**Shubhamkar Bajrang Ayare**
**Computer Science and Engineering**
**IIT Bombay**

**170050018**
**UG Fourth Year**
**Male**
**DOB: 09/05/1999**

| Examination | University | Institute | Year | CPI/% |
|---|---|---|---|---|
| Graduation | IIT Bombay | IIT Bombay | 2021 | 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

**py4cl2 – python libraries for common lisp** June 2019 - present

- Contributed several improvements to the **open source** project py4cl such as a **30-times speed up in large array transfers** using pickling; **function signature import**; and enabling synchronous output
- Used **semaphores** and **macros** to construct **with-python-output** to obtain python output as a string
- Enabled loading the python part of py4cl2 to be used from a variable, to make it **embeddable into lisp image**
- 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 intrinsics** using the **SBCL** implementation of common lisp
- Used **broadcasting** and **custom array** type to provide basic operations with **speeds comparable to numpy**
- Provided a **with-elementwise-operations** macro to **ease open coding** non-simple arithmetic expressions
- Used **compiler-macros** to enable **compile time optimizations** for several cases

**Image conversion using conditional GANs** Autumn 2019

*Prof. Ganesh Ramakrishnan* (course project) *Foundations of Artificial Intelligence and Machine Learning*

- Worked in a **team** to implement satellite to non-satellite image conversion using **conditional GANs**
- Compared and analyzed performance of different variants of the model using **Inception Score** as a metric

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

- Worked on an going 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**

**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**, Separate Virtual Output Queues were used for each input port to avoid head of line blocking.
- Created and implemented state diagrams for **Arbiter** for scheduling, in accordance with a round robin algorithm, while awarding **higher priority for the express buffer ports** at the same time.

**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

**Android** 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**

**3D Tic Tac Toe** Spring 2018

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

- Used **object oriented programming** to **encapsulate** and **abstract the board,** allowing internal board representation changes without any external changes Also abstracted the size and the difficulty
- 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.

**Machine Learning** Summer 2019

- Implemented Word Embedding Model for predicting movie review sentiment
- Implemented a Sequence to Sequence Neural Machine Translator for english to hindi

**Web Development** 2019

- Optimized the **layout** of The Common Lisp Cookbook to ensure **useability** on small screens.
- Implemented a **simplified** version of **PoP3** email protocol in C++ using **socket** programming. Multiple client support was provided using the select system call.
- Used a **static website** generator to redesign **70+ web pages** for **alterschoolindia**

## 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

- Foundations of Network Security and Cryptography
- Design and Analysis of Algorithms
- Software Systems Lab
- Introduction to Numerical Analysis
- Discrete Structures
- Computer Architecture
- Abstractions and Paradigms of Programming
- Computer Networks
- Artificial Intelligence and Machine Learning
- Operating Systems
- Calculus
- Automata Theory
- Database and Information Systems
- Digital Logic Design
- Implementation of Programming Languages
- Linear Algebra

## EXTRACURRICULARS

- Discovered RAM Manager for Magisk to **fix aggressive app killing** on android
- **500+ Karma** on **r/lisp; 300+ reputation** on **Stackoverflow; 150+ 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