

# Aman Kansal

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## EDUCATION

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### Indian Institute of Technology, Bombay

July 2017- May 2021

*Bachelors with Honors in Computer Science & Engineering*

*Institute Silver Medalist, GPA: 9.86/10, Honors GPA: 10/10*

**Thesis:** Use of Type Embeddings in Dense Passage Retrieval (supervised by Prof. Soumen Chakrabarti)

## PUBLICATIONS

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### 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

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### 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 Intern*

*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

### Cryptographic Protocol Security Verification

May 2019 - July 2019

*Research Intern (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 Intern*

*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

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### High-Level Supervision in ASR Accent Adaptation [\[demo\]](#)

Dec 2019 - Feb 2021

Advisor: Prof. Sunita Sarawagi & Prof. Preethi Jyothi

IIT Bombay

- 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

IIT Bombay

- 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

IIT Bombay

- 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

IIT Bombay

- 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

- Led the development team tasked with reviving Bodhitree android app - IIT Bombay's online learning platform
- 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

- 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

- 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

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- 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

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### 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 holding tutorial sessions and setting and correcting programming assignments and examinations

## EXTRA-CURRICULAR ACTIVITIES

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- 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)