Vatsal Verma

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vatsalcode
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Education

2018–2022 **B.Tech (Hons.) in Computer Science and Engineering**, *SRM Institute of Science and Technology*.
CGPA: **8.96/10**

Experience

Jun 2021 - Present **Research Intern**, *Laboratory for Social Machines, MIT Media Lab*, MIT Cambridge, USA.
- Our research focuses on several racial and socioeconomic disparities in K-12 education to identify relationship between review content and school quality by applying recent advances in NLP.
- We analyzed about half a million reviews posted for more than 60,000 publicly funded US K-12 schools on popular rating websites. We identified differences in the topics discussed in reviews posted by different stakeholders using BERT-topic

May-Aug 2021 **Research Intern**, *LASI Lab, ETS Montreal*, MITACS Globalink, Canada.
- Worked on a research project that inclined towards the imperial study of mobile frameworks and impact on their application quality with respect to developers' aspects.
- Analyzed the most trending framework like Flutter, React Native, Xamerian using multiple open-source software like SonarQube, PMD, SOOT for extraction of results.

March-April 2021 **Open Source Mentor**, *GS Summer of Codes*, GSSOC.
- Contributed and mentored thousands of participants in GSSOC'21 , on Friday- Personal Assistant open source project and reviewed 1000+ lines of code.

Nov-Jan 2019 **Software Development Intern**, *Sintech Technologies*, Noida, India.
- Developed Sintech App for both Android and IOS from scratch using Flutter framework.Used Firebase for Database and Authentication , also consumed RESTful APIs to connect to database
- Used Apollo MockProvider , Jest and Enzyme for Unit and Integration testing with code coverage of 83%.

Key Research Projects

Jun-2021-Ongoing **School Review V2 Analysis**, Dr. Nabeel Gillani, Massachusetts Institute of Technology .
- Analyzed more than 2 Million reviews after classifying them into various stakeholders like Parents, Students, and Community members, used Bertopic modeling and LDA to compare the topics and what these stakeholders tend to talk more about.
- Our model can predict a school's test scores from its review language with a mean squared error of 42% better than the baseline; and progress scores at 1.33% over the baseline. Our analytical framework makes it straightforward to explore the relationship between parents' reviews and school demographics more directly.

May 2021 - Aug 2021 **An empirical study of mobile development frameworks and their impact on apps**, Prof. Ghizlane El Boussaidi, Ecole de technologie superieure ETS Montreal.
- The project was based on study of most trending hybrid frameworks like Flutter, React Native , Xamerian etc and we tried to find the design patterns and practices with respect to developers aspect.
- Initially, we started analyzing each framework to determine the code smells and various metrics like object-oriented, project metric using open-source tools like SOOT, PMD, SonarQube, and Dart Code Analyzer.

Jan-May 2021 **Machine Vision for Intelligent Vehicles in India**, Dr.Naveen Ahlawat, SRM IST.
- We developed an algorithm that deals with the complex section dealing with streets, unstable roads, and environmental conditions using depth and optical flow
- We got efficient results, indicating that the vision system is useful for developing vision algorithms and the proposed idea was robust for recognition of complex road environments like in India.
- We presented this work at the Springer ICRTC 2021 Conference.

July-Nov 2021 **Dense Caption Imagining**, *BTech Thesis*, Prof. Shivangi tyagi, KIET Ghazibad.
- My team and I explored several architectures to perform image generation conditioned on a text description.
- We used the COCO and California- UCSD Birds 200 dataset for this task. We used the StackGAN architecture as a baseline. Our work consisted of result replication together with the implementation of Laplacian Pyramid upsampling and attention mechanisms to obtain around 10% improvement on our selected baseline.
- This work is currently under review at the IJSR 2022.

