

Kaunil Dhruv

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RESEARCH

COOPERATIVE INSTITUTE FOR RESEARCH IN ENVIRONMENTAL SCIENCES | INDEPENDENT RESEARCH

June 2019 – Present | Boulder, CO

- Collaborating with [Dr. Michael John Willis](#) at [CIRES](#) on HPC implementation of CV techniques such as Image Mosaicing and 3D reconstruction using CUDA.
- Trained and optimized (60x compared to original implementation) a UResNet based semantic segmentation model for high resolution Synthetic Aperture Radar Imagery to delineate bedrocks in Antarctica mixed precision training in PyTorch.

INSTITUTE OF COGNITIVE SCIENCE | GRADUATE RESEARCH ASSISTANT

May 2019 – Present | Boulder, CO & Syracuse, NY

- Working with [Dr. Leanne Hirshfield](#) at the [SHINE Lab](#) on Cognitive Science and Deep Learning (LSTMs and 3D-CNNs) for Multi-Label classification of fNIRS data to predict human cognitive workload.
- Researched and implemented a ConvLSTM based Siamese Neural Network to predict cognitive workload of a 50 time step 5x24 fNIRS data input.
- My work at I.C.S. also involves research and development of a multi-modal cognitive workload estimation system under a Simulated Aircraft Piloting task.
- You can learn more about my work [here](#).

EXPERIENCE

INSYLO TECHNOLOGIES SLU (CONTRACT) | COMPUTER VISION INTERN

March 2018 – June 2018 | Girona, Spain

- Developed a computer vision pipeline for volumetric estimation of Silos with the help of 2D monocular and RGB-D images.
- Researched and implemented: Depth from Focus, planar geometry reconstruction using Laser Mesh Projection.

FACEBOOK | SOFTWARE ENGINEER IN CONNECTIVITY LABS AND A.M.L

Sept 2016 – Dec 2017 | Menlo Park, CA & Mumbai, India

- Researched and implemented a pipeline for visualizing learned features of VGG-16, SegNet, and U-ResNet based semantic segmentation architectures.
- Developed data annotation tools using Qt5 (c++) used by a team of G.I.S Analysts for enhancing the generalization of semantic segmentation models using Active Learning paradigm.
- Designed & deployed an Android App using an R-Tree based back-end to validate predicted road geometries.
- All the codes are open sourced and maintained at [github://facebookresearch/street-address](https://github.com/facebookresearch/street-address).

ISENSES INC. | RESEARCH AND DEVELOPMENT INTERN

Dec 2015 – Jan 2016 | Mumbai, India

- Developed a machine learning pipeline for Disguised Face Detection from 2D images.
- Implemented a SegNet based feature detector to identify facial action units which were then used to classify disguised faces using an S.V.M loss based classifier.
- Entire pipeline was optimized and implemented on a an FPGA and materialized into a product.

EDUCATION

UNIVERSITY OF COLORADO BOULDER | PHD IN COMPUTER SCIENCE

Expected May 2023 | Boulder, CO • Cum. GPA: 3.54

Relevant Courses: Advanced Robotics • Machine Learning • Computer Vision • Natural Language Processing • Advanced Computer Graphics • Big Data Analytics

UNIVERSITY OF MUMBAI | B.E. IN COMPUTER SCIENCE

Aug 2013 – May 2017 • Cum. GPA: 7.0/10.0

RELEVANT PROJECTS

TENSOR LIB | CUDA implementation of NumPy based Tensors in C++ 17.

CUDA-CV | CUDA implementation of Computer Vision algorithms.

TENSOR AUTOGRAD | A pedagogical implementation of Automatic Differentiation on numpy tensors.

FEATURE BASED SLAM | Python implementation of Feature Based SLAM on monocular images.

COBRIX | Computing Interface for the visually impaired to learn computer programming.

DISGUISED FACE DETECTION | Live demo of my work at iSenses Inc.

MEDICAL REPORTS DIGITIZER | Android Application to scan and digitize user's medical reports using CV and Tesseract OCR.

PUBLICATIONS

- [Kaunil Dhruv](#), Trevor Grant, Lucas Hayne, Leanne Hirshfield. "Taking a Deeper Look at the Brain with High-Density fNIRS: Predicting Discrete Components of Cognitive Load with Deep Learning and Model Transparency Techniques". SIGCHI 2020, Submitted for peer review.
- Ilke Demir, Forest Hughes, Aman Raj, [Kaunil Dhruv](#), Suryanarayana Murthy, Sanyam Garg, Barrett Doo, Ramesh Raskar. "A Holistic Framework for Addressing the World using Machine Learning". CVPR 2018 workshops.
- Ilke Demir, Forest Hughes, Aman Raj, [Kaunil Dhruv](#), Suryanarayana Murthy, Sanyam Garg, Barrett Doo, Ramesh Raskar. "Generative street addresses from satellite imagery". International Journal of Geo-Information (ISPRS 2018).
- Ilke Demir, Forest Hughes, Aman Raj, Kleovoulos Tsourides, Divyaa Ravichandran, Suryanarayana Murthy, [Kaunil Dhruv](#), Sanyam Garg, Jatin Malhotra, Barrett Doo, Grace Kermani, Ramesh Raskar. "Robocodes: Towards Generative Street Addresses from Satellite Imagery". CVPR 2017 workshop on Earthvision. (best paper award)

SKILLS

PROGRAMMING

python | c++ > 11 | R | MATLAB | js | php

DEEP LEARNING FRAMEWORKS

pyTorch | Tensorflow | Chainer | LuaTorch

WEB FRAMEWORKS

ReactJS | D3.js | AngularJS | Deck.GL

BIG DATA

Apache Spark | Hadoop | Hive