



Devansh Chandak
Computer Science & Engineering
Indian Institute of Technology Bombay

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UG Third Year (B.Tech.)
Male
DOB: 20/11/1999

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	9.52
Intermediate/+2	CBSE	Birla High School, Kolkata	2018	99.00
Matriculation	ICSE	La Martiniere For Boys, Kolkata	2016	98.67

SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 4**, State Rank 2 in the Grade 10 **ICSE** Examination out of **170,000** students (2016)
- Achieved **All India Rank 5** in the **CBSE** Board Examinations (Grade 12) out of **1.2 million** candidates (**Overall East Zone Topper** and **All India Rank 3** in the Science Stream) (2018)
- Only student to receive the **Advanced Performance (AP)** grade in **Computer Programming & Utilization** and amongst the **top 3** in the **Biology** course (*Molecular, Physical and Biomedical modules*) out of **500+** students (2018-19)
- Awarded **AP grade** in **Advanced Calculus** (*top 12 out of 1000+* students) for *exemplary* performance (2018)
- Attained a Semester Performance Index (**SPI**) of **perfect 10** in the First, Fourth and Fifth Semesters (2018, 2020)
- Among the **top 12** students to be granted **Change of Branch**/Major to Computer Science (2019)
- Offered **Computer Science** at the National University of Singapore (**NUS**) with **100 %** scholarship (2018)

SCHOLARSHIPS AND RECOGNITION

- Bagged the **Institute Academic Award**, given to the **Top 25** out of a batch of 1000+ students for *exceptional* academic performance in the first year of Undergraduate Study at IIT Bombay (2018-19)
- Bestowed with the **KVPY** (Kishore Vaigyanik Protsahan Yojna) Fellowship, given to the talented young minds in the field of Science and Technology, by Department of Science and Technology, Govt. of India (2018)
- Felicitated by **The Governor of West Bengal**, with the *Mamraj Agarwal Rashtriya Puraskar* for exemplary performance in the ICSE and by *Mr. S.K.Birla*, industrialist & trustee of Birla High School with a **Gold** medal (2016, 2018)
- Received a **Letter of Appreciation** from Ms. Mamata Banerjee, Chief Minister of West Bengal for *exemplary* performance in the CBSE Examinations along with the *Swami Vivekananda Scholarship* for *Undergraduate Study* (2018)
- Granted the *Ramawatar Gupt Pratibha Puraskar* and a cash award by **Sanmarg Foundation** for securing **99%** in Hindi in the ICSE, the **Times of India EduShine** for stupendous performance in the Grade 12 Board (2016, 2018)
- Recipient of the **Udbhav Poddar Memorial Prize** and the **Dr. RS Pandey Proficiency Silver Medal** for securing the **highest marks** in the country in Mathematics and Hindi respectively, in the ICSE Examinations (2016)

INTERNSHIP AND RESEARCH EXPERIENCE

Software Development Intern

(Dec '20 - Jan '21)

Guide: Mr. Sachin Korgaonkar (Project Manager)

MOTILAL OSWAL FINANCIAL SERVICES LTD.

- Designed an **HR Compliance portal** with different functions for different user types, using C#, ASP.NET and MS-SQL
- Features: add/edit user and document category details, upload documents in each category and view them in a repository

Computational Linguistics (COLING) Conference, 2020

NLP CONFERENCE | (July - Dec '20)

- Textgraphs-14: Shared Task on Multi-Hop Inference for Explanation Regeneration:**
 - Co-authored a **publication**, developed methods to reconstruct the explanation graph for elementary science questions
 - Developed a model with an improvised Information Retrieval using tf-idf vectorizer to rank all explanations in the dataset
 - Designed a unique *re-ranker* using **BERT**, **RoBERTa** & **SciBERT**, got 0.5061 MAP score and were ranked **4th**

Research Intern — Cryptography

(April - May '20)

Guide(s): Prof. Steve Kremer and Jannik Dreier

INRIA, NANCY, FRANCE

- Formal Verification** of security protocols:
 - Studied operational semantics, equivalence properties (in the *applied pi calculus* and the **Tamarin** prover) and the **SAPIC** plugin (tool translating high level protocols to multiset rewrite rules, *analyzable* by Tamarin)
 - Introduced the notion of biprocesses (*semantics and translation*) and **diff equivalence** in SAPIC, and worked on the **soundness proof** of the translation after the addition

