Sai Himal Allu

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Education

- **Indian Institute of Technology, Roorkee** — Roorkee, India
  Bachelor of Technology in Electronics and Communication Engineering; GPA: 8.554/10.000) — *July 2016 - July 2020*

Research Experience

- **Research Assistant** — Hyderabad, India
  Supervised by Dr CV Jawahar and Dr Vinay Namboodiri — *July 2020 - Present*
  - Studying the problem of low resource neural machine translation through the lens of transfer learning particularly in the context of Indian languages.

- **Undergraduate thesis** — Shanghai, China
  Supervised by Dr Lu Hongtao and Dr Debasis Ghosh — *August 2019 - May 2020*
  - Undergraduate thesis; partly carried out at Shanghai Jiaotong University.
  - Studied the problem of continual learning in neural networks and the problem of catastrophic interference with special focus on a setting where the information signal from the task boundaries is not made available to the model beforehand
  - Attempted to provide an empirical basis for reported findings that a class of approaches (regularization based methods) in isolation were insufficient to mitigate catastrophic forgetting in neural networks.

- **Research Project** — Roorkee, India
  Dr Partha Pratim Roy — *September 2018 - December 2018*
  - Worked on the problem of text detection from images especially text inclined at an angle
  - Experimented with an approach which could learn a more general quadrilateral shape instead of a regular rectangular bounding box by introducing parameters to offset the co-ordinates of a rectangular bounding box
  - Designed experiments to test this idea against the present state of the art approaches in text detection

- **Research Project** — Roorkee, India
  Dr Biplab Banerjee — *December 2017 - February 2018*
  - Designed and conducted experiments on various architectures that were based on the idea of Siamese neural networks
  - Conducted an extensive literature survey over the problem of stereo vision

Internships

- **BCMI Lab, SJTU** — Shanghai, China
  Supervised by Dr Lu Hongtao — *May 2018 - July 2018*
  - Studied the literature on the then state of the art object detection networks
  - Performed a comparative study on two-stage and one-stage object detectors to determine the advantages and disadvantages of each approach
  - Put together an implementation of Mask R-CNN to gain a better understanding of some of the ideas introduced in that particular paper

- **American Express** Bengaluru, India
  Machine Learing Engineer *May 2019 - July 2019*
  - Involved in the development of architectures based on CNN's as an alternative to the RNN based architectures; effort to achieve better performances in terms of time and speed
  - Implemented a CNN model using the principles established in Neural Ordinary Differential Equations; established the initial benchmarks for this model to motivate further internal research
  - Proposed a change in the data preparation strategy which led to a significant increase over the previously established in-house benchmarks

Projects

- **WAT 2020**
  [link]
  - Proposed an approach which utilized encoder pre-training and fine-tuning routines to train a multilingual model.
  - On the leaderboard, the approach was ranked second on the En-Te task and fourth on the En-Od task

- **ExpertNet-PyTorch**
  [link]
  - Implemented and open-sourced the ideas presented in the CVPR 2017 paper "Expert-gate: Lifelong learning with a network of experts"
  - Designed and conducted experiments to enable testing these ideas on a lower scale (in terms of the size of the datasets used and computational resources required)

- **MaS-PyTorch**
  [link]
  - Implemented and open-sourced the ideas presented in the ECCV 2018 paper "Memory Aware Synapses: Learning what (not) to forget)"
  - Minimized the redundancies present in the author's implementation

- **Habitat-API**
  [link]
  - Habitat-API is a modular high-level library maintained by Facebook Research for end-to-end development in embodied AI
  - Implemented a Behavioral cloning baseline to enable bench-marking of future embodied AI algorithms

- **Mask RCNN**
  [link]
  - Worked on developing an open sourced version of Mask R-CNN built using PyTorch
  - Was a part of GitHub Trending when released to the public

- **PredictX: Open Health Hackathon**
  [link]
  - A recommender system that the team built which predicted colleges (among a limited number of options) and grades using the datasets of the students from Kaggle
  - Trained model gave a commendable accuracy of 77.6 % on the predictions made. Model was also substantially resistant to outliers

- **Course Project: Computer Architecture**
  [link]
  - Developed an implementation of a 24 bit RISC processor in Verilog
  - Used a self developed Instruction Set Architecture
  - Optimized performance by implementing necessary pipelining protocols

- **Course Project: Digital Image Processing**
  [link] [report] [slides]
  - Implemented and open sourced the ideas presented in the paper "When sparsity meets low-rankness: Transform learning with non-local low-rank constraint for image restoration" in Python
  - Developed an experimental procedure to prove the solution of the optimization equation proposed and used by the authors

- **Optical Character Recognition for the submission of forms**
  [link]
  - Part of a team responsible for the development of a module that could recognize the package number (delivery services) using convolutional neural networks

- **Steps: Smart India Hackathon**
  [link]
  - Developed a chatbot for a proposed platform for startups and investors to enable direct communication regarding funding between the interested parties

Relevant courses (including online)

- **CS231N**: CNNs for Visual Recognition; Stanford course by Dr Andrej Karpathy
- **Reinforcement Learning**: UCL course by Dr Dave Silver
- **deeplearning.ai**: Coursera courses by Dr Andrew Ng
- **Digital Image Processing**: Part of coursework at IIT Roorkee
- **Linear Algebra**: Part of coursework at IIT Roorkee

Achievements

- **ComedK 2016**: Ranked 3 among a pool of more than ten thousand applicants for the examination
- **JEE Advanced 2016**: Ranked 1247 among a pool of hundred thousand applicants for the examination
- **Smart India Hackathon**: The team made it to the final round alongside 250 other teams selected nation-wide

Programming Skills

- **Languages**:Python, C++, Verilog **Technologies**: PyTorch, Keras, Tensorflow, Git, Linux