Sai Himal Allu
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Education

- **Indian Institute of Technology, Roorkee** — Roorkee, India
  B.Tech in ECE; CGPA: 8.554/10.000 (First Division with Distinction) — *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 catastrophic forgetting in multilingual neural machine translation systems.

- **Undergraduate thesis** — Shanghai, China / Roorkee, India
  Supervised by Dr Hongtao Lu and Dr Debashis Ghosh — *July 2019 - May 2020*
  - Undergraduate thesis; partly carried out at Shanghai Jiao Tong University.
  - Worked on the problem of Continual Learning in neural networks with a special focus on the task-agnostic setting.
  - Provided 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
  Supervised by Dr Partha Pratim Roy — *September 2018 - December 2018*
  - Worked on the problem of text detection from images especially irregular text inclined at an angle.
  - Designed an approach to 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 then state of the art approaches in text detection.

- **Research Project** — Roorkee, India
  Supervised by 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 on the problem of Computer Stereo Vision.

Internships

- **American Express** — Bengaluru, India
  Machine Learing Engineer — *May 2019 - July 2019*
  - Improved the inference time of the fraud detection system by proposing a CNN based alternative to the in-house RNN based model.
  - Proposed changes to the data preprocessing routines which led to a significant improvement in the system's results over the previously established in-house benchmarks.
  - Implemented a CNN using the principles established in Neural Ordinary Differential Equations; established the initial benchmarks for this model to motivate further internal research.

- **BCMI Lab, SJTU** — Shanghai, China
  Supervised by Dr Lu Hongtao — *May 2018 - July 2018*
  - Performed a comprehensive comparative study on two-stage and one-stage object detectors.
  - Put together an implementation of Mask R-CNN in an effort to recreate the results reported in the paper.

Publications

- Exploring Pair-Wise NMT for Indian Languages
  Sai Himal Allu, ASVS Kartheek, S Sridhar, Zeeshan Khan, Aman Singhal, Vinay Namboodiri, CV Jawahar
  ICON 2020: Short Paper

Projects

- **WAT 2020**
  [link]
  - Proposed an approach which utilized encoder pre-training and fine-tuning routines to train a multilingual neural machine translation model.
  - On the leaderboard, the approach was ranked second on the English-Telugu task and fourth on the English-Odia task.
- **Habitat-Lab Fork**
  [link]
  - Habitat-Lab is a modular high-level library maintained by Facebook Research for end-to-end development in Embodied AI.
  - Worked on implementing a Behavioral Cloning baseline in an effort to support bench-marking of future Embodied AI algorithms.
- **Mask R-CNN**
  [link]
  - Implemented and open sourced a version of Mask R-CNN built using PyTorch.
  - Was a part of GitHub Trending when released to the public.
  - As of February 8, 2021 the project has 924 stars and 170 forks.
- **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.
- **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 to the optimization problem framed by the authors.
- **Optical Character Recognition for the submission of forms**
  [link]
  - Part of a team responsible for the development of a CNN based application to optimize campus delivery services.
- **Steps: Smart India Hackathon**
  [link]
  - Developed the chatbot for a proposed platform enabling direct interaction between startup founders and investors.

Relevant courses (including online)

- **Computer Networks**: Part of coursework at IIT Roorkee
- **Computer Architecture**: Part of coursework at IIT Roorkee
- **Object Oriented Programming**: Part of coursework at IIT Roorkee
- **Data Structures**: Part of coursework at IIT Roorkee
- **Digital Image Processing**: Part of coursework at IIT Roorkee
- **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

Achievements

- **Undergraduate thesis**: One of the two students selected from the ECE department to conduct our thesis abroad.
- **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/C++, Verilog **Technologies**: PyTorch, JAX, Keras, Tensorflow, Git, Linux

Volunteer Work and Extra-curriculars

- **National Service Scheme (NSS), IIT Roorkee**: Organized and participated in bi-annual blood donation camps hosted by NSS, IIT Roorkee.
- **Cinematic Section, IIT Roorkee**: Wrote and supervised scripts for several productions of the Cinematic Section at IIT Roorkee.
- **WatchOut, IIT Roorkee**: Worked as a junior editor for the official campus magazine of IIT Roorkee.