Hrituraj Singh

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Email : hrituraj1997@gmail.com
Mobile : +91-9997511010

Education

- **Indian Institute of Technology** — Roorkee, India
  B.Tech in Electrical Engineering; GPA: 9.905/10 — *July 2015 – May 2019*
- **M.M. Public School** — Delhi, India
  All India Secondary School Certificate Examination; Percentage: 97.6/100 — *April 2013 – March 2015*

Experience

- **Adobe Research** — Bengaluru, India
  Research Scientist/Engineer — *Sep 2019 - Present*
  - **Natural Language Processing**: Working on a range of controlled text generation problems while employing reinforcement learning to introduce certain characteristics in generated texts
  - **Natural Language Grounding**: Initiating a project combining Computer Vision and NLP in the field of Chart Question Answering and Robot Navigation
- **Adobe Research** — Bengaluru, India
  Research Intern — *May 2018 - July 2018*
  - **Natural Language Processing**: Worked on state of the art NLP Techniques to devise the solution for controlled text summarization using convolutional sequence to sequence model and Long Short Term Memory Networks
  - **Research Output**: Proposed modifications to the existing models to solve the problem of characteristics tuning while maintaining the quality of summaries. **Patent** for the technology has been filed. **Paper** accepted at International conference on Computational Linguistics and Intelligent Text Processing 2019
  - **Software Development**: Used the python libraries like pytorch, nltk and tensorflow to implement the final solution. Also prepared the demo for final presentation using a Flask based HTML web app
- **AGH University of Science and Technology** — Krakow, Poland
  Research Assistant — *June 2017 - July 2017*
  - **Data Analysis**: Analyzed the huge data obtained from journals worldwide to find the various correlations between the various entities in the huge corpora of text. Analysed the different methods to visualise the information
  - **Software Development**: Used networkx and pandas of python to find out the communities in the graphs and calculate various measures to present the final social network analysis of the entities mentioned in the journals .

Scholastic Achievements

- **Institute Silver Medal**: Awarded the prestigious medal by President of India for exception academic performance.
- **Department Gold Medal**: Highest CPI in entire department among all specialization with 150+ students.
- **Joint Entrance Examination**: All India Rank - 156 among 1.4 Million Candidates in JEE Main - 2015.
- **KVPY Fellow**: Awarded KVPY Fellowship by the Department of Science and Technology , Government of India.
- **Awards**: Awarded Shakuntala Devi Prize and 1988 Batch Alumni Prize for exceptional academic performance.
- **Awards**: Nominated Twice for OP Jindal Award; Once for IITR Heritage Excellence Award; Once for Encore Award

Programming Skills

- **Languages**: Python, C++, Java **Technologies**: MATLAB, NLP, Computer Vision, DL, RL

Publications

- [**2020**]: *Anonymous Submission 1* Under Review in **ACL 2020**
- [**2020**]: *Anonymous Submission 2* Under Review in **ACL 2020**
- [**2018**]: *Generating Summaries tailored to target characteristics* Accepted in **CICLING 2019**
- [**2019**]: *Multisurface Proximal SVM Decision Trees For Heart Disease Classification* Accepted in **IEEE TENCON**

Patents

- [**2018**]: *Generating Summary Content tuned to a target characteristic using word generation model* Filed on Jan 30, 2019

Projects

- **Neural Architecture Search** — Roorkee, India
  ML Lab, EED IIT Roorkee — *June 2019 - August 2019*
  - **Role**: Worked in a team of 3 people on the problem of neural architecture search which is an attempt to alleviate the problem of designing manual neural architectures through design of the complete optimization problem
  - **Work**: Implemented different optimization algorithms including RL, DARTS to the problem of medical image segmentation. Worked on refining the macro level architecture to facilitate development of architectures like U-Net

