

# Bhushan B. Sonawane

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## SKILLS

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

## EDUCATION

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- **SUNY StonyBrook University** StonyBrook, NY  
*Master of Science in Computer Science; GPA: 3.57/4* May 2019
  - **Thesis:** Lighting Estimation of faces using deep learning; Advisor: Professor Dimitris Samaras;
  - **Research Lab:** Computer Vision Lab
  - **Courses:** Machine Learning, Convex Optimization, Prob and Stats, Artificial Intelligence, Analysis of Algorithm
- **Vishwakarma Institute of Technology** Pune, India  
*Bachelor of Technology in Computer Engineering; GPA: 9.27/10* May 2015

## PROJECTS

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- **Lighting estimation for faces:** Used domain adaptation for lighting estimation of face images; Implemented GANs to map real images latent space into synthetic image space; Used Spherical Harmonics(SH) for modelling lighting; Denoising Autoencoder to denoise noisy SH and trained only one neural network; **Link:** Report, Source; [Python, PyTorch]
- **Co-Operative GANs:** Train multiple generators and copy weights of best performing to other generators every epoch. This solves mode collapsing, saddle point and local minima problem in training; **Link:** Source; [Python, PyTorch]
- **ADMM Optimizer in PyTorch:** Implemented ADMM Lasso and Ridge regression in PyTorch and tested on toy dataset; Outperformed Scikit-Learn's state of the art Lasso and Ridge solver; **Link:** Report, Source; [Python, PyTorch]
- **Machine Learning Algorithms:** Implemented Ridge Regression, Lasso Solver, Support Vector Machine using Stochastic Gradient Descent and Quadratic Programming; **Link:** Source; [Python, Matlab]
- **SmartOFF - Managing power supply of appliances for energy conservation:** Home appliances consumes significant power in stand by mode; Internet of Things and Machine Learning solution; LSTM model for predicting appliances' usage pattern and control power supply accordingly. **Links:** Reports, Source; [Python, Scikit-learn, Keras]
- **NIPS 2018 AI for Prosthetics Challenge:** Using Reinforcement learning to model human with a prosthetic leg to run; osim-rl environment; Using keras-rl library; [Python, Keras, Ongoing]
- **Visual Domain Adaptation Challenge:** Developing model to adapt between synthetic and real objects for detection; Developing a method of unsupervised domain adaptation for object classification with additional unknown categories; [Python, PyTorch, OnGoing]

## EXPERIENCE

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- **Nvidia** Santa Clara, CA  
*Intern, SPIR-V/GLSL Compiler* May 2018 - Current
  - **Compiler Knobs Infrastructure:** Implemented Knobs infrastructure to allow compiler debugging[C++, LLVM]
  - **Compiler Phase Dispatcher:** Implemented Compiler phase ordering and parameter tuning framework for machine learning tool to explore compile time and run time improvements of compiler [C++, LLVM]
- **Nvidia** Pune, India  
*System Software Engineer, Compiler* Jun 2015 - Jul 2017
  - **Optimizing compiler:** Worked on Nvidia Tegra graphics and CUDA compute compiler; Improved peephole optimizations; OpenGL/DX driver interfaces; Optimization for compile time improvements; Developed Profiling infrastructure; Worked on Tegra(Android) compiler issues; Worked on Coverity, GCov; [C/C++]
  - **Assembler:** Implemented DWARF 2.0 compliant debug frame support for CUDA 9.0. [C]
- **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++]

## OPEN-SOURCE

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- **PyTorch:** Implemented isInf and isFinite; Porting dropout to ATen [Python, C++]