Bhushan B. Sonawane

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Education

- **SUNY StonyBrook University** — StonyBrook, NY
  Master of Science in Computer Science; GPA: 3.67/4 — *Aug 2017 - May 2019*
  - **Thesis**: Face illumination estimation advised by Professor Dimitris Samaras; Member of Computer Vision Lab
  - **Courses**: Machine Learning, Convex Optimization, Probs and Stats, Artificial Intelligence, Analysis of Algorithm
- **Vishwakarma Institute of Technology** — Pune, India
  Bachelor of Technology in Computer Engineering; GPA: 9.27/10 — *Aug 2011 - May 2015*

Experience

- **Apple** — Cupertino, CA
  Software Engineer in Machine Learning, CoreML Frameworks — *June 2019 - Current*
  - **ONNX-CoreML Converter**: Maintaining converter for deploying ONNX model into iOS ecosystem; Implemented conversion for neural network layers supported in CoreML 3.0; [Python] **view contributions**
  - **CoreML Tools**: Implemented optimization passes; Image input support; Implemented Custom layers; Changes in builder API to generate ML Model specification as per CoreML 3.0; [Python, Objective-C] **view contributions**
  - **Deploying ML models on device**: Helping first-party and third-party developers on-board on CoreML by converting and deploying MLModel on device; [Python, Objective-C]
  - **Community Building**: Helping and analyzing community engagement with CoreML;
- **Nvidia** — Santa Clara, CA
  Intern, SPIR-V Compiler — *May 2018 - Aug 2018*
  - **Compiler Optimization Controller**: Infrastructure for controlling optimization- optimization order and parameters [C++, LLVM, Python]
  - **Knobs Infrastructure**: Infrastructure to allow compiler debugging and experimentation [C++, LLVM]
- **Nvidia** — Pune, India
  System Software Engineer, Compiler — *Jun 2015 - Jul 2017*
  - **Compile time and memory infrastructure**: Collaborated with OpenGL driver and GLSL Front-end compiler team for implementing Compile time and Memory usage profiling infrastructure [C++]
  - **Early copy propagation**: Phase ordering of copy propagation; Reduced number of instructions processed by optimizer; Improved compile time from few hours to few minutes for specialized shaders; [C++]
  - **Assembler**: Implemented DWARF 2.0 compliant debug frame support for CUDA 9.0; Implemented Vendor specific extensions to support DWARF 3.0 features in DWARF 2.0; [C]
  - **Misc**: Implemented/Enhanced various peephole optimizations, interfaces and heuristics. [C/C++/Python]
- **Nvidia** — Pune, India
  Intern, Compiler — *Jun 2014 - Apr 2015*
  - **PBQP based Register Allocator**: Implemented Partitioned Boolean Quadratic Problem based register allocator for Nvidia compiler; 98% of existing tests improved (graphics and compute tests); [C++] **view presentation**

Open-Source

- **PyTorch**: Contributes to deep learning framework PyTorch for fun; Have worked on torch functions, autograd, convolutions, jit: **contributions** [Python, C++]

Other Experience

- **Teaching Assistant**: Graduate course **Intro to Computer Vision** at StonyBrook University. [Spring 19]
- **SUNY Research Foundation**: Implemented image parser for converting proprietary bio-medical image format into tiled-tiff format [C] [Feb 2018 - March 2018]
- **Vishwakarama Institute of Technology**: Instructor of a undergraduate course [Jan 2017 - May 2017] **'Problem Solving and Programming'**
- **Mentor at CalHacks 2019**: Mentoring undergrad students during **CalHacks** hackathon at UC Berkley

Projects

- **Face Illumination Estimation**: GANs for domain adaptation. Used SIRFS method for generating shading, albedo, normal and lighting for synthetic and CelebA dataset. Enhanced Jon Barron's SIRFS; [Python, Matlab, PyTorch]
  report, source & results;
- **Illumination model based on shading residue**: New illuminatin model based on shading residue to capture geometric imperfections in SfSNet; [PyTorch]
  report, source & results
- **Co-Operative GANs**: Auto-ML approach for GAN training- Train multiple generators and copy weights of best performing to other generators at the end of each epoch; Weight sharing across generators helps learn the best representation; Solves mode collapsing, saddle point and local minima problem in training; [Python, PyTorch]
  source and results;
- **ADMM Optimizer in PyTorch**: Implemented ADMM optimizer in PyTorch. Tested on Diabetes dataset; 1.6x faster than Scikit-Learn's state of the art Lasso and Ridge solver; [Python, PyTorch]
  report, source & results;
- **ML Algorithms**: Implemented Ridge Regression, Lasso Solver, Support Vector Machine using Stochastic Gradient Descent and Quadratic Programming; Human Action recognition using CNN and RNN; [Python, Matlab]
  source;
- **SmartOFF - Automate power supply of home appliances**: LSTM model for predicting appliances' usage pattern and predict when appliance will not be used and can be turned off. Used ESP8266 Microcontroller for communication. Client-Server model where Server devices using trained LSTM model sends signal to toggle power of respective device; [Python, Scikit-learn, Keras]
  report and source;
- **GAN I have your attention?**: Extending MaskGAN for filling the missing word with attention model for long sentences; [Python, PyTorch]
  source
- **Self Driving car along with Learning to see in dark**: Using behavioral cloning approach to train self driving car in CARLA simulator; Extending to driving in night using learning to see in dark; [Python, PyTorch]
  source

Skills

- C++, C, Python, Java, Groovy, Prolog, PyTorch, Tensorflow, Keras, LLVM, Django, Grails, Android

Awards

- **Finalist of F8 Hackathon 2019**: Implemented Open-Curriculm: Platform for teachers across globe to share, manage and distribute educational content, lesson plans. **check project**
- **Project rank 2/126**: PBQP based register allocator project secured second place at VIT(2015)
- **Paper Presentation rank 2/88**: Page Replacement algorithm using hashing at Papyrus, VIT(2014)
- **Completitions**: **Rank 2/66** in Kaggle Competition for Human Acticity Recognition(2018); **Rank 1/600** at programming contest(C-Athlon)(2014); Qualified for **ACM ICPC** Amritapuri regionals(2013)