- **Multisurface Proximal SVM Boosted Decision Trees** — Roorkee, India
  EED IIT Roorkee — *Jan 2019 - April 2019*
  - **Role**: Team member in the course project of the elective course of EE for the course on Machine Learning. Work has been accepted and was presented at IEEE TENCON
  - **Work**: Manipulated the Multisurface proximal Support Vector Machines to build decision trees using them. Applied Random Forest and Gradient Boosting on top to verify the performance on classification task

- **Brain Tumor Segmentation using Deep Learning** — Roorkee, India
  Artificial Intelligence and Electronics Society, IITR — *May 2017 - Dec 2017*
  - **Role**: Team member in a team of 3 which implemented the project as a part of the Srishti - Technical Project Exhibition at IIT Roorkee and represented ArIES in the exhibition scoring one of the highest points 85/100
  - **Work**: Implemented different methodologies of tumor segmenetation using traditional as well as CNN based deep learning techniques incorporation patch based and full image methods. Developed UI to let users investigate results

- **Electrical Load Forecasting using LSTM** — Roorkee, India
  Industry Oriented Project, EED IIT Roorkee — *May 2017 - Dec 2017*
  - **Role**: Lead a three member team in a course of Electrical Engineering which requires students to work on a project with industrial importance guided by Professor Dheeraj Kumar Khatod, EE Dept. IIT Roorkee
  - **Work**: Implemented and investigated the results of ARIMA, SARIMA and Neural Fuzzy Models, Developed the Demo with Long Short Term Memory Model. Awarded O grade i.e. topped in the class of 150 students

- **Recommendation System for Choosing Electives** — Roorkee, India
  Artificial Intelligence and Electronics Society, IITR — *Jan 2017 - March 2017*
  - **Role**: Lead a three member team to implement a collaborative filtering based recommendation system to assist students in choosing elective courses during their graduation in different branches of engineering at IIT Roorkee
  - **Work**: Collected relevant Data and implemented a neural network based model to identify and recommend the appropriate course for the user using his traits collaboratively. Project was presented at Inter IIT Tech meet

- **Mini Projects**
  Independent Projects — *Jan 2017 - Present*
  - **Pixel CNN**: A naive implementation of PixelCNN in Pytorch as described in the paper by A Oord et. al
  - **Pytorch Transformer**: Implementation of Transformer Network by Vaswani et al. in Pytorch library
  - **LSTM Text Generator**: Simple LSTM Based Text Generator trained using Plain text file purely in numpy
  - **Particle Swarm Optimizition**: A naive implementation of PSO in Python with Animation of Swarms
  - **RajFlow**: A naive tensorflow/Pytorch like small library in pure numpy for CNNs incl. backpropagation
  - **Titanic**: My solution to the "Hello World" problem of Data Science in python jupyter notebook
  - **Artistic Neural Style Transfer**: Implementation of the standard neural style transfer problem in tensorflow
  - **Empirical Mode Decomposition**: Implementation of EMD technique to decompose time series in python
  - **RNN Text Generator**: Pure Vanilla RNN Text Generator trained using Plain text file purely in numpy

Miscellaneous

- **Youth Delegation**: Selected by the Ministry of Youth Affairs and Sports to represent Indian in South Korea
- **Mentorship**: Co-founded in a team the flagship Student mentorship programme of IIT Roorkee in 2017
- **Entrepreneurship**: Actively initiated, in a team of Entrepreneurship cell, the first ever E-Summit of IIT Roorkee
- **HPAIR**: Selected for Harvard Project for Asian and International Relations as one of 300 delegates from around globe
- **Tsinghua University**: Accepted for Experiencing China Summers Program by Tsinghua University, China.
- **United Nations**: Selected for the United Nations Youth Assembly 2017 held at New York, USA.
- **IIM Lucknow**: Interned under Prof. Sameer Mathur performing analysis on a range of marketing issues
- **Eagerbug**: Interned for a period of month as a content writer in an emerging startup for JEE aspirants
- **NGO**: Cofounded the Local Chapter of Robinhood Army at IIT Roorkee to distribute food among homeless kids