Quantitative Research Analyst

(Dec '19 - Jan '20)

Guide(s): Prof. Prasanna Tantri, Prof. Nitin Kumar and Ravi Ranjan

INDIAN SCHOOL OF BUSINESS, HYDERABAD

- Deep Learning: Applying NLP techniques to Time Series Analysis for Stock Futures :**

- Designed an intuitive approach for storing the stock history in vector form using a Ticker **Embedding Model**. Incorporated technical indicators such as Momentum, Trailing Volatility, Asset Class and average return per asset class
- Designed and implemented an **LSTM** classifier (using **PyTorch**) to forecast the trend of **Expected Returns**
- Expanded the LSTM to incorporate **attention**, and **retrain** over latest data *while testing*
- Optimized the hyperparameters using libraries: Ray for **Grid Search** and Hyperopt for **Bayesian** optimization
- Trading Algorithms: Implementation and back-testing using Python**
 - Implemented the **Pairs**, **Betting against β** and **Momentum** trading algorithms on the Nifty-200 stocks
 - Experimented with daily, weekly and monthly *rebalancing* of equally weighted and value weighted portfolios
- Awarded a **Letter of Recommendation** for *exceptional* performance shown throughout the internship

Data Analytics Intern

(June - July '19)

Guide: Mr. Amit Ambekar (Vice President, Marketing)

SPENCER'S RETAIL LTD.- RPSG GROUP

- Analysis of underperforming stores given all KPIs and SKU (Stock Keeping Units) level data: **Statistical Analysis** of transactional & brick level data to attribute reasons for de-growth in the *MGF Gurgaon* and *Vizag* hyper stores
- Given all category **KPIs**, *deep dived* into SKU level performance to come up with solutions to **counter degrowth**

Machine Learning Intern

(May - June '19)

Guide: Prof. Vipul Arora

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

- Analysis of ML Algorithms for Spam Email Classification in Python: Analyzed SVMs and Neural Networks before implementing **Naive Bayes** and **KNN** on numerous data sets using *Keras*, *Pandas*, *Numpy* and *Scikit-learn*

Software Engineering Intern

(Nov - Dec '18)

Guide: Mr. Mohsin Ali (Project Manager)

CITYTECH SOFTWARE PVT. LTD.

- Configured and enhanced a **chatbot** for Employee Leave Applications using **Microsoft LUIS** after a *comparative study* with *Google Dialog Flow*. Helped in introducing *Voice to Text* feature (using Bing API) from Microsoft Azure
- Researched on **Human Resource Automation** and developments in *Google Assistant*, *IBM Watson*, *Alexa* and *Cortana*

PROJECTS & KEY ASSIGNMENTS

Buffer Overflow Attacks and Defenses | Computer Architecture

COURSE PROJECT | (Sept - Dec '20)

- Demonstrated the Stack and Heap based buffer overflow exploits and the special cases: Return to LibC, Off by One and Use after Free using **C** & **x86**. Performed a detailed case study on the Code Red Worm which was based on buffer overflow

Google Forms and Survey Management | Software Systems

COURSE PROJECT | (Sept - Nov '19)

- Designed own Form and Survey Management system like Google Forms with **user authentication**
- Allowed *modular* question design (paragraph, file upload, dropdown, checkbox, radio button), form validation (constraints on answers like alphanumeric, range, email-ID, .pdf only), adding **collaborators** and shareable forms (surveys & quizzes)
- Data analyzable by plotting of numerics (**Matplotlib**), learning dependencies in responses and summarized presentation of subjective answers. Used **Django** for backend, **Sqlite3** for database structure, **Bootstrap** for responsiveness

Sentiment Analysis by BERT

SELF PROJECT | (July '20)

- Achieved **91 %** accuracy in predicting positive/negative sentiments on the **IMDB** reviews dataset
- Used BERT from the Hugging Face *transformers* library and **Pytorch** for preprocessing and funetuning the model

