SONNANDH KALAKA

SOFTWARE ENGINEER

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Education

Indian Institute of Technology, Bombay	Mumbai, India
B. Tech in Computer Science Engineering with Honors │ CGPA - 8.2	June 2019 – Present
Sri Chaitanya Junior College	Visakhapatnam, India
Intermediate │ GPA - 9.89	2017 – 2019
Sri Chaitanya Techno School	Visakhapatnam, India
Matriculation │ GPA - 9.7	2017

Scholastic Achievements

- Achieved rank of **441** in 2019 Andhra Pradesh EAMCET out of 230, 000 candidates
- Attained a rank of **80** in 2017 AS Rao Talent Search Examination
- Ranked among nation's top **1%** in the NSEC (Chemistry) examination conducted by IAPT
- Achieved a max rating of **2128** (5 ☆) in **CodeChef** with a global rank of **1267**
- Secured a global rank of **13** and **26** in Lunchtime Challenges conducted on CodeChef

Internship Experience

Amazon — Bangalore, India

Software Engineering Intern │ Warehouse Management System — May 2022 – July 2022

- Built dynamic UI components using **React.js** and **Meridian** for a distributed warehouse ticketing system
- Created categorized client-side and backend filters for viewing tickets in a specially designed table format
- Implemented **APIs** in a microservice architecture approach using **Java**, **Kotlin,** and AWS **Coral** Services
- Used **Dagger** framework for object binding and generating static, compile-time object dependency graph
- Performed **E2E** and **unit** testing by deploying APIs and using JUnit, jest, Mockito, and AWS **CDK** framework

Key Projects

Restaurant Management System — March 2022 - April 2022

- Developed an RMS supporting ordering, inventory management, employee scheduling, data analytics, table reservation, and customer feedback system using **Angular** frontend and **Node.js** and **PostgreSQL** backend
- Optimized database using schema **normalization** and **indexing** for ensuring data integrity and scalability
- Created materialized views, triggers for improving performance of complex queries & automated updates
- Implemented secure authentication and role-based access control for various users with cookie support

Mini Moodle — Nov 2020 - Dec 2020

- Built an admin based Moodle-like LMS using **Django** as routing server for a centralized notification system
- Supported features like course creation, user addition & removal, setting deadlines, permission management
- Integrated **FCM** for publishing priority categorized notifications to students with acknowledgment visibility
- Developed an Android and iOS app for receiving notifications and viewing courses using **Kotlin** and **Flutter**

Algorithmic Trading and Financial Modelling — Dec 2022 - Present

- Performing backtesting using trading strategies & models to evaluate performance and **risk** characteristics
- Reviewing **momentum trading**, **paired switching** strategies and research papers on Stock price forecasting
- Utilizing machine learning, statistical methods, and Pandas to perform **EDA** on historical stock market data
- Implementing an **CNN - LSTM** model to predict stock market prices on segmented data using **PyTorch**

Internet Security and Cryptography — Oct 2022 - Nov 2022

- Performed TCP **SYN** and **RST** flood attacks by means of sniffing and spoofing using **Scapy** and **Wireshark**
- Performed **XSS** cross-site scripting, **SQL Injection** attacks on websites in the form of data leaks and popups
- Employed **openssl** to encrypt & decrypt images using **AES-128** encryption with varying block modes & IV's
- Generated **RSA** asymmetric keys to encrypt messages and benchmarked performance against AES-128

Hate Speech Detection — Oct 2022 - Nov 2022

- Created dataset by collecting hate comments from Youtube and processing benchmark **HateXplain** dataset
- Translated & performed data augmentation, categorization and tokenization of custom data using **Python**
- Implemented a Neural Network to fine tune pre-trained multi lingual **BERT** model using **PyTorch** and numpy

Social Distancing Detection System — April 2021 - May 2021

- Developed tracing website using **Django** and **OpenCV** for frame by frame processing of images & videos
- Employed **YOLO**, NMS & IOU to eliminate overlapping bounding boxes and identify maximal bounding box
- Leveraged pre trained **CNN** for object detection & applied homography to measure accurate real distances

