Vaibhav Balloli

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Academic Education

BITS Pilani, Hyderabad Campus   **Hyderabad, India**
BE (Hons) Electronics and Communication Engineering, CGPA: 8.46/10   *July 2020*
Undergraduate Electives: Information Retrieval, Machine Learning, Game Theory, Computer Graphics, Operating Systems, FPGA Systems and Design, Cryptography, Computer Architecture
Coursera: Reinforcement Learning(UoAlberta), Deep Learning(deeplearning.ai), Data Structures and Algorithms(UCSD), Bayesian Methods for Machine Learning(NRUHSE)

Skills

- **Programming languages**: C, C++, Python, Swift, Java, Julia, Verilog, Javascript, MATLAB, Bash
- **Frameworks and tools**: PyTorch, TensorFlow, Swift for TensorFlow, JAX/Flax, SymPy, Numpy, ROS, sklearn, PyQt5, Django, Django Rest Framework, NodeJS, OpenGL, OpenCL, CUDA, Git, LaTeX, Xilinx ISE
- **Hardware**: Raspberry Pi, NVidia Jetson, TX1, TX2, Arduino, Xilinx FPGA, Sensors, Wireless modules, Soldering, Quadcopters

Work Experience

Distributed Algorithms and Systems Lab: IST, Austria   **Vienna, Austria**
Visiting Scientist, Research   *May 2020 - Present*
- Working on automating model compression techniques using Reinforcement Learning and Hessian based pruning techniques under Dr. Dan Alistarh and Dr. Razvan Pascanu(DeepMind).

CANDLE Labs   **IIT Hyderabad, India**
Neural Architecture Search for GPU-like hardwares, Undergrad Thesis   *August - December 2019*
- Studied Neural Architecture Search for designing low latency, energy-efficient neural network architectures for GPUs under Prof. Sparsh Mittal
- Implemented Efficient NAS algorithm using PyTorch
- Used PyTorch wrappers for CUDA for benchmarking and objective function implementation

AlphaICs   **Bangalore, India**
AI Intern   *June - August 2019*
- Devised efficient data structures, algorithms and protocols for AlphaIC's AI board and deep learning library
- Built an application in python for inter-operability of deep learning models and quantization of these models for faster inference using Tensorflow, ONNX and PyQT5.

Publications

- [1] Thakur, Abhishek, Vaibhav Balloli, and Arnav Dhamija. "Video Streaming using Scalable Video Coding over Opportunistic Networks." 2019 International Conference on Wireless Communications Signal Processing and Networking (WiSPNET). IEEE, 2019. DOI: 10.1109/WiSPNET45539.2019.9032752

Projects

NFNets and Adaptive Gradient Clipping   **Vienna, Austria**
PyTorch implmentation (☆GitHub 180)   *October 2020*
- Implemented Adaptive Gradient Clipping as a wrapper for generic pytorch optimizers from the paper "High-Performance Large-Scale Image Recognition Without Normalization" by DeepMind in PyTorch.
- Deployed it on PyPi and with user-friendly documentation.

Vision Transformers(ViT-Flax)   **Vienna, Austria**
Re-implementation of Vision Transformers(intro. in ICLR 2021)(☆GitHub 6)   *October 2020*
- Worked on Vision Transformers, a image classification architecutre based on the Transformers paradigm introduced in an ICLR 2021 submission using JAX/Flax available as an installable package on PyPi.
- This project received special mention on PapersWithCode and Flax co-author.

VECTORS   **Hyderabad, India**
VidEo Comm. Through Opportunistic Relays and Scalable Video Coding   *September 2018 - January 2019*

- Worked on Scalable Video Coding encoded video on a DTN(Disruption Tolerant Network) developed for Android devices under Prof. Abhishek Thakur [1]. Presented Camera-ready paper at WiSPNET 2019, Chennai, India.
- Developed an Android App cross-compiling SHM and JSVC for ARM processors to encode recorded video to send on the network.
- Used Opportunistic Network Environment(ONE) to run simulations and automatic generation of reports from results

SmartCampus   **Hyderabad, India**
Co-Founder | Developer   *September 2017 - May 2019*

- Co-founded SmartCampus, a student group who setup the Cashless system on campus, handling transactions worth 15 million rupees every year
- Built and deployed an Android app to make cashless payments on campus sustaining an active user count of 50 per cent of campus population
- Built a prototype recommender system yet to be deployed on the production-server using information retrieval and modern recommender system techniques

Open Source

Flower: Adap   **Hyderabad, India**
Federated Learning framework   *2020*

- Contributed to Federated Learning framework.

Google,TensorFlow   **Hyderabad, India**
JAX/Flax, Swift for TensorFlow   *2020*

- Contributed to core Swift for TensorFlow APIs in optimizers, layers.
- Added image classification models to the S4TF models repository
- Contributed to Google JAX/Flax framework by feature additions

FAIR   **Hyderabad, India**
PyTorch   *2020*

- Contributed to PyTorch framework in computer vision models via bug fixes and dataset additions.

Miscellaneous

- **ML Reading Group**: Founded and organized ML reading group discussing various papers in ML.
- **Research papers**: Weekly blog summarizing and reviewing research papers in the fields of Convex Optimization, Federated Learning and Machine Learning Systems.
- **Reinforcement Learning**: Blog summarizing concepts, algorithms and developments in Reinforcement Learning.

Clubs

Automation and Robotics Club(Member): Conducted introductory Arduino and Robotics workshops, built quadcopters.

Achievements, Press and Scholarships

- IST Austria stipend for visiting researchers
- Selected to attend RegML 2020 and Convex Optimization summer school.
- 3rd in In-Class Kaggle Competition at BPHC
- **Press:** SmartCampus featured in campus journals and interviews.