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

○ **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