Madhur Singhal

Computer Science and Engineering
Indian Institute of Technology, Delhi

msinghal1998@gmail.com
cs1150235@cse.iitd.ac.in
github.com/madhurcodes
https://www.linkedin.com/in/madhur-singhal/

Academic Details

Year	Degree	Institute	CGPA/Percentage
2015-2019 (Current)	B.Tech in Computer Science and Engineering	Indian Institute of Technology Delhi	8.69
2015	Class XII, CBSE	Pragati Vidya Peeth	93.8%
2013	Class X, CBSE	Little Angels High School	10.00

Scholastic Achievements

- Secured **All India Rank 85** in Joint Entrance Exam Advanced - 2015 among 150 Thousand candidates.
- One of three students from India invited by Microsoft to the **Build 2017** summit in Seattle, Washington.
- Runner up in **Microsoft's Code.Fun.Do** campus wide Hackathon in 2017.
- **SAT** score 2280/2400 (M:800, R:800, W:680), SAT Subject Tests score 1600/1600 (P:800, M2:800).
- Became a National Talent Search Examination (**NTSE**) scholar for being in top 1000 at National level in 2011.

Major Projects

Automated Video Description using Deep Learning Prof. Subhashis Banerjee, May-July 2017

- Built software for generating natural language descriptions of short video clips.
- Designed encoder decoder network architecture consisting of Multilayered LSTMs to achieve this translation
- Used transfer learning in encoder by employing state of art CNN (Inception V4) trained on Imagenet to encode individual video frames.
- Experimented with Data Augmentation, Audio Features, Attention models and Alternate Loss metrics to improve performance.
- Explored its applications in areas like Video Surveillance and helping Visually impaired.

Indoor Navigation System for Visually Impaired Prof. M. Balakrishnan, May-July 2016

- Designed to help visually impaired people navigate inside buildings and airports.
- Uses fingerprinting of Wi-Fi and Bluetooth signals to achieve localization within 2 meters.
- Built two Android Applications, one for logging Wi-Fi and BLE strengths and the other to help the user navigate.
- Implemented Levenshtein Distance Algorithm, WKNN Algorithm and also tried using PCA and Isomap in order to reduce dimensionality.

Pipelined MIPS Simulator with Debugger and Cache simulator Prof. Kolin Paul, Mar-April 2017

- Developed a pipelined MIPS simulator supporting animation of instruction execution through multiple stages in C.
- Simulated all stages in parallel using threads (pthreads).
- Designed a trace based cache simulator and debugger for the processor with various configuration options.
- Used SVG to show current instruction in each stage and Javascript, CSS for styling.

Other Projects

Study of Data Science and Application to Kaggle Datasets Independent Study, Jan-August 2017

- Pursuing the Microsoft Professional Program in Data Science having completed 8 of the 10 courses.
- Learnt Data Visualization in PowerBI, Data Cleaning and Manipulation in R and Python, and Machine learning with Scikit-Learn and AzureML.
- Studied Deep Learning architectures and implemented fully connected and convolutional layers from scratch in Python.
- Completed Kaggle machine learning challanges employing data cleaning, feature engineering and predictive ML algorithms on provided Datasets.

Automated Image Captioning Prof. Subhashis Banerjee, Jan-April 2017

- Developed a software to automatically generate captions for images.
- Used a encoder decoder network similar to machine translation for generating captions.
- Used Inception V4 network to extract features from images using transfer learning
- Used Multilayered LSTM network to decode image embeddings into natural language sentence.
- Achieved baseline performance of paper Show and Tell by Vinyals et al.

Prolog Interpreter in Ocaml Prof. Sanjiva Prasad, Mar-April 2017

- Developed a Prolog Interpreter in OCaml with full command line interpreter.
- Token generation and Parsing was done using OCaml-Lex and OCaml-Yacc respectively.
- Rule unification and backtracking were done in order to implement the relational backbone of the interpreter.

Relevant Courses

- **Computer Science:**
  Computer Vision*, Algorithm Design*, Networks*, Programming Languages, Computer Architecture, Design Practices, Data Structures & Algorithms, Discrete Mathematics, Digital Logic
- **Mathematics and Electrical Engineering:**
  Signals & Systems*, Probability & Stochastic Processes, Calculus, Linear Algebra, Intro to Electrical Engineering.
- **Online:**
  Deep Learning (Fast.ai), Data Science (10 courses on Edx) Intro to Machine Learning (Stanford, Coursera), Intro to Computer Science (CS50, Harvard).

**Courses currently pursuing*

Technical Skills

- **Programming Languages:** C, C++, Python, Java, JavaScript, NodeJS, VHDL, C#, Matlab.
- **Frameworks:** Tensorflow, Keras, ExpressJS, Django, Web2Py, Bootstrap, JQuery
- **Programming Environments:** Jupyter, Android Studio, LaTeX, Visual Studio, Xilinx ISE Design Suite

Extra Curricular Activities

- Developed a chatbot named CampusBot during Code.Fun.Do to fulfil the basic needs of college students.
- Attended the St Stephens Model United Nations recreating World War 2 diplomacy over the course of three days.
- Attended the Ground Zero Summit and Workshop, the largest grey hat hacking conference in India.
- Member of the Development Club at IITD, working to foster the spirit of making open source technology.
- Member of the Microsoft Student Partner program with the goal of organizing hackathons and seminars in our campus.