Other Course Projects

- **File System**: Emulated a disk over a text file with the superblock, inode and data blocks. Implemented a file system on the emulated disk with basic operations like open/close/read and write
- **Copy-on-Write Fork in xv6**: Implemented the CoW fork which allocates new memory pages only on modification
- **Custom Memory Manager**: Implemented a memory manager to allocate and deallocate memory dynamically. Extended the allocator to be elastic and map pages only on demand
- **Scheduler in xv6**: Modified the current scheduler in xv6 to consider user-defined process priorities. Used priorities as weights to implement a weighted round robin scheduler, while taking care of starvation
- **Custom Linux Shell**: Built a shell in **C** with support for background, serial & parallel processes, and kill signal & exit
- **Pure Numpy Implementation of CNN**: Implemented the Fully Connected, Convolution, Avg and Max Pooling layers in pure numpy. Trained the model on the MNIST and CIFAR10 datasets to achieve accuracies of 94% & 53% respectively
- **Spanning Tree Protocol**: Simulated the network bridge topology as a *distributed system* of nodes, communicating via messages, in **C++**. Configured nodes to run the protocol and agree upon a *loop-less topology* to prevent a *broadcast storm*
- **SAT Solver**: Designed a SAT Solver using **z3 in Python**, to check satisfiability in CNF (Conjunctive Normal Form). Solved the *NQueens*, *Sudoku* and *Graph Colouring* problems with the solver, using **DPLL** (a backtracking algorithm)
- **Efficient Memory Allocator**: Designed a simulator in **C++** for efficient dynamic memory allocation of processes using the *first-fit strategy*. Handled allocation, deallocation & termination requests for upto 10^6 process requests simultaneously
- **Non Parametric Estimation**: Compared methods of histogramming & Kernel Density Estimation, analyzed *rate of convergence*. Implemented **Cross Validation** in **MATLAB** (*bandwidth selection* giving maximum joint likelihood)

PCA for Fruit Image Generation and MNIST | Data Analysis

COURSE PROJECT | (Oct - Nov '19)

- Plotted closest representations of RGB fruit images, using *Principal Component Analysis*, fitting a *MultiVariate Gaussian*. Generated new images by random sampling (representative of the dataset), using the closest representations, in **MATLAB**
- Performed *Principal Component Analysis* on the MNIST dataset to visualize principal modes of variation (*MultiVariate Gaussian* fitting), in **MATLAB**, decided on number of *degrees of freedom* of digits and inferred handwriting tendencies.

POSITIONS OF RESPONSIBILITY

Teaching Assistant | CS 101 - Computer Programming & Utilization | Prof. Purushottam Kulkarni

(July - Nov '19)

- **Only sophomore** to be selected for TA-Ship on the basis of **academic prowess** in the subject. Involved in teaching and assisting students within and outside lab hours, with problems and conceptual doubts on a **one-to-one basis**

Interact Coordinator — Community Service | Rotary Club of Calcutta Visionaries

(2017-18)

- Coordinated **blood camps**, **health camps**, eye camps, newspaper collection drives, **organised sports** for *village children* in the Sunderbans. Conducted free **computer classes** for *underpriveleged* children of Sambhu Sadan Vidayala, Kolkata

Events Coordinator, Techfest | Asia's largest Science and Technology Festival

IIT BOMBAY | (2019-20)

- Spearheaded a team of **15+** in conceptualizing and organizing **Technoholix**, featuring *International* performances. Organized **PAN India** workshops on investment education with *NISM*, *NSE* & *SEBI*, under the *Financial Literacy Initiative*

TECHNICAL SKILLS

Languages

C++, PYTHON, JAVA, C#, BASH, MATLAB, VHDL

ML Libraries

PYTORCH, KERAS, TENSORFLOW, SCIKIT-LEARN, RAY, HYPEROPT, ROUGE, GROBID

Web Tools

HTML5, CSS3, JAVASCRIPT, BOOTSTRAP, DJANGO, SQLITE3, MS-SQL, ASP.NET

Software Tools

GIT, L^AT_EX, SED, AWK, MAKEFILES, SCIPY, NS3, WIRESHARK, PROVERIF