Aman Kansal

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EDUCATION

Indian Institute of Technology, Bombay July 2017- May 2021
Bachelors with Honors in Computer Science & Engineering
GPA: 9.86/10, Hons. GPA: 10/10 (Institute Silver Medal)
Thesis: Use of Type Embeddings in Dense Passage Retrieval (supervised by Prof. Soumen Chakrabarti)

PUBLICATIONS

1. Error-Driven Fixed-Budget Personalization For Accented Speakers**
   Abhijeet Awasthi*, **Aman Kansal***, Preethi Jyothi and, Sunita Sarawagi
   Proceedings of ICASSP 2021, Ontario, Canada

* joint first authors

WORK EXPERIENCE

Low-Level Aging Analysis for Android Devices Sep 2021 - Present
Software Engineer, Samsung Electronics, South Korea

- Developing an efficient database for storing long term performance statistics of android devices and implementing statistical analysis systems for detection of performance degradation
- Improving internal tools for automatic delegation and log extraction for user-reported issues using a mix of rule-based and ML-based strategies

Virtual Apparel Try-on Visualization May 2021 - August 2021
Advisor, Uplara Inc.

- Improved the company's core try-on-visualization pipeline ML modules, like bounding box prediction and human silhouette segmentation as part of the AI development team
- Audited and improved the company's WAS-VTON implementation while helping them realize code refactoring strategies for long-term efficiency.

Client-Server Architecture for Automation May 2020 - June 2020
Software Engineering Internship, Samsung Electronics, South Korea

- Implemented a client-server program with an Android Client and a Python server for asynchronous task outsourcing and response reception in tasks like apk installation and file transfer
- Developed an asynchronous heartbeat mechanism, working agnostic to the processing time of jobs on the client side *[The objectives but the functionality of the project can't be disclosed as per company policy]*

Cryptographic Protocol Security Verification May 2019 - July 2019
Advisor: Prof. Steve Kremer & Prof. Vincent Cheval, INRIA Nancy, France

- Extended Deepsec Tool's algorithm (used for protocol security verification), to handle Determinate Probabilistic Protocols, without changing the core implementation and using it as a black box
- Developed symbolic syntax and semantics for formal specification of probabilistic protocols, formally proving the soundness and completeness of symbolic domain with respect to concrete domain

Machine Learning Models for Citation Analysis [slides] Nov 2018 - Jan 2019
Software Engineering Internship, Kwench Global Technologies

- Built an auto-tagger prototype to extract an appreciation's targeted quality for the company's rewards and recognition platform. Used a text classification model with 14 target categories and established a baseline accuracy of 48%
- Implemented type-ahead text prediction similar to Google's Smart Compose in Gmail

OTHER SELECTED PROJECTS

High-Level Supervision in ASR Accent Adaptation [demo] Dec 2019 - Feb 2021
Advisor: Prof. Sunita Sarawagi & Prof. Preethi Jyothi, IIT Bombay (R&D Project)

- Developed a web-based framework for efficient and scalable crowd-sourcing of error-focused speech data.
- Experimented with strategies for incorporating focused data in accent adaptation. Tried finetuning techniques like phone-based MTL and select layer finetuning with contrastive XENT and CTC losses.
- Paper accepted in ICASSP 2021

Superpool - Service Sharing and Pooling Platform [code] Jan 2020 - May 2020
Entrepreneurship Project

- Developed a web-based application enabling users to pool daily services like food, travel, and shopping
- Used Django for server implementation. Incorporated functionality for making service usage posts, matching service posts among users, link sharing, and in-app chatting

Emotion Detection and Transformation in Speech [report] [code] [slides] Aug 2019 - Nov 2019
Advisor: Prof. Preethi Jyothi (Course Project)

- Compared performances of different ML models (Random Forest, GBDT, SVM, Naive Bayes, MLP and Deep BiLSTM) for emotion detection task in speech using custom hand-crafted features.
- Achieved an accuracy of 40% by GBDT, comparing to 53.9% from RNN-LSTM model employing MFCC
- Implemented emotion conversion using the self-regenerating approach of Conv-VAEs, commonly used for speaker conversion tasks. Obtained satisfactory results from subjective feedback.

Mastering Pacman using Reinforcement Learning [report] [code] [slides] Aug 2019 - Nov 2019
Advisor: Prof. Ganesh Ramakrishnan (Course Project)

- Tested different RL techniques like Q-Learning, Approximate Q-Learning, and Deep Q-Learning for playing Pacman and analyzed the performances under varied conditions (# ghosts, grid size, etc.)
- Proposed a novel algorithm for joint training of pacman and ghosts, taking inspiration from GANs

Bodhitree App [report] [app] [slides] Aug 2019 - Dec 2019
Advisor: Prof. Bhaskaran Raman, Synerg Group, IIT Bombay (Development Project)

- Led the development team tasked with reviving the android app of Bodhitree - the online learning platform of IIT Bombay
- Fixed crucial bugs in user login, course filtering, discussion forums, and video/quiz rendering. Implemented new features like gesture detection, notifications panel, and slide support integration.