Publications & Talks

Research Paper	"Machine Vision for Intelligent Vehicles in India", Vatsal Verma, Shristi Alhawat, Darpan Khanna,[**Accepted**] at International Conference on Recent Trends in Computing 2021
Research Paper	"Dense Caption Imagining", Vatsal Verma, Gaurav Gupta, Rohan Pradhan,[Submitted] at International Journal of Science and Research 2022
Invited Talk	"Advances in AI for Indian Traffic System", Dr. Reena Grover, Vatsal Verma, Gaurav Gupta,[**Invited Talk**] at Google DSC Club, SRM [Link]
Seminar Lecture	"Introduction to Open Source and GitHub Seminar", Vatsal Verma, Vishal gupta, Aditiya [**Seminar Talk**] at CodeChef Chapter, SRM [Link]
YouTube Guest Invite	"Internship Experience and Tips @ETS Montreal, Cananda", GeeksforGeeks Webinar on Youtube held on 2nd April 2021 live [**Webinar**] at Youtube, India [Link]

Other Projects and Open Source Contributions

Jan-Feb 2020 **ALzHI App**, Prof. Nishant Kumar Singh (SRM IST).

- Collaborated in a **team of 6** to make an application which can predict if a person is suffering from Alzheimer's.
- Programmed entire application using Flutter and firebase ,implemented an attractive UI We got 78.5 % accuracy rate and used University of Michigan data set of Alzheimer's information for results.

Nov-Dec 2020 **Detection and Interpretation of English Puns**.

- Implemented Locating the Pun Using Syntactic Characteristics and Corpus-based Metrics[UWaterloo].
- Implemented BERT which produced results by increasing f1 score from (0.84) current SOTA to (0.95).

Jan-March 2021 **Safe Reinforcement Learning in Pacman**.

- Learnt about safe RL using shields built by combining safety specifications written in Linear Temporal Logic and the environment represented as a Markov Decision Process
- Implemented a simpler shield for pacman environment, evaluated it on six different metrics and made inferences about the usefulness and performance overheads of using the shield

March-June 2021 **Scaling MMSB for large datasets**.

- Explored Mixed Membership Stochastic Blockmodel with an aim to achieve scalability over baseline implementations and added new functions for manipulations of symbolic polynomials and trigonometric functions

Open Source Contribution **SymEngine | Fastest symbolic manipulation library written in C++**.

- Implemented a new Infinity class in C++ to handle calculations which could lead to infinitely large values
- Added new functions for manipulations of symbolic polynomials and trigonometric functions

Awards and Achievements

2021	MITACS Globalink Research Internship, 2021 [**Awarded**]$9000 grant for research at ETS Montreal
2021	OIST Research Internship Program Japan, 2021 [**Selected**] Fully funded internship at OIST, Japan.
2021	Eastern European Machine Learning Summer School, 2020 [**Selected**]sponsored by Google DeepMind
2021	LMLS, 2021[**Selected**]focusing on NLP and Computational Linguistics, sponsored by univ. in Portugal
2020	Harvard Project for Asian and International Relations Conference (HPAIR) 2021 [**Selected**]
2020	Secured National Rank -1431,2811 in Google Hash-Code and Google Code-Jam.
2019	Global Entrepreneurship Boot Camp, Kuala Lampur 2019 [**Selected**] represented India as Delegate.

Technical Experience

Languages	`C, C++, Java, Python, JavaScript, Flutter, Dart, React Native`
Fameworks	`scikit-learn, Keras, Pandas, Docker, PyTorch, Tensorflow, Opacus, OpenCV`
Others	`gdb, asio, Git, network and systems programming, MySQL, NoSQ, Quartus, Modelsim`

Teachings, Leadership Roles and Extra Curricular Activities

2019-2021	**Founder & President** | CodeChef Chapter, Biggest Programming Club - SRM
2018-2020	**Executive/Core Member** | International Organisation of Software Developers (IOSD Club) - SRM
Spring'21	**Teaching Assistant** | 19CSC204J, Design & Analysis of Algorithms - SRM
Fall'21	**Teaching Assistant** | 18CSC305J, Artificial Intelligence - SRM