Lovish Chopra

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Education

Indian Institute of Technology (IIT), Kharagpur 2016 – 2020
Bachelor of Technology (Hons.), Department of Computer Science and Engineering **CGPA: 9.94 / 10.00**
Institute Silver Medal: Department Rank 1 among 105 students of Computer Science and Engineering
Bigyan Sinha Memorial Award: Institute Rank 2 among 1500 students of IIT Kharagpur

All India Senior School Certificate Examination (AISSCE, Class 12) 2016
New Era Public School, Central Board of Secondary Education (CBSE) **Aggregate: 98.8%**
All India Rank 4 among 1.1 million students

Publications

PARIMA: Viewport Adaptive 360-Degree Video Streaming
Lovish Chopra, Sarthak Chakraborty, Abhijit Mondal, Sandip Chakraborty
Proceedings of The Web Conference 2021 (WWW '21), pp. 2379–2391, April 19–23, Ljubljana, Slovenia, Paper, Github

Research/Work Experience

Senior Member Technical, D. E. Shaw India Pvt. Ltd. June 2020 – Present
Domain: Software Development, Operating Systems, Database Management, Machine Learning

- Developed various software systems for trading and analysis in Macro division (Project Details Confidential)
- Responsible for maintenance of the Flows database: took initiatives to improve the infrastructure of the database
- Member of DESIS Advanced Analytics Club: an exclusive club for sharing knowledge of advanced data analytics

Undergraduate Researcher, B.Tech Project Jan 2019 – June 2020
Prof. Sandip Chakraborty; PARIMA: Viewport Adaptive 360-Degree Video Streaming
Institute Proficiency in Project Work Award: Best B.Tech. Project in Computer Science and Engineering

- Developed an end-to-end viewport-adaptive 360° video streaming system using state-of-the-art viewport prediction
- Exploited video contents in terms of object trajectories derived using a robust spherical object tracking algorithm
- Designed an augmentation of Passive-Aggressive Regression and ARIMA time-series models for viewport prediction
- Implemented the model to be online in nature, adaptive to user preferences dynamically and effective for streaming
- Compared the model performance with state-of-the-art baselines and observed an improvement of QoE by over 30%
- Implemented a server-client video streaming system using Kvazaar HEVC encoder, MP4Client and GPAC

Software Development Intern, D. E. Shaw India Pvt. Ltd. May 2019 – July 2019
Developed Market (DM) FX Positioning Monitor

- Developed positioning monitors for nine DM currencies using flow market participants (Project Details Confidential)
- Implemented stepwise causal regression modelling to analyse statistical relevance and stability of flow variables

Research Intern, Industrial Technology Research Institute (ITRI), Taiwan May 2018 – July 2018
Automated Data Mining Software for Car Accidents from Youtube Videos, Github Link

- Developed a software using optimised algorithms to extract small clips involving car accidents from youtube videos
- Developed a smart video crawling tool that can scrape videos given as input a search query with various search filters
- Utilised the tool to crawl car videos, developed algorithms to filter dashcam videos and detect cars from the same
- Devised a robust algorithm to detect collisions between cars using the objects detected in 2-dimensional video frames
- Extracted the dataset of video clips involving car accidents to be used to train the autonomous driving model at ITRI

Projects

PedalPals: Bicycle Rental and Marketplace Software Feb 2020 – April 2020
Database Management Systems, Prof. Shamik Sural, Web App Link, Android App Link

- Developed a full-stack website and android application using SQLite database for renting and selling bicycles
- Implemented industrial development techniques like SRS, DFD and UML for developing the software design
- Modelled the database for the system using Entity-Relationship Model and designed the relational database schema
- Incorporated features like trading and renting bicycles, user rating, feedback, discount coupons, customer queries etc.