SPC - Secure Personal Cloud [report] [code] [slides] Aug 2018 - Nov 2018
Advisor: Prof. Soumen Chakrabarti, IIT Bombay (Course Project)

- Built a secure cloud-based file storage system, with a zero-knowledge server developed using Django web framework, and a linux-client featured with client-side encryption written in Python
- Provided choice of encryption schemes among AES-256, ARC4, and Blowfish, and handled issues of deadlocks and data-synchronization in a multi-user environment with multiple logins
- Developed a mobile-friendly file rendering web app, with client-side decryption, using JavaScript

CorRacketify - Racket Spelling Corrector [report] [code] Jan 2018 - May 2018
Advisor: Prof. Amitabha Sanyal, IIT Bombay (Course Project)

- Developed a spell check software in Racket, using bloom filter (a probabilistic data structure) backed with 13 instances of MurmurHash3 to optimize space requirements and minimize false positives
- Implemented spell suggestion using Burkhard-Keller Tree, constructed using Damerau-Levenshtein distance metric, with user-controllable mistake tolerance and support for a dynamic dictionary
- Followed a multi-paradigm approach using imperative, functional, and object-oriented programming

SCHOLASTIC ACHIEVEMENTS

- Recipient of **Institute Silver Medal 2021** for the best academic performance among students graduating with honors in the computer science department *(2021)*
- Awarded with **Institute Academic Prize 2017-18** and **2019-20** by IIT Bombay *(2020)*
- Among the **21** students honored with **Charpak Lab Scholarship** by Embassy of France, India *(2019)*
- **All India Topper** with a score of **454/450** in BITSAT 2017 (engineering entrance examination conducted by Birla Institute of Technology), among **190K+** candidates *(2017)*
- Achieved **All India Rank 15** in JEE Advanced among more than **200,000** aspirants *(2017)*
- Secured **All India Rank 21** in JEE Main among **1.2 million** candidates *(2017)*
- Secured an **AP Grade (top 1%)** in Physical Chemistry and Quantum Physics course *(2017)*
- Awarded with a **certificate of merit** for being among the **top 1%** students in NSEP (National Standard Examination in Physics) and qualifying for the Indian National Physics Olympiad *(2017)*
- Attended Chemistry Olympiad OCSC and awarded with a certificate of merit and a gold medal for being in **top 35** candidates at NSEC-INChO examination out of **39400** candidates *(2017)*
- Recipient of the prestigious **NTSE Scholarship** instituted by the **Govt. of India** *(2016)*
- Awarded with **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellowship, bagging **All India Rank 40** among 35K+ candidates *(2015)*

POSITIONS OF RESPONSIBILITY

SoC Mentor - Pool It! [code] Apr 2020 - June 2020
Web and Coding Club, IIT Bombay

· Mentored five freshmen students under WnCC Summer of Code program to complete a summer coding project, making an open-source version of Superpool
· Helped with database design, supervised implementation, and code review for the project

Senior Department Academic Mentor Apr 2019 - Aug 2021
Department Academic Mentorship Programme (DAMP), IIT Bombay

· Part of the **23** member **DAMP** team providing academic support to students
· Providing assistance to students facing difficulties in academics, in coping with the curriculum, and guiding decisions and actions of the team towards their academic welfare

Institute Student Mentor July 2020 - Aug 2021
Institute Student Mentorship Programme (ISMP), IIT Bombay

· Member of the **ISMP** team comprising of 108 senior students selected based on a thorough judgment of scholastic and interpersonal skills
· Mentored 14 freshmen and helped them in smooth acclimatization to the university environment

Teaching Assistant Jan 2019 - Aug 2021
CSE Department, IIT Bombay

· Teaching Assistant for three computer science courses - CS215 (Data Analysis and Interpretation), CS152 (Abstractions and Paradigms in Programming) and CS728 (Organization of Web Information)
· Tasked with taking tutorial sessions and setting and correcting programming assignments and examination questions

EXTRA-CURRICULAR ACTIVITIES

- Participated in and completed Triathlon 2018 of IIT Bombay *(2018)*
- Completed a yearlong swimming course under National Sports Organization (NSO) *(2017-18)*
- Completed mountaineering course achieving 'intermediate' level certification *(2012)*
- Attended 10 days National Cadet Corps (NCC) camp organized by the Indian Air Force. *(2012)*