Skanda Vaidyanath
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EDUCATION

- **Stanford University** — Stanford, California
  M.S. in Computer Science, A.I. Track — *Sep 2021 – Current*
- **BITS Pilani, Hyderabad Campus** — Hyderabad, Telangana
  B.E.in Computer Science and a Minor in Data Science with Distinction — *Aug. 2016 – May. 2020*
  - Overall GPA: 9.93/10
  - Major GPA (only CS courses): 10/10

AWARDS AND HONORS

- Class Valedictorian
- BITS Hyderabad Merit Scholarship (for being in the top 1% of my class every semester)
- IUSSTF-Viterbi Scholar 2019 (one out of fifteen students chosen from India for the programme)
- Max Planck Institute for Informatics 2019 Research Scholar Fellowship

RESEARCH EXPERIENCE

- **Stanford University** — Stanford, California
  Research Assistant (Advised by Prof. Stefano Ermon) — *Sep 2021 – Current*
  - Working on developing self-supervised models for satellite images
  - Working on language-conditioned reinforcement learning
  - **Keywords**: Self-supervised learning, deep reinforcement learning

- **Microsoft Research** — Bangalore, India
  Research Intern (Advised by Dr. Sriram Rajamani) — *Dec 2020 - Jul 2021*
  - Used program synthesis techniques to generate code from multi-modal user input using large language models like GPT-3
  - Developed a Jupyter notebook extension to generate code from user commands and I/O examples for the Pandas library in Python
  - **Keywords**: Program Synthesis, natural language processing

- **Max Planck Institute for Informatics** — Saarbrucken, Germany
  Research Intern (Advised by Dr. Andrew Yates and Dr. Paramita Mirza) — *Aug 2019 - May 2020*
  - Used deep reinforcement learning to recommend travel destinations to users based on forum posts and user reviews.
  - Used deep reinforcement learning to improve document retrieval from a corpus via document expansion.
  - **Keywords**: Deep reinforcement learning, information retrieval

- **USC Institute for Creative Technologies** — Los Angeles, USA
  Research Intern (Advised by Prof. Kallirroi Georgila and Prof. David Traum) — *May 2019 - July 2019*
  - Developed a policy to control a swarm of drones that attempts to negotiate with and save civilians from a forest fire and achieved a success rate of over 95% on the task.
  - **Keywords**: Reinforcement learning, Monte Carlo, TD-learning

- **BITS Pilani, Hyderabad Campus** Hyderabad, India
  Undergraduate Researcher (Advised by Prof. N.L. Bhanu Murthy and Prof. Aruna Malapati) *Aug 2018 - May 2019*
  - **Software Bug Detection using Source Code**:
    - Developed an efficient method to extract features from source code of software projects to detect bugs.
    - **Keywords**: Machine learning, software engineering, natural language processing
  - **Retrieving similar questions from CQA archives**:
    - Developed deep learning solutions for retrieving similar questions from a large Q&A archive for a distance-learning platform.
    - **Keywords**: Siamese neural networks, bidirectional LSTM, CNN, natural language processing, information retrieval
- **Indira Gandhi Centre for Atomic Research** Kalpakkam, India
  Research Intern *May 2018 - Aug. 2018*
  - Developed a search engine on a nuclear corpus and outlined a semantic-based approach for entity profiling from raw text to build a factoid-based question answering system.
  - **Keywords**: Information retrieval, natural language processing, autoencoders, recommender systems

PUBLICATIONS AND PRESENTATIONS

- Naman Jain, **Skanda Vaidyanath**, Arun Iyer, Nagarajan Natarajan, Suresh Parthasarathy, Sriram Rajamani, Rahul Sharma. Jigsaw: Large Language Models meet Program Synthesis. *ICSE 2022, Pittsburgh* [pdf]
- **Oral Presentation** at **Engineering@MSRI Talks 2021** at **Microsoft Research, India**
- **Skanda Vaidyanath**, Kallirroi Georgila, David Traum. Using Reinforcement Learning to Manage Communications Between Humans and Artificial Agents in an Evacuation Scenario. *FLAIRS 2021, Florida. (Short Paper)* [pdf][poster]
- **Oral Presentation** for the IUSSTF-Viterbi programme 2019 at **USC Viterbi School of Engineering** and **USC Institute for Creative Technologies** [slides]
- **Oral Presentation** and **model demo** at the **Computer Division, Indira Gandhi Centre for Atomic Research** [pdf][slides]

COURSE PROJECTS

- **Cirrhosis Analysis**: Analysed a dataset using several statistical techniques like MANOVA, Kruskal-Wallis test, Chi-squared goodness of fit test and Discriminant Analysis to draw conclusions about the different features in the data. Tests conducted on SPSS and submitted towards the course Applied Statistical Methods. [pdf][slides]
- **Analysis of Convex Hull algorithms and Segmented Linear Regression**: Analysed the run time of three convex hull algorithms and plotted relevant graphs. The algorithms were Kirk Patrick Seidel, Jarvis March and Graham's scan. Also implemented and analysed the dynamic programming algorithm for segmented linear regression. Submissions made for the course Design and Analysis of Algorithms. [code]
- **Search Engine, Recommender Systems**: Built a search engine using the vector space model for a corpus of food recipes. Made use of word embeddings for query expansion. Built recommender systems for a movie dataset using collaborative filtering (with and without baseline), SVD and CUR. Submissions made for the course Information Retrieval. [code-search-engine][code-reco-sys]
- **Patient Monitoring System**: Built a software system that acts as a patient monitoring system. It can track patient vitals, keeps track of past visits and allows different levels of access for patients, nurses, doctors, etc. Submissions made for the course Software Engineering. [code]

- **Stock Trading Website**: A website that allows users to trade stocks at the market price. Users can buy/sell stocks or post/accept offers made by fellow users. Hosted with MySQL and Flask. Submissions made for the course Database Systems. [code]
- **Automatic Quiz Generator**: Developed a tool that will enable one to randomly generate a quiz containing the specified number of questions from the question bank. Users can also edit the question bank by inserting/deleting/modifying questions as they see fit. Submissions made to the course Object Oriented Programming. [code]

PERSONAL PROJECTS

- **Brain Decoding**: A Transductive Ensemble learning approach to decoding brain signals on the Kaggle DecMeg 2014 challenge. Implemented machine learning techniques such as stacked generalization and covariate shift to classify MEG brain signals of patients looking at a clear face vs a blurry face. [code][pdf]
- **MIT Battlecode 2018**: Submissions made to the annual MIT Battlecode competition using basic path-finding algorithms such as BFS and A-star. [code]
- **Personalized Learning from Job Descriptions**: Analysed several job descriptions to design a curriculum to prepare individuals for different jobs. Used several algorithms like k-means clustering, topic modeling with LDA, self organising maps and Naive Bayes text classification. [code][slides]

WORK EXPERIENCE

- **8K Miles Software Services Ltd.** Chennai, India
  Software Engineer *July 2017*
  - Worked on several cloud services on the Google Cloud Platform, especially the Google Deployment Manager.
  - Wrote templates in Jinja and YAML to be deployed via Java code through Google Cloud APIs
  - Allowed the company to manage usage of and keep track of their resources through code rather than the Google Cloud Platform user interface

RELEVANT COURSEWORK

- CS330 Deep Multi-task and Meta Learning, Stanford University
- CS221 Artificial Intelligence: Principles and Techniques, Stanford University
- Machine Learning, BITS Hyderabad
- Data Mining, BITS Hyderabad
- Information Retrieval, BITS Hyderabad
- Foundations of Datascience, BITS Hyderabad
- CS285 Deep Reinforcement Learning, UC Berkeley (online)
- NPTEL Reinforcement Learning, IIT Madras (online)

SKILLS

- **Languages**: Python, C/C++, Java, Matlab/Octave
- **Technologies**: PyTorch, Scikit-Learn, Pandas, Numpy, Matplotlib/Seaborn, Tensorflow/Keras, Gensim, NLTK, SPSS, SQL, Latex, Git

ACTIVITIES AND INTERESTS

- Research With Impact: Developing Skills as a Community Engaged Scholar, SGSI 2021, Stanford University [link]
- Leadership Labs, SGSI 2020, Stanford University [link]
- Personal Blog, RL Course: I write blog posts on several topics on deep learning and RL that fascinate me, which include reviews of interesting research papers that I come across during my research. I have also started writing a series of blog posts that will serve as an introductory RL tutorial. [link]
- Member, Tennis Team, 2016-19 and Captain, 2018-19, BITS Hyderabad. Winner of two gold medals at the college's sports fest – *ARENA*.
- Vice Chairperson, IEEE Student Branch, BITS Hyderabad, 2018-19
- Teaching Assistant for the course *Introduction to Linguistics*, BITS Hyderabad, Aug 2018 - Dec 2018
- Member, Department of Professional Events, BITS Hyderabad, 2017-18
- Member, Department of Publicity and Public Relations, BITS Hyderabad, 2016-17