SAQIB AZIM

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EDUCATION

University of California San Diego
Master of Science in ECE
2021 – Present

Indian Institute of Technology Bombay
B.Tech in Electrical Engineering with Minor in CS
2015 – 2019

RESEARCH PROJECTS

Indoor Positioning System over WLAN Network

- Built a SOTA self-adaptive system to locate an object with high accuracy ($\leq$ 10 cm) in indoor environments
- Proposed a setup of stationary signal receivers to account for indoor topology and signal attenuation effects. Used LSTM models to estimate the distance of an object from wireless access point
- Quarter-Finalist at India Innovation Challenge '18

Zero-Shot Learning (ZSL) for Object Recognition

- Proposed a semi-supervised VGG16-based encoder-decoder network to learn visual-semantic mapping using novel combination of hinge-rank loss and Word2Vec embeddings
- Achieved ZSL performance improvement from 58.7% to 65.3% on the AwA dataset.

Optimal Pursuer-Evader Shepherding Problem

- Proposed a novel pursuer-evader problem for estimating an optimal control algorithm to drive a multi-evader system to destination using inter-agent interactions
- Used deep-learning based LSTM module to solve constrained optimization task and generate optimal pursuer trajectories

Autonomous Self-Driving Car

Mahindra Rise Driverless Car Challenge

- Studied the effect of shadows and varying lighting conditions on roads and provided low-computation solution using image processing algorithms
- Collected and prepared custom-dataset of Indian roads and learned to detect road, obstacle, zebra-crossing, etc. with YOLO network

PUBLICATIONS & PATENTS

- **S. Azim**, T. Nito and K. Nakamura, "Localization in Dynamic Environments with Targeted-Inference based SLAM", *Japan Patent Application*, *filed Aug '21 (pending)*
- P. Sankhe, **S. Azim**, S. Goyal, T. Choudhary, K. Appaiah and S. Srikant, "Indoor Distance Estimation using LSTMs over WLAN Network", *IEEE Workshop on Positioning, Navigation and Communications (WPNC) 2019* & *Indian Patent Application*, *filed Dec '18*

SKILLS

Programming: Python, C/C++, MATLAB, Java (Android)
Frameworks: Tensorflow, PyTorch, Pandas, Git, Docker

ACHIEVEMENTS & ROLES

- Ranked among **top 0.75%** and **top 0.15%** candidates in JEE Advanced and JEE Main '15
- **Teaching Assistant** for 2 undergraduate level courses at UC San Diego and IIT Bombay
- **Mentor -** Guided 12 students at *Summer of Science ('19, '20)* & *Institute Technical Summer Project '17*
- **Open Source** - Actively contributed to Kivy, Kivent
- Member of the **Innovation Cell** team at IIT Bombay

INDUSTRY EXPERIENCE

HITACHI RESEARCH — Oct '19 - Sep '21
Assistant Researcher (Computer Vision Team)

Navigation using Visual-Inertial (VI) SLAM

- Proposed a novel VI-SLAM algorithm for localization in dynamic environments using deep-learning targeted inference to minimize computation
- Reduced mean localization error by 47% over SOTA conventional methods

Risk Activity Detection in Workplaces

- Developed vision-based system for quantitative risk estimation by determining positional relationship between person and dangerous objects
- Demonstrated successful working of this technology at a Japanese Factory. Presented this technology at Hitachi Research Symposium '20.

SAMSUNG RESEARCH — May '18 - Jul '18
Research Intern

- Worked on building a smartwatch-based handwritten text recognizer by learning the relation between hand movements and character patterns using pipelined SVM and LSTM network

ACADEMIC PROJECTS

Image Registration using FFT

- Built FFT-based tool for registering and mosaicing images captured from different viewpoints using rotation and translation alignment methods
- Selected in Top 5/40 projects. Presented at TEQIP (KITE) Resource Creation Workshop under MHRD, Govt. of India Initiative

PPG Signal Acquisition Module

- Designed and developed a hardware module for faithful PPG signal acquisition with low noise and minimal filtering

Simultaneous Dictionary Optimization

- Implemented a compressed sensing framework using coupled-KSVD and OMP algorithm for joint design and optimization of sensing matrix and non-parametric dictionary