

# Bhushan B. Sonawane

bhushansonawane.com

Email: bhushansonawane94@gmail.com

Mobile: +1 (631) 590 9644

## EDUCATION

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- **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

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- **Apple** Cupertino, CA  
*Machine Learning Engineer, CoreML* *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

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

## OTHER EXPERIENCE

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- **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]
- **Vishwakarma Institute of Technology:** Instructor of a undergraduate course [Jan 2017 - May 2017] **'Problem Solving and Programming'**
- **Mentored at CalHacks 2019:** Mentoring undergrad students during **CalHacks** hackathon at UC Berkley

## PROJECTS

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- **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 illumination 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

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

## AWARDS

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- **Finalist of F8 Hackathon 2019:** Implemented Open-Curriculum: 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)
- **Competitions: Rank 2/66** in Kaggle Competition for Human Activity Recognition(2018); **Rank 1/600** at programming contest(C-Athlon)(2014); Qualified for **ACM ICPC** Amritapuri regionals(2013)