Suyash Agrawal

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Academic Details

Year	Degree	Institute	CGPA/Percentage
2015-2019 (Current)	B.Tech in Computer Science and Engineering	Indian Institute of Technology Delhi	9.885 **Institute Rank 3**
2015	Class XII, CBSE	Vishva Bharti Public School	96.4%
2013	Class X, CBSE	Christ Jyoti Senior Secondary School	10.00

Scholastic Achievements

- Secured **All India Rank 69** in Joint Entrance Exam Advanced - 2015 among 150,000 candidates.
- **Institute Rank 3**. Consistently ranked in top 3 in the institute during academic years 2015-2018.
- Selected for **ACM-ICPC 2017 and 2018** Regional Round with teams competing from all over India.
- Among **top 3** teams in **Microsoft's Code.Fun.Do** campus wide Hackathon in **2016, 2017 and 2018**.
- Became a National Talent Search Examination (**NTSE**) scholar for being in **top 1000** at National level in 2013.
- Selected as **KVPY** Scholar in 'Kishore Vaigyanik Protsahan Yojana' by Indian Institute of Science given to **top 1%**.

Internships & Major Projects

Order Entry Service — Risk Technology, Tower Research Capital
Summer Internship — *May-July 2018*

- Designed a modern Web based architecture for Order Entry service used for sending manual orders to market.
- Used C++ to create a micro-service for managing raw socket connections with Trade servers and sending trade orders.
- Created Order Manager service in Golang to handle multiple users and serve as a broker between user and markets.
- Developed an extensible API using GRPC and Protobufs for communication between Order Manager and multiple Pods.
- Devised various mechanisms to extensively handle connection drops and corresponding updation in the whole network. Tested the whole network architecture extensively for fault tolerance in various scenarios.
- Used REST APIs to standardize order sending protocol and WebSockets for realtime updates of orders on Dashboard.

Backend for an Ed-Tech Startup — Bozobaka Labs Pvt. Ltd.
Independent Internship — *Jan-Aug 2018*

- Designed the entire backend system, focusing on reliability and speed, and successfully deployed its app.
- Built numerous services and portals for effective management of app content and administrative purposes.
- Built app backend using Loopback framework on NodeJS and aimed at keeping the APIs intuitive and extensible.
- MySQL+MongoDB were used for storage, prioritizing minimal duplication while optimizing time delay of frequent APIs.
- Used Redis for caching frequently used and compute intensive APIs to make service faster and reduce server load.
- Created a dockerized OCR service using Tesseract for easing content creation and enabling smarter search of doubts.

Automated Video Description — Prof. Subhashis Banerjee
Summer Undergraduate Research Award — *May-July 2017*

- Built an end to end model using deep learning to generate natural language summary of short video clips.
- Utilized transfer learning in encoder by finetuning state of art CNN (Inception V4) to encode individual video frames.
- Designed encoder decoder network architecture consisting of Multilayered LSTMs to achieve this translation.
- Experimented with Data Augmentation, Audio Features, Attention models, Loss metrics to improve performance.

Other Projects

Semantic Image Segmentation using Priors — Prof. Parag Singla
Bachelor's Thesis Project — *July 2018 - Present*

Proposed a novel technique to improve multi-task learning inference using prior knowledge during test time. Tested this hypothesis on the task of semantic image segmentation using DeeplabV2 model on Pascal VOC dataset by forking a classification module to allow for multi-task learning. Currently performing rigorous tests on various architectures.

Real Time Video Augmentation — Prof. Subhashis Banerjee
Computer Vision Project — *Oct-Nov 2017*

Transported a human from a live green screen video stream into a custom 3D environment. Used techniques like Chroma Keying in YCrCb space to get a matte from the green screen video. Unreal Engine was used to create 3D environment and light mask was used for realistic keying output. Demo video can be seen here.

Debunking Neural Essay Scoring — Prof. Mausam
Natural Language Processing Project — *Mar-May 2018*

Analyzed various Neural and Non Neural systems for automated essay scoring and designed various experiments to compare their qualitative performance. Using the insights gained from these experiments, proposed methods to improve the qualitative performance of neural models. The link to the report is here.

Krivine and SECD Machine — Prof. Sanjiva Prasad
Programming Language Project — *April - May 2017*

Implemented a compiler with Krivine and SECD machine in OCaml. A Lex Scanner converted program to tokens which were converted to an Abstract Syntax Tree using Recursive Descent Parser. The AST was type checked and a low level code was generated, which was executed by the machines. Machines also supported features like scoping,recursion etc.

Relevant Courses

- **Computer Science:**
  Computer Vision, Natural Language Processing, Machine Learning, Artificial Intelligence, Operating Systems, Computer Networks, Parallel Computing, Theory of Computation, Algorithm Design, Logic for CS, Programming Languages, Computer Architecture, Design Practices, Data Structures & Algorithms, Discrete Mathematics, Digital Logic
- **Mathematics and Electrical:** Linear Optimization, Signals & Systems, Prob. & Stochastic Processes, Calculus.

Technical Skills

- **Programming Languages:** C, C++, Python, Java, JavaScript, Golang, OCaml, Prolog, SML,VHDL, C#, Matlab.
- **Frameworks:** Docker, NodeJS, OpenCV, OpenMP, MPI, Git, Loopback, Django, MongoDB, Tensorflow, PyTorch.

Extra Curricular Activities

- Co-founded **Software Development Club** in IIT Delhi to foster development culture and created interesting projects.
- **System Administrator** in Updaters Group, handling the entire system architecture of CSE Dept. IIT Delhi.
- Overall Coordinator at **Coding Club**, responsible for organizing all competitive coding related events at IIT Delhi.
- **Technical Coordinator** at Tryst 2018, created and managed the entire back-end of the technical festival.