Kautuk Raj

Computer Science and Engineering
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Academic Details

Year	Degree	Institute	CGPA/%
2019-2024 (expected)	Integrated M.Tech in Computer Science and Engineering	International Institute of Information Technology, Bangalore	3.77/4
2019	Class XII, ISC	Narbheram Hansraj School, Jamshedpur	97%
2017	Class X, ICSE	Rajendra Vidyalaya, Jamshedpur	97%

Relevant Courses

- **Computer Science:**
  Data Structures and Algorithms, Computer Architecture, Computer Networks, Design and Analysis of Algorithms, Database Systems, Software Engineering, Theory of Computation, Machine Learning, Cloud Computing, Cybersecurity, Multi-Agent Systems, Operating Systems, Programming Languages, Software Architecture, Software Testing, Software Production Engineering
- **Mathematics:**
  Calculus, Linear Algebra, Differential Equations, Probability and Statistics, Mathematics for Machine Learning

Internships

- **Tata Steel, Jamshedpur** (*May - July, 2021*)
  Mentor: Rahul Kumar
  - Implemented a machine learning model for prediction of the late arrival of an employee based on several parameters like house location, the vehicle used, etc.
- **Center for Sustainable Mobility, IIIT Delhi** (*August, 2021 - December, 2021*)
  Mentor: Prof. Anuj Grover
  - Worked on the research problem of building low-cost GPS modules for e-rickshaws and auto-rickshaws to improve last-mile connectivity in Delhi, India.
  - Implemented a real-time operating system for the GPS modules to function.
- **Scalable Data Science Lab, IIIT Bangalore** (*May, 2022 - present*)
  Mentor: Prof. Vinu E Venugopal
  - Working on Reason-AIR, a project in collaboration with the University of Luxembourg and IIIT Delhi, intending to develop a distributed high-performance reasoning system for Description Logic (DL) ontologies. Specifically, developing a baseline system integrating Apache Spark and the Owlready2 API.
  - Designing a use case (and a pattern of applications) where the reasoning over streaming data is useful and envisage a system design that helps to attain a high maximum sustainable throughput (MST) in the stream reasoning context.
  - Used Apache Spark (in Python, Jupyter setups) to simulate a streaming setup on the big data and perform rate-testing of reasoning on a cluster computing setup to demonstrate the scalability of stream-based reasoning.
  - Learnt and gained experience in the areas of ontology, reasoning, stream processing as well as big data applications of these using Apache Spark.
- **TechR - Technology for Human Rights, Oslo, Norway** (*January, 2023 - present*)
  - Part of a European Union programme to develop mobile and web-based platforms incorporating ludic design to bridge the digital divide between and among the youth of diverse backgrounds and cultures.

Key Projects

- **Inventory Management Portal** (*November, 2019*)
  Mentor: Prof Sujit Kumar Chakrabarti
  - Designed and implemented a portal for warehouses to effectively manage their inventory using Python, Django and SQLite.
  - A browser-based graphic interface was also provided, for ease of access.
- **SAP Computer** (*February - March, 2020*)
  Mentor: Prof Subhajit Sen
  - Implemented and tested the *simple-as-possible* computer, a basic model of a microprocessor in Verilog, a hardware description language.
  - Developed an understanding of how a microprocessor works, how it interacts with memory and other parts of the system like input and output.
- **Multiplayer Quiz Game Show** (*March - April, 2020*)
  Mentor: Prof Tricha Anjali
  - Designed a multi-player P2P network-based game using PyGame for graphics and TCP sockets as the network component.
  - Reinforced the concepts of socket and network programming through an interactive real-world problem.

- **IAS Machine** (*August - September, 2020*)
  Mentor: Prof Nanditha Rao
  - Implemented the processor and memory components of the first electronic computer built at the Institute for Advanced Study (IAS), Princeton using Java.
  - Developed a strong understanding of the von Neumann architecture, amongst other concepts of computer architecture and organization.
- **Logistics Simulation** (*September - October, 2020*)
  Mentor: Prof TK Srikanth
  - Designed and implemented a logistics handling system to route packages from one location to another, using Java.
  - Developed a good understanding of the object-oriented style of programming, and the GUI widget toolkit Swing.
- **Personal Data Store** (*August - November, 2021*)
  Mentor: Prof Chandrashekar Ramanathan
  - Designed and implemented a database management system in C to store information about a person.
  - CRUD operations were carried out on this database.
  - Further, JDBC (Java Database Connectivity) was also used to interface MySQL with Java, for an enhanced version of the project.
- **Kaggle Malware Prediction Competition** (*October - November, 2021*)
  Mentor: Prof Neelam Sinha
  - Competed in a Kaggle competition for malware classification. Carried out batch-wise processing due to the big data nature of the input, tried out various strategies for high classification accuracy and finally settled on a LightGBM setup.
- **Data Processing using Hadoop MapReduce** (*February 2022*)
  Mentor: Prof Vinu E Venugopal
  - Processed, analyzed big data sources (Wikipedia entries) and ran semantic queries on them using Hadoop MapReduce, a distributed computing algorithm, in Java.
- **Edge Computing using EdgeX Foundry** (*April 2022*)
  Mentor: Prof Vinu E Venugopal
  - Created a mood lighting setup for a room using a mock setup of LEDs and Raspberry Pi (hardware end) and EdgeX Foundry, Docker and Python (software end).
  - Computing was carried out at the edge of the network, free from network constraints and latency.
- **Course Allocation System** (*April 2022*)
  Mentor: Prof Chandramouleeswaran Sankaran
  - Implemented a multi-threaded educational server and client application in C.
  - Used semaphores to protect data members while they were being accessed.

Scholastic Achievements

- Part of the **Dean's Merit List** at IIIT Bangalore for excellent academic performance, for three consecutive years (2020, 2021, 2022).
- Recipient of the Tata Steel Millennium Scholarship for demonstrating distinctive academic acumen.
- Secured a %ile of 99.43 in JEE Main (2019), among 1.2 million candidates.
- Among the top 1%ile of the ISC examination (class 12), conducted by CISCE.

Technical Skills

- **Programming Languages:** C, C++, Python, Java, LaTeX, SQL

Extra Curricular Activities

- Part of the organizing team at TEDx, IIIT Bangalore edition.
- Part of the core committee of the Google Developer Student Club at IIIT Bangalore.
- National semi-finalist at the Wipro Earthian Sustainability Quiz 2021, India's first quiz on sustainable development.
- Two-time finalist at the Tata Crucible Campus Quiz (2021, 2022), India's largest business quiz.
- National semi-finalist on News Wiz 2016, India's first and biggest news quiz, broadcast on India Today TV.
- National finalist on Travel Quest 2015, India's first nationwide travel quiz, an initiative by Thomas Cook.
- Regional finalist on TCSITWiz 2014, India's biggest IT quiz, conducted by Tata Consultancy Services.
- Three-time winner of the JRD Tata Memorial Quiz (2014, 2015, 2016), organised in memory of the industrial pioneer by Tata Steel.