkata | 1 |
| JNTU Hyderabad | 1 |
| MNIT Jaipur | 1 |
| NIT Patna | 1 |
| Dayalbagh Educational Institute | 1 |
| Techno International University, Kolkata | 1 |
| IIT Guwahati | 1 |
| Jadavpur University | 9 |
| SVNIT, Gujrat | 1 |
| Chandigarh University | 1 |
| ISM Dhanbad | 1 |
| Amity University, Punjab | 1 |
| IIIT Naya Raipur | 1 |
| VIT Bhopal | 2 |
| B. V Raju Inst of Tech, Telengana | 1 |
| IIT Patna | 1 |
| AMITY University Noida | 1 |
| Swami Vivekananda University West Bengal | 1 |
| Sri Krishna College of Engg and Technology, Coimbatore | 1 |
| IIT Madras | 1 |
| Maulana Abul Kalam Azad University of | 1 |

| | |
|--|---|
| Technology, West Bengal | |
| VR Siddhartha Engg College | 1 |
| Sister Nivedita University, Kolkata | 1 |
| Sri Sri University, Odisha | 1 |
| J C Bose University of Sc. and Tech, Haryana | 1 |

After finalization of teams, Jury members for the physical hackathon contest were assigned as per the thematic areas. Prof Samiran Chattopadhyay, Former Head, Department of Information Technology, Jadavpur University, acted as the Technical Co-ordinator for the event and coordinated with the jury members for problem statement formulation, adjudication process, technical content and related database management. Two problem statements per thematic areas were assigned to the teams. The teams took part to solve any one of the two given problems continuously for 30 hours.

Jury Members:

| Sr. no. | Theme | Name of the Jury Member | Affiliation |
|---------|---------------------|-----------------------------------|-----------------------|
| 1 | AI/ ML | Dr Alokesh Ghosh | CDAC Kolkata |
| 2 | | Prof. Prasenjit Majumder | DA, IICT, Gandhinagar |
| 3 | | Mr Surupendu Prakash Gangopadhyay | DA, IICT, Gandhinagar |
| 4 | Cyber Security | Dr. John Jose | IIT Guwahati, CSE |
| 5 | | Mr Venugopal Ramamurthy | Qualcomm, Hyderabad |
| 6 | Data Driven Finance | Prof. Susmita Ghosh | JU, CSE |
| 7 | | Prof. Jamuna Kanta Singh | JU, CSE |
| 8 | Big Data | Dr. Subhadeep Basu | JU, CSE |
| 9 | | Prof. Snehanshu Saha | BITS, Goa |
| 10 | | Mr Vivek Karmakar | TheMathCompany |

The jury members were assisted by a few associates, who have extensive R&D background as research scholars or postdoctoral fellows, and were nominated by the jury members.

5. Problem Statements

AI/ML:

Problem 1 - Automatically generate research highlights (RHS) given the abstract of a research paper.

Problem 2.1 - Binary Classification: Predict whether the close price of the next day will be in the upward or downward direction w.r.t to current day.

Problem 2.2 - Regression: Predict the share price of the next day based on historical information.

Big Data Computation:

Problem 1 - Publication data (DBLP) analysis

Problem 2 - Automated Surface Classification System using Vibration Patterns

Cyber Security:

Problem 1 - Application to manage access control to a defined set of applications based on user profile

Problem 2 - Application to determine the strength of password and also the ability to guess the user password

Data Driven Finance:

Problem 1 - Forecast minute-by-minute prices and volume (open-high-low-close-volume) of bitcoin trading.

Problem 2 -Determine whether a particular person would be a loan defaulter or not.

6. Progress of the event:

The registration process of the event was commenced on 3rd September at 8.00 am. Subsequently, the inauguration of the event took place in the auditorium at 9.00 am. Prof. Rajib Bandyopadhyay welcomed Prof. Sivaji Chakravorti, Vice President INAE, to formally inaugurate the event and express his views on the ideation process. Subsequently, Prof. Samiran Chattopadhyay briefed the problem statements and the process flow instructions for the participants. The participants spent the entire night in the hackathon venue. Food, water, emergency medicines and other facilities of convenience were provided by the organizers in regular intervals. An army of 28 student volunteers and 12 faculty members were deployed to take care of the participants and ensure smooth functioning of the logistics.



Inauguration of the program on 3rd Sep.



Students solving the problems

On 4th September, after the completion of 30-hour hackathon, each team was given the opportunity of pitching their outcomes with results in front of jury members. At the end, score sheets were handed by the jury members over to Prof. Sivaji Chakravorti. Prof Indranil Manna, President INAE, and Prof Sandeep Verma, Secretary, SERB, and the Chief Guest of the program, joined virtually during the valedictory session, that was held in hybrid mode. Both Prof. Manna and Prof. Verma emphasized on the importance of introducing digital

gaming initiatives to young students. Prof Suranjan Das, Vice-Chancellor, Jadavpur University, highlighted that this hackathon provided a platform to solve problems pertaining to the themes, which encompassed new and emerging areas of science and engineering. Prof. Bhaskar Gupta, Dean Faculty of Engg and Technology, Jadavpur University, highlighted the importance of these hackathon events to pave the fast technological advancement in recent years, and alluded to scenarios, where minds are controlled and communicated through machines. On behalf of the organizers, Prof. Sivaji Chakravortian and Prof. Rajib Bandyopadhyay felicitated all the jury members and INAE members. In the end, Prof. Sandip Verma announced the names of the winners; a total of six Prizes were announced at the Hackathon in which Cash Prize of Rs 75,000 was announced to the winning team and Rs 50,000 to the runner-up.



Prof. Indranil Manna, Prof. Sandeep Verma
Prof. Sivaji Chakravorty and Prof. Bhaskar
Gupta addressing the audience during the
Valedictory program

Photo session after the event

The final result of the Hackathon is shown in the table below:

| Thematic Area | Name of the Participants, Institution |
|--|---|
| Artificial Intelligence and Machine Learning First Prize | Baban Gain, IIT, Patna |
| | Dibyanayan Bandyopadhyay, IIT, Patna |
| Artificial Intelligence and Machine Learning Second Prize | Sohel Aman Khan, Vidyasagar University |
| Cyber Security First Prize | Sumit Bhardwaj, J C Bose University of Science and Technology, Haryana |
| | Suhani Garg, J C Bose University of Science and Technology, Haryana |
| | Dinesh Yadav, J C Bose University of Science and Technology, Haryana |
| Cyber Security Second Prize | Mohit Raj, Vellore Institute of Technology, Bhopal |
| | Ashutosh Dubey, Vellore Institute of Technology, Bhopal |
| | Sayanth Fredaric Chalissery, Vellore |

| Thematic Area | Name of the Participants, Institution |
|---|--|
| | Institute of Technology, Bhopal |
| Big Data Computation, Second Prize | Nikhilkumar Rajnikant Panchal, IIT Madras |
| | Abhijit Gajananrao Bhakte, IIT Madras |
| | Arunkumar M, IIT Madras |
| Data Driven Finance, Second Prize | Arka Choudhuri, Jadavpur University |
| | Anubhab Das, Jadavpur University |