Shubhamkar Bajrang Ayare **170050018**
Computer Science and Engineering **UG Fourth Year**
IIT Bombay **Male**
DOB: 09/05/1999

Examination	University	Institute	Year	CPI/%
Graduation	IIT Bombay	IIT Bombay	2018	8.29
Intermediate / +2	MSBSHSE	Anglo Urdo Boy's High School	2017	89.85
Matriculation	MSBSHSE	Rosary High School	2015	94.20

My Github Profile - digikar99

KEY PROJECTs & INTERNSHIPs

Satellite to non-Satellite Image Conversion using cGANs Autumn 2019

Prof. Ganesh Ramakrishnan (Course Project) *Foundations of Artificial Intelligence and Machine Learning*

- Trained a **cGAN** comprising of a **patchGAN discriminator** and a **U-net generator** to achieve the conversion
- Using **Inception Score** as the metric to compare & analyze the performance of **different variants** of the model

Sentiment Prediction from Movie Reviews Summer 2019

- Used **word embeddings** to obtain user sentiments from movie reviews using keras and numpy
- Obtained **88% accuracy** on **IMDB movie review dataset** using a **multi-layer perceptron**

Conditional Random Field for Named Entity Recognition Spring 2020

Prof. Soumen Chakrabarti (Course Project) *Organization of Web Information*

- Implemented **inferencing** to obtain the best label sequences corresponding to the **named entities**
- Using **softmax**, attempted to improve **macro averaged F1 score** by introducing an auxiliary loss term

Optimization of ROS-like frameworks ***(Internship** at Sony [Japan])* July 2020 – August 2020

- Developed a **simple distributed tracer** to obtain trace information with minimal throughput degradation
- Used **nodelets** and **ZeroMQ** to attempt a decrease in the publishing overheads of the framework

py4cl2 – python libraries for common lisp June 2019 – present

- **Imported python function signatures** and enabled **asynchronous output** in an **open source** project py4cl
- Obtained a **30-times speed up** in large array transfers using pickling; also array-element-type preservation
- Used **semaphores** and **macros** to construct **with-python-output** to obtain python output as a string
- Enabled **embed-ability into lisp image** by storing the python part of py4cl2 into a variable
- Improved **documentation** and started **versioning** and maintaining **releases**; currently a maintainer of py4cl2

numericals – numerical computing library for common lisp March 2020 – present

- Defined basic arithmetic **SIMD compiler intrinsics** using the **SBCL** implementation of common lisp
- Provided arithmetic operations with **speeds comparable to numpy** using **broadcasting** & **custom array** type
- With **with-elementwise-operations** macro, enabled **easy open coding** of non-simple arithmetic expressions
- Used **compiler-macros** to enable **compile time optimizations** for several cases

BodhiTree Django Migration (under Prof. Kameswari Chebrolu) Spring 2020

- Worked on an ongoing effort towards migrating a **40k LoC codebase** from **Django** 1 to 2, and python 2 to 3, qualifying url names by namespaces, removing deprecated functions, and managing the semantic change of strings
- Used **magit, grep** and **find** to aid code merges that arose with the parallel development of the main branch

OTHER PROJECTS

KnowTNet – a collection of best useful links from the internet December 2019

- Used hunchentoot, parenscript, clsql (ORM), cl-markup to implement the **full stack**
- Used **argon2** to hash passwords in a **GPU & ASIC resistant manner**; provided abilities for **persistent login**
- Also implemented a reduced feature version of the website using **JAMStack** using **local storage** and **React**

smart-god-mode – a smart "dumb" modal editing mode for emacs January 2020

- Extended **emacs' god-mode package** that provides yet another vim-like modal editing in emacs to prevent RSI
- Engaged in **metacognition** to enable **seamless automatic switching** between the insertion & command modes

common-lisp.rtfd.io – easier documentation for defacto common-lisp libraries March 2020 - present

