Surya S Dwivedi

Curriculum Vitae

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Education

2019-2021 **MS in Computer Science**,
The University of Texas at Austin, USA.

2015-2019 **B.Tech(Hons.) in Computer Science and Engineering**,
Indian Institute of Technology, Kharagpur, India,
CGPA: 9.09/10.

Honors and Awards

- Team selected for ACM ICPC Chennai Regionals 2017 and secured **44th** rank in the same
- Awarded Gorelal Syngal Memorial Scholarship (IIT Kharagpur) during the years 2016-17 and 2017-18 for excellent academic performance
- All India Rank **219** in JEE Advanced 2015 among **1.3 million candidates**
- All India Rank **05** in Kishore Vaigyanik Protsahan Yojana 2014 (A prestigious research fellowship examination conducted by Indian Institute of Science, Bangalore)
- Selected in Regional Mathematics Olympiad and represented Rajasthan State in Indian National Mathematics Olympiad 2013 and 2014.
- Among **Top 1%** in state in National Standard Examinations in Physics and Chemistry 2014
- Awarded Certificate of Merit by Central Board of Secondary Education for scoring perfect grades in all subjects in Secondary School Examination
- Awarded INSPIRE scholarship by Science and Technology Department, Govt. of India for outstanding performance in Maths and Science in junior school

Patents and Publications

- Paridhi Maheshwari, Nitish Bansal, **Surya S Dwivedi**, Rohan Kumar, Pranav Manerikar, Balaji Vasan Srinivasan, **"Exemplar Based Experience Transfer"**, published at ACM Intelligent User Interfaces - 2019
- **Surya S Dwivedi**, Ramit Pahwa, Jayanta Mukhopadhyay, Vishwa Vinay, Sunav Choudhary, **"Model Blending for Text Classification"**, submitted in EMNLP 2019
- Patent titled **"Techniques for generating templates from reference single page graphic images"** filed in the US

Research and Internships

Summer 2019 **Development of LSTM and GRU Layers in TMVA - GSoC 2019**, *CERN-HSF*, Mentors - Dr. Lorenzo Moneta, Dr. Sitong An.

Working on development of Long Short Term Memory(LSTM) and Gated Recurrent Unit(GRU) layers in TMVA - a library used at CERN for data analysis for paricle physics experiments - as part of Google Summer of Code 2019. These layers can have important applications like analyzing the voltage time series from the electronic monitoring system present in superconducting Large Hadron Collider magnets.

2018– current **Reducing Complexity of Deep Neural Networks**, *Bachelor's Thesis Project*, Mentor - Prof. Jayanta Mukhopadhyay, in collaboration with Adobe Research.

Working on developing techniques to improve the execution latency of deep learning algorithms. Currently exploring the idea of distilling knowledge from state of the art RNN based architectures to CNN based architectures for natural language tasks such as text classification. This would reduce the test time as parallel processing is possible in case of CNNs but not for RNNs.

Summer 2018 **Inspiration Driven Experience Transfer**, *Adobe Big Data Experience Labs*, Mentor - Dr. Balaji Vasan Srinivasan.

Developed a system that creates a new design based on multiple user inspirations. Implemented a CNN based architecture to extract the design template from the image of a single banner. Used an energy based approach to combine design elements from these extracted templates. The energy functions were designed to capture certain latent design variables such as alignment, white space etc.

2017– current **Swarm Robotics Research Group**, *IIT Kharagpur*, Mentor - Prof. Somesh Kumar.

Working as a software team member in Swarm Robotics, a research group that aims to design robots exhibiting swarm intelligence. Implemented algorithms for visual SLAM. Developed and tested path planning algorithms based on Artificial Potential Field. Implemented a simple simulator for testing the algorithms on bots.

Summer 2017 **Glyph Spotting in Old Bali Manuscripts**, *Visual Information Processing Lab, IIT Kharagpur*, Mentor - Prof. Jayanta Mukhopadhyay.

Worked in the area of Document Image Analysis. The task was to build a system to spot glyphs in images of old degraded Bali manuscripts. Segmented glyphs using seam carving, binarization and connected component analysis. Implemented a CNN based architecture to classify the glyph segments.

Notable Projects

Spring 2018 **Memory Resident File System**, *Operating Systems Course Project*, Mentor - Prof. Indranil Sengupta.

Implemented a memory resident file system that could be accessed using a library of APIs. The file system consisted of 3 data structures - super block, inode list and data blocks, all in memory. The API consisted of functions like read, write etc. implemented on these data structures.

Spring 2018 **TCP Tahoe**, *Computer Networks Course Project*, Mentor - Prof. Sandip Chakraborty.

Implemented a transport layer wrapper at the application layer on top of UDP. This wrapper implemented the basic functionalities of TCP like flow and congestion control. The congestion control algorithm was based on TCP Tahoe.

Spring 2018 **Guest House Booking System for IIT Kharagpur**, *DBMS Course Project*, Mentor - Prof. Shamik Sural.

Implemented a guest house booking system for IIT Kharagpur to shift the tedious offline booking process online. Used the Django framework for creating the web application. The schemas used in the relational database like Student, Guest, Room, Guest House etc. were derived based on the ER diagram. SQLite database was used.

Fall 2017 **MiniMatlab Compiler**, *Compilers Course Project*,
Mentor - Prof. Pralay Mitra.
Developed a compiler for MiniMatlab (a subset of Matlab) in C++.

Summer 2016 **Bus Tracking Android Application for IIT Kharagpur Buses**, *Self Project*, Nex-G Exuberant Solutions, Noida.
Developed a bus tracking android application for institute buses to save students' time. Used Firebase server for writing the coordinates of the bus and Google Maps API to display it to user.

Relevant Courses

Computer Science Courses:.
Algorithms - I*, Software Engineering*, Formal Language and Automata Theory, Discrete Structures, Switching Circuits and Logic Design* , Computer Organization and Architecture*, Compilers*, Algorithms- II, Intelligent Game Design, Operating Systems*, Database Systems*, Computer Networks*, Machine Learning, Cryptography and Network Security, Artificial Intelligence, Image Processing, Parallel and Distributed Algorithms, Theory of Computation, Distributed Systems, Deep Learning |* *laboratory components as well*

Mathematics Courses:.
Probability and Statistics, Linear Algebra, Maths - I (Multivariable Calculus, Differential Equations, Sequences and Series, Complex Variables), Maths - II (Integral Calculus, Vector Calculus, Numerical Analysis)

Technical Skills

Programming Language	C, C++, Python, Java
Tools	OpenCV, Tensorflow, Android Development, Django, NumPy, Git, MySQL, Unity
Operating Systems	Windows, Unix, Macintosh

Extracurricular Activities

- Member of National Service Scheme(NSS) under Ministry of Youth, Govt of India. Devoted 2 hours per week for social service during 1st and 2nd years. Involved in various tasks such as health awareness, educating children, old cloth collection and distribution in villages near IIT Kharagpur
- Developed a windows phone game(Samurai Tic Tac Toe) as a part of Microsoft Code.Fun.Do hackathon in less than 24 hours
- Keyboardist in Azad Hall of Residence IIT Kharagpur Band
- Badminton Team member of Azad Hall of Residence IIT Kharagpur