Esha Singh

Basic Information

Citizenship: India

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Education

Birla Institute of Technology and Science, Pilani, India **Aug'14 - June'18**
Bachelor of Engineering (Hons.), Electronics and Communication
Graduated in top 10%

St.Theresa's Convent School, Karnal, Haryana **Apr'12 - June'14**
XII CBSE(Sciences)
Passing Percentage: 93.4%

Technical Skills

Languages: *Proficient*: Python, C, C++, Java | *Basic*: Lua, SQL, HTML/CSS, JavaScript
Toolkits: Tensorflow, Keras, XILINX, LTspice, MATLAB, Django, Wireshark, Pytorch, Spacy, Docker, LaTeX

Research Experience

- **ValueLabs**: Machine Learning Consultant- Strategy *(Jun'18 - Aug'19)*
  Themes: Prototype Designing, Deep Learning; Computer Vision; Entity Extraction; Machine Learning
- **Ericsson India Global Services**: Intern (R&D) *(July'17 - Dec'17)*
  Software Defined Networking, Networking&Cloud Computing team
  Themes: SDN architecture; North Bound API; REST APIs; Computer Networks
- **Centre for Development of Imaging Technology**: Student Researcher *(May'16 - Nov'16)*
  Department of Optical Image Processing
  Themes: Image & Morphological Processing; Image compression
- **Engineers Without Borders, India**: Student Volunteer *(Aug'14 - Sep'15)*
  BITS Pilani, Student Chapter
  Themes: Optics; LED; Electronic Circuits

Recent Projects

Fall Detection device using BMA280 Web

– Target was to engineer a fall detection device for the elderly as a part of Self-care kits.
– Worked on prototyping the device using BMA280 & microprocessor.
– Sans any visual device embeddings like camera needed to develop a system which can predict free-fall based on accelerometer readings, Heart-rate, blood pressure & perspirations. We identified four basic parameters for free-fall detection which effected where the device is to be worn like on wrist, waist or around the neck.

Customer Service Auto-Reply System Web

– Key problem was to Auto-generate responses on the Customer service side, where the response corresponds to only one query category, from available 14 query classes (Order modification, cancellation etc.)
– First, used SVM to classify the user query in the pre-decided 14 query classes.
– Then, used an encoder-decoder architecture for generating the response. Pre-processing steps(language detection, tokenization, sentence segmentation)+ LSTM for response selection + response generation(includes Semantic Intent clustering, Semi-supervised Learning, Cluster Validation)

Unstructured to Structured Data for Corporate Invoices using Machine Learning Web

– Aim was to extract all intelligible information from unstructured data sans any Rule-based logic.
– Used Tesseract for OCR of invoices & developed the algorithm using Fuzzy matching(Levenshtein, Jaro–Winkler distance). Also working on signature extraction using connected-component analysis.
– The algorithm is independent of invoice formats with a Precision of 83% (over 2k documents)(Precision-Recall metric)

Vehicle Route Optimization Web

– Aim was to find the most optimized route to take with constraint in the time window and load of the vehicle.
– Worked on creating a Vehicle Route Optimization interface where we use Geo-codes(UK) to pin-point locations.
– Dijkstra, A* and Contraction Hierarchies are supported by the route optimization engine.

Past Projects

Integrated SDN Troubleshooter Interface *(July'17 - Dec'17)*
Guide: Vivek Srivastava, Principle Engineer(SDN R&D) Web

- Project-based on development and designing of an integrated troubleshooting environment for SDN(Kafka dumps).
- The troubleshooting interface interconnects Control Data-Plane-Interface, SDN Controller and outgoing Northbound APIs. The interface has been released for scale testing.

Analog Devices & Circuits *(Jan '17 - Apr '17)*
Guide: Dr. Souvik Kundu Web

- Aim was to design and implement 10 theoretical circuit designs within 5% of precision range.
- Implementation of Clamper circuits, Common Emitter, Operational Amplifier, Sallen-Key, Precision Circuits, Sinusoidal and Non-sinusoidal Oscillators, Instrumentation and Programmable Gain Amplifiers.
- Equipment & Components: Analog Electronics Trainer kit, DSO (Analog Discovery kit), Digital Multi Meter, 741 ICs, Resistors, Potentiometers, Capacitors, Diodes and Patch cords.