- Used **regular expressions** to implement an ASDF system to **parse** documentation strings into a markdown file
- Worked towards **simplifying the official documentation** to obtain a more friendly **getting started** sections on several libraries like postmodern, quicklisp, asdf, cl-ppcre; currently hosting **10+ libraries** using **mkdocs**

Secure Personal Cloud Autumn 2018

Prof. Soumen Chakrabarti (course project) *Software Systems Lab*

- Developed an encrypted cloud storage with client-only keys stayed to provide true data privacy using **Django**
- Used **node.js**, and **browserify** to implement decryption on the webclient using **CryptoJS** library.
- Used the bash tools – **curl, inotifywait** to create a linux-client, with **single-client livesync** capabilities

3D Tic Tac Toe Spring 2018

Prof. Amitabha Sanyal (course project) *Abstractions and Paradigms of Programming*

- **Encapsulated** and **abstracted the board** using **object oriented programming**
- Used **higher ordered functions** to implement a function to determine whether the current state is a win.
- Implemented **minimax algorithm** as the AI agent in the game.
- Used **racket/gui library** to implement the game as 4 2d Boards and git for version control.

Contention Resolution and Switching Spring 2019

Prof. Ashwin Gumaste (course project) *Digital Logic Design*

- Implemented Contention Resolution and Switching module of a router in VHDL using Xilinx ISE
- Created and implemented state diagrams for reading and writing data to FIFO based **Virtual Output Queues**
- Used Separate Virtual Output Queues for each input port to avoid head of line blocking
- Implemented **round-robin** based state diagrams for **Arbiter** for scheduling while accounting for **express ports**

Android Development Summer 2019

- Added a **tablet mode** to the android app **bVNC** (a VNC viewer application), using **onTouchEvent**, to provide simultaneous support for **single finger scroll**, **long tap and drag** to select and **long tap** to right click
- Added **unicode math symbols** and **del** key to the open source android app **Hacker's Keyboard**

Miscellaneous 2017-20

- Implemented **Davis-Putnam-Logemann-Loveland** in racket to solve the boolean satisfiability problem
- Used **Deterministic Finite Automata** to construct a regular expression matcher
- Experimented with **multithreading** in Java to determine when multithreading is useful
- **reader** – lisp library for providing **reader macros** for lambdas, hash-tables, hash-sets, accessors, arrays.

ACADEMIC ACHIEVEMENTS

- Selected for **Chennai Mathematical Institute**'s B. Sc. (Honours) Mathematics Course (2017)
- Secured AIR 700 amongst 2 lakh candidates in JEE (Advanced) (2017)
- Secured AIR 1120 amongst 1.2 million candidates in JEE (Mains) (2017)
- Amongst national **top 1%** in **National Standard Examination in Physics** (2017)
- Selected for the award of scholarship in **National Talent Search Examination** (2015)
- Selected for the award of scholarship in **Kishore Vaigyanik Protsahan Yojana** (2015)

KEY COURSES

Machine Learning	Data Analysis & Interpretation, Learning with Graphs*, Organization of Web Information, Artificial Intelligence & Machine Learning, Foundations of Intelligent & Learning Agents*
System & Softwares	Software Systems Lab, Design & Analysis of Algorithms, Operating Systems, Foundations of Network Security & Cryptography, Computer Architecture
Others	Economics, Philosophy, Psychology*, Human Cognitive Processes*

*would be completed by December 2020

EXTRACURRICULARS

- Discovered RAM Manager for Magisk to **fix aggressive app killing** on android
- 500+ Karma on r/lisp; 309 reputation on Stackoverflow; 151 reputation on AskUbuntu
- Tinkered with **Custom ROMs** and **rooting**, to extend the useable life of my smartphone and tablet
- Studied **myopia** to understand its cause and methods of prevention / cure
- Created a repository of free **JEE Advanced Unsolved papers** – solved are available everywhere
- Compiled a list of **Learning Points** from the **anime** Digimon Adventures and Naruto
- Under National Social Service scheme: **taught underprivileged kids** at an NGO (LCCWA); **recorded hindi news audio books**, as part of Voice for Purpose