Other Projects

Multi Thread Synchronization
Sep 2021 - Oct 2021
- Utilized **Pthreads** library in Linux to simulate multi threaded programming in master worker thread pool
- Implemented synchronization between producer and consumer threads using **locks** and **condition variables**
- Created lightweight user space semaphores with same synchronization functionality as kernel semaphores

Natural Language Processing
Sep 2022 - Oct 2022
- Performed POS Tagging with Hidden Markov Models & **Viterbi** algorithm on Brown corpus dataset in **Python**
- Implemented weighted **Page Rank** algorithm for Word Sense Disambiguation task using Sense embedding
- Built FFNN with **PyTorch** & pretrained W2V models to compare effectiveness for POS tagging of HMM model

Cricket Statistics Website
Feb 2022 - March 2022
- Built a website for visualizing comprehensive metrics of multiple cricket games using **Angular** and **Express**
- Employed **Python** scripting and **Pandas** to efficiently insert data from csv files into **PostgreSQL** database

Network Protocols
Feb 2021 - March 2021
- Analyzed effects of loss and delay on **TCP Reno** and **TCP Cubic** performance using window scaling graphs
- Implemented **ARQ** for **UDP** to tackle packet loss between sender, receiver via **socket programming** in **C++**

Compiler Design
Feb 2022 - April 2022
- Built a compiler for subset of **C** language, supporting arrays, functions, recursion, scope, control sequences
- Implemented four-phased pipeline using **AST**, **TAC,** and **RTL** statements for generating **MIPS** assembly code

Custom CLI
Aug 2021 - Sep 2021
- Built a shell similar to Linux shell for execution of commands using **fork**, **exec**, **chdir** & **setpgid** system calls
- Provided support for serial, parallel, and background execution with exclusive signal handling for SIGINT

Hybrid Databases
March 2022 - April 2022
- Processed web server log files, performed clustering and traffic analysis using **DataFrame** in Apache **Spark**
- Utilized **Cypher** scripting to design and implement **Neo4j** database and perform complex real time querying

Image Compression using QuadTrees
Sep 2020 - Oct 2020
- Implemented data structure for reducing size of 2-bit gray-scale images & efficiently store them using **C++**
- Supported image editing, extraction, rescaling, complemention, union, and intersection of two images

Technical Skills

Programming: C++, Python, Java, Typescript, Kotlin	**Frameworks:** React, Angular, Django, Express, Dagger
Libraries: PyTorch, Numpy, Pandas, nltk	**Tools & Technologies:** Git, Docker, Wireshark, pgAdmin
Data Management: PostgreSQL, Neo4j, sqlite3, Spark	**Testing:** vitest, jest, jUnit, Mockito, Selenium

Positions of Responsibility

Department Placement Coordinator
Mumbai, India
Institute Placement Team, IIT Bombay
June 2022 – Present
- Assisting in placement of **1900+**students by working as liaison between the placement office and students
- Representing department in Institute Placement Team & guiding batch of **200+**students through placements
- Conducted **20+** coding & **10+**quant tests and **2** buddy talks with alumni to enhance preparation of students
- Responsible for resume verification of **120+**students & expertise company pitching for maximum recruitment

Relevant Coursework

Data Structures and Algorithms	Operating Systems	Computer Networks
Computer Architecture	Database and Information Systems	AI & Machine Learning
Speech & Natural Language Processing	Network Security and Cryptography	Deep Learning for NLP
Intelligent Learning Agents	Design and Analysis of Algorithms	Automata Theory
Software Systems Lab	Game Theory and Mechanism Design	Compilers

Extracurriculars

- One of the **40** members that got selected into IIT Bombay NSO **Badminton** out of **1000**+ students
- One of the core members of Team **Raptors** that placed second in the **Aahvaan Badminton** Tournament
- **Winners** of the Mixed team **Volleyball** tournament conducted by IITB Volleyball club out of **10**+ teams
- Contributed as a member of the Kramnik team that placed **second** in the IITB **Chess** League
- Finished as **runner-ups** in the Intra Department **Kho-Kho** Tournament conducted by CSEA