# Siddeshwar Raghavan

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## EDUCATION

**University of Wisconsin-Madison -** *Master of Science (Research) in Electrical Engineering*

SEPT 2019 - MