Kaivalya Swami

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Education

B.Tech, Computer Science and Engineering | Indian Institute of Technology Delhi | GPA – 8.512/10 *2017–2021*

CBSE Board, Grade 12 | Lal Bahadur Shashtri School, Kota | Score – 91.20% *2017*

CBSE Board, Grade 10 | AECS #1, Tarapur | Score – GPA – 10/10 *2015*

Publications

- Kartik Sharma, Kaivalya Swami, Aditya Shete and Samar Husain, "**Can Greenbergian universals be induced from language networks?**", 18th International Workshop on Treebanks and Linguistic Theories (SyntaxFest), 2019.

Internships

APT Portfolio | *Mentor: Sonal Raj* **Member of Data Management & Reseaech Team**

Enhanced Alerting and Monitoring Sytem *May 2020 - July 2020*

- **Designed an end to end fast pipeline** to handle alerts of different priorities.
- Used **Kafka as a queuing mechanism** for routing alerts from different servers.
- Built C++/Python wrappers from Kafka producers APIs for producing/sending alerts to the system.
- Used MongoDb database and built a Flask web app for monitoring alerts on a dashboard.

PDCL Lab, SCSE NTU Singapore | *Supervisor: Prof. Weichen Liu* **Research Internship**

Analysis of Quatization Techniques of Neural Networks *May 2019 - July 2019*

- Used **BMXNet to implement Binarized NNs** on **CPU/GPU** in order to accelerate inference of CNNs.
- Analysed the **quantization method of XNOR-Net** practical difficulty to achieve theoretical speedup on CPU.
- Used models **AlexNet, VggNet** for experimentation to analyse speedup gain on different models.

Tensor Dynamics (IIT Delhi Startup) **Core Member**

Exploiting satellite images for weather forecasting *Dec 2019 - Present*

- Used **Optical Flow method for predicting cloud movement** for short span of time (Intra Day).
- Predicted solar irradiance for 3 hrs in future using cloud type and optical flow.

Selected Projects

Low Resource NMT for Indic languages. | *Prof. Parag Singla* | Undergraduate Thesis *Sept 2020 - Present*

- Ran experiments to **fine-tune mBART** for Indic Languages and analysed performance for similar languages.
- Encoding Parse Information in NMT systems and analysing accuracy gain obtained with various amounts of parallel data.
- Creation of a **Standard Test Benchmark** for translation amongst 12 Indian language pairs for facilitating further research.

Indian Sign Language (ISL) Recognition | *Prof. Jay Dhariwal* | Course Project *Oct 2020 - Jan 2020*

- Analyzed the various approaches to aid deaf people with the aim to help them interact with others.
- Built a classification model for classifying 26 alphabets of Indian Sign Language.
- Integrated the model, with Zoom/GMeet filters for realtime detection during video calls.

Linguistic Network Analysis | *Prof. Samar Husain* | Research Project *Dec 2018 - June 2019*

- Use of Universal Dependency TreeBank for making a language network with dependencies between words as edges.
- Transformed the network by inducing word order to study graph parameters.
- Showed that certain linguistic universals can be derived from the network by clustering them based on network parameters.

Other Projects

AI Bot: Canon Board Game | *Prof. Mausam* | Course Project *October 2019*

- Used **alpha beta pruning** and various heuristics to efficiently search best action possible.
- **Tournament Winner: 1st amongst 40 teams**, in a tournament amongst AI bots. (*Repo Link*)

Hand Gesture Recognition | *Prof. Chetan Arora* | Course Project *October 2019*

- Made a Real-time hand gesture recognition model to recognise 3 gestures using Pytorch. (*Repo Link*)
- Curated my own data set by collecting samples amongst friends and used various edge detection to prepossess the dataset.

Silly Things | Game for Social Cause | *Prof. Rijurekha Sen* | Course Project *May 2019*

- Designed 1-player Android game, aiming to target working memory of users to make them learn good habbits. (*Repo Link*)

Indian Road Simulation | *Prof. Rijurekha Sen* | Course Project *February 2019*

- Made an interactive interface using OpenGL for graphics to simulate typical Indian road near traffic signals (*Repo Link*)
- Used multi-threading to implement dynamic control of simulation from keyboard and alongside a configuration file.

Teaching Experiences

Teaching Assistant | Data Structures and Algorithms, offered by **Prof. Rahul Garg** *Sept 2020 - Jan 2021*

- Involved in taking lab sessions for a group of 20 students.
- Contributed in preparation of course assignments and evaluation of quizzes and exams.

Academic Mentor | IIT Delhi *June 2018 - May 2019*

Held sessions at the hostel level solving doubts of individual students and explaining core concepts.

Relavant Courses

Principles of AI, Computer Networks, Analysis & Design of Algorithms, **Computer Vision**, Introduction to Language Science, **Machine Learning**, Operating Systems, Theory of Computation, **Database Management Systems**, Data Structures, Programming Languages, Discrete Mathematics, **Data Mining**,Logic for Computer Science., Special Topics in Machine Learning: **Deep learning***, Special Topics in Copmuter Applications: **Social Computing*** *Ongoing

Technical Strengths

Languages and Frameworks: Python, C/C++, Java, SQL, OCaml, Prolog, Javascript, HTML/CSS, VHDL, Bash
Tools and Platforms: Git, MXNet, PyTorch, TensorFlow, Flask, Django, BitBucket, Kafka

Scholastic Achievements

- Secured **All India Rank 561** in Joint Entrance Exam Advanced - 2017 among 1.5 million applicants.
- **KVPY Scholar** : Was awarded **fellowship award by IISC Banglore** with AIR- 571.
- **Astronomy Olympiad -NSEA** : In **top 200 students** in the country, selected to appear for INAO (2017)
- **Physics Olympiad -NSEP**: Amongst top 1 percent students in the state Rajasthan (2017)

Extra Curriculars

Executive, Dev Club | IIT Delhi *May 2018 - May 2019*

- Built SenData (A file sending service in intranet network of IIT);Gave lectures on Bash Scripting & Github.

AINA | An Initiative for National Advancement *December 2018 - Present*

- Regular participant in coordination of weekly teaching program, group discussions and rural trips, conducted by the club.

Captain, Aquatics | Karakoram | Led aquatic team for interhouse competetions of water polo. *2019*

Sports | Represented hostel at Inter Hostel events in Table Tennis and Tennis. Won **Gold** in Table Tennis in 2019

References

Prof Parag Singla | *Associate Professor, CSE, Indian Institute of Technology Delhi* | parags@cse.iitd.ac.in
Prof Samar Husain | *Assitant Prof. Dept. of Humanities and Social Sciences, IIT Delhi* | samar@hss.iitd.ac.in
Prof Weichen Liu | *Nanyang Assistant Professor, SCSE, NTU Singapore* | liu@ntu.edu.sg