"Computer Architecture Pipeline Designing" *(Mar '17 - Apr '17)*
Guide: Dr. Chetan Kumar V Web

- Aim was to design and implement a 4-stage pipeline processor to execute a set of specific instructions.
- Implementation of memory units, ALU & program counter synchronized in a pipeline flow using Verilog language.

Microelectronics and A&D VLSI Designing *(Sept'16 - Nov '16)*
Guide: Dr. Chetan Kumar V Web

- Aim was to design and implement MOSFET circuits to execute some specific functions with an input signal of 15A and output amplification scaled to ratio of 9:7.

"Producing Veridical Facial Line Drawings From Obscure Images In MATLAB" *(May'16 - Nov'16)*
Guide: Sri. Sajan Ambadiyil, Head of Department Design and Research, OIP Web

- Wrote a thesis & developed an algorithm for facial recognition of humans using MATLAB & its conversion into veridal lines. The algorithm has 90% success rate.
- Created dataset of 4k images from video footages of criminal activities. Further segregated them into 3 categories based on facial angle visibility.

"Low-power light source using LEDs&waste materials for villages near BITS Pilani" *(Aug'14 - Sep'15)*

- Worked with EWB (Engineers without Borders) organization - India Chapter, as a member, in prototype designing for the project.
- We made 100 prototypes and distributed to nearby villages for 1-5 rupees ($0.014 - $0.068)

Thesis

"Particle Swarm Optimisation - Applications" *(Aug '18 - present)*
Guide: Prof. Nagendra Prasad Pathak, IIT- Roorkee Web

- Working towards writing a research paper which will include custom Algorithm and data-set.
- We use PSO technique to find the most optimized solution for electromagnetic device parameters and readings. Will be extrapolated to neural networks and related use-cases.

"Lab-On-Chip PCR Miniaturization using MEMs For Molecular Diagnosis & Cure Generation of MDR-TB" *(Jan '17 - Sept '17)*
Guide: Prof. Sanket Goel, Associate Professor & Head, Department of EEE, BITS Pilani Web

- Worked extensively with Peltier thermostats, thermocyclers, ARDUINO UNO R3 ATMega328P and PID controllers to design a miniature on-chip PCR.

Relevant Coursework

Analog & Digital VLSI Design, Algorithms, Data Structures, Control Systems, Electrical Machines, Microprocessors & Controllers, Computer Architecture, Operating Systems, Microelectronics, Information Theory & Coding, Advanced Calculus, Discrete Mathematics, Optimisation, Probability & Statistics

Positions of Responsibility

ValueLabs, Hyderabad, India *Aug'18 – Present*

– Panel Member for All India recruitment drive for Technical consultants Level 1 for IIT Madras, IIIT Banglore, IIIT Allahabad, CBIT, SRM University, and NIT Warangal.

– Represented Valuelabs, India for INSPIRE 2018, London

Placement Logistic Coordinator,BITS *Sep'14 - Dec'17*

Hosted 3 companies for campus placements: Accenture, Microsoft, MuSigma as a coordinator.

Nirmaan, Student Volunteer *Oct'14 - Dec'17*

Organised various events for the organisation. Also, taught primary students of villages around the college Arithmetic & English.

Student Prefect Leader *Aug'13 - Mar'14*

St. Theresa's Convent School

Haryana State Skating Team Captain *Jun'02 - Dec'11*

Captain of Haryana Girls Skating Team which competed on state and National level

Achievements & Awards

- Recipient of Merit Scholarship - BITS PILANI
- Qualified All India Physics Teachers' Association Exam (A Homi Bhabha Science Education Exam) with 80 percentile in 2012
- Qualified Science Olympiad with AIR 164, Math Olympiad with a state rank of 1 (2009, 2010,2011, 2012, 2013, 2014)
- National level skater: state champion (Haryana) 4 times
- Avid debater with state-level prizes (1st, 2nd) throughout schooling