Akshay Iyer

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PROFESSIONAL SUMMARY

Strong research experience in computer vision, deep learning, and data science in medical imaging and autonomous vehicles
Previously worked with Deloitte Touche Tohmatsu in software development, robotic process automation, and enterprise architecture

EDUCATION:

Worcester Polytechnic Institute, Massachusetts, USA — **May 2020**
Master of Science in Robotics | Thesis (Deep Learning) — **GPA: 4.0/4.0**
Relevant Coursework: Computer Vision, Artificial Intelligence

Veermata Jijabai Technological Institute (VJTI), India — **June 2015**
Bachelor of Technology in Electronics and Telecommunication — **Rank 2/74; GPA: 3.9/4.0**
Relevant Coursework: Digital Signal Processing, Probability and Stats, Data Structures and Algorithms

PUBLICATIONS AND PEER REVIEWS:

- Deep Learning: "Characterizing the effects of adverse lighting on semantic segmentation of wound images and mitigation using a Deep Retinex Model", **Elsevier Medical Image Analysis** (Impact Factor 11.15), 2020 (In review)
- "RealNET – Internet of Things in everyday life using Raspberry Pi", **IRJET** (Impact Factor 7.53), 2017
- Reviewer – **IEEE Internet of Things Journal** (Impact Factor 9.93)

TECHNICAL SKILLS AND CORE COMPETENCIES:

Technical Skills: Modern C++, Python; Tensorflow, PyTorch, Sagemaker, OpenCV, PyData, Weights&Biases, Flask, Slurm, HPC
Competencies: CNNs, LSTMs, Conv-LSTMs, AEs, Web deployment of ML models, Image Classification, Segmentation

WORK EXPERIENCE

- **Deep Learning Research Engineer – UMass Medical School** — **July 2020 – Present**
  Designing a neural network from scratch to estimate a surrogate signal for respiration for motion correction in SPECT imaging
  Using GAN-based deep learning models to estimate attenuation map from SPECT emission data alone for Boston Children's Hospital. This would eliminate the need for an additional CT scan reducing the exposure to harmful ionizing radiation to children
- **RPA Developer/Technology Consultant - Deloitte India (Leader of the Big Four in Consulting)** — **July 2015 - June 2018**
  Successfully built and tested RPA code to automate a very complex returns process at UBS, UK yielding 83% time savings
  Designed the first digital pharma workbench in India, for Sun Pharma, to yield an estimated 40% reduction in overall TAT

ACADEMIC RESEARCH EXPERIENCE

- **Research Assistant (Deep Learning Thesis) – Advisor: Prof. Emmanuel Agu** — **July 2019 – May 2020**
  Worked on studying the effects of adverse lighting on wound segmentation by U-Net, for a smartphone-based wound-care app
  Created the first large-scale dataset of 55k wound images under varying lighting and performed extensive data analysis
  Trained a complex neural network for image enhancement which improved U-Net's segmentation accuracy by up to 300%
- **Deep Learning Summer Intern - SmartWands Group, WPI** — **May 2019 – July 2019**
  Performed extensive deep learning literature review on intrinsic image decomposition to counteract bad lighting in images.
  Trained a complex autoencoder using self-supervised learning on the ShapeNet dataset for intrinsic image decomposition
- **Computer Vision Researcher – Building Occupant Signaling Lab, WPI** — **Feb 2019 – May 2019**
  Explored cross-calibration of FLIR E40 and Orbbec Astra cameras using Hermann grids and boards with thermal gradients.
  Developed a pipeline to create a 3D thermal model from a pair of images using image registration and point cloud fusion

RECENT PROJECTS 2018 – 2020, OTHER PROJECTS: https://akshay-iyer.github.io

- **Monocular visual odometry using a Recurrent Convolutional Neural Network** (PyTorch, Python)
  Implemented a Conv-LSTM: a 9 layer FlowNet model followed by a 2 layer LSTM to predict ego-motion from a camera feed.
  Trained on WPI's HPC Cluster and obtained a translation RMSE drift of 19% and rotational RMSE drift of $1.61°/100$ m
- **Stereo Visual Odometry for robot localization using a feature-based approach** (C++, OpenCV)
  Successfully implemented Geometric VO using feature matching and tracking that performed in real-time on the KITTI dataset.
  Implemented Lucas-Kanade and Perspective-n-Point algorithms for 3D-2D estimation and used RANSAC for outlier rejection
- **Machine learning-based prediction of Alzheimer's disease** (Python, Scikit-learn, Tensorflow)
  Achieved accuracies of 67% (Gradient Boosting) and 75% (CNN) in the three-class detection problem of Alzheimer's disease
- **Multi-goal reinforcement learning-based robot control** (Python, PyTorch, MuJoCo, OpenAI Gym)
  Made the Fetch Robot push a puck across the table to the goal position by implementing Vanilla DDPG and DDPG with HER