Scalable Methods for Representing Large Scale Graphical Networks Aug 2019 – Nov 2019

Scalable Data Mining, Prof. Sourangshu Bhattacharya, Github Link

- Developed a hierarchical community-detection algorithm for low-dimensional network embedding of large scale graphs
- Constructed hierarchy tree using Louvain community detection and established inter-community links at each level
- Generated node embeddings using Node2vec at each level and combined them to get the overall network embedding

Exploring Secure Monitor Calls in Trusted Execution Environments (TEE) Aug 2019 – Nov 2019

Advances in Operating Systems Design, Prof. Sandip Chakraborty, Report Link

- Assembled and built a secure OP-TEE OS on Raspberry Pi and developed a trusted server-client system on the OS
- Booted Linux with OP-TEE using u-boot and developed interrupt handlers for managing Secure Monitor Calls
- Examined the application of the project in secure transfer of inaudible acoustic signals for confidential information

Simulation of Virtual Memory using Demand Paging Mar 2019 – Apr 2019

Operating Systems, Prof. Indranil Sengupta, Github Link

- Simulated operation of Virtual Memory Management using demand paging with translation-lookaside buffer (TLB)
- Developed the page-fault handling routine using Free Frame List and local page replacement with LRU criteria

NASA Space Voyage Linked Data July 2018 – Dec 2018

Knowledge Modelling and Semantic Technologies, Prof. Plaban Kumar Bhowmick, Github link

- Developed knowledge graphs using semantic web technologies to represent information about NASA space missions
- Used RDF, RDFS and OWL concepts to add semantics to the knowledge graph and make it usable for applications

Tiny-C to RISC Compiler and RISC Processor July 2018 – Nov 2018

Compilers, Computer Organisation and Architecture, Compiler link, Processor link

- Constructed a compiler to translate a code with a subset of C primitives to an RISC assembly language
- Developed a modular single-cycled RISC Processor using Verilog on Xilinx ISE and Block RAMs for data memory

Relevant Coursework

• Algorithms* • Operating Systems* • Advances in Operating Systems Design • Computer Networks* • Machine Learning
• Compilers* • Discrete Structures • Database Management Systems* • Software Engineering* • Object Oriented Systems
• Switching Circuits and Logic Design* • Linear Algebra • Scalable Data Mining • Artificial Intelligence
• Computer Organisation and Architecture* • Probability and Statistics • Knowledge Modelling and Semantic Technology
• Principles of Programming Languages *(* marked courses include Laboratory component)*

Other Awards and Achievements

- Recipient of J. C. Ghosh Memorial Prize 2019 for securing the highest CGPA in the department after six semesters
- Three-time recipient of Goralal Syngal Memorial Scholarship awarded for academic excellence from 2017 to 2019
- Attained All India Rank 53 in JEE Main 2016 and 885 in JEE Advanced 2016 among 1.2 million students

Technical Skills

- **Languages**: Python, C++, C, POSIX C, Java, SQL, MIPS, Verilog HDL, HTML, CSS, PHP, Haskell, Scheme, Lisp
- **Data Mining**: Tensorflow, Spark (Scala), Hadoop • **Semantic Web**: OWL, RDF, RDFS, Blazegraph, Protege

Positions of Responsibility

Business Development Advisor | Ehtiyaat | Enactus Khalsa and Enactus CVS April 2020 – May 2021

- Advised a team of 25 members in the collaborative technical and social entrepreneurship project 'Ehtiyaat'
- Provided employment to 5 women in creation of quality Covid-19 safety kits, which were sold India-wide at low prices

Editor | Awaaz, IIT Kharagpur | Student Media Body of IIT Kharagpur Aug 2016 – July 2020

- Led a team of 50 members to analyze various problems pertaining in campus and take initiatives to resolve them
- Developed and published insights on various topics like institute rankings, elections, placements and internships

Extra Curricular Activities

- **Volunteer at 'Desh Ke Mentor' program by Delhi Government (Oct 2021 – Present)**: Mentoring four government high school students explore various career options and develop their own career trajectories
- **Mentor at Student Welfare Group (2017 – 2020)**: Guided seven freshers in academic and extra-academic aspects
- **Open IIT Mathematics Olympiad (Nov 2019)**: Secured Silver Medal among over 100 participating teams
- **IEEE Robotics Workshop (Dec 2017)**: Attended the Image Processing Workshop organised in IIT Kharagpur
- **Volunteer at National Service Scheme (NSS), IIT Kharagpur (Jul 2016 – Apr 2018)**: Taught the students of a primary school in Talbagicha village; part of Annual NSS Camp in Dec 2016 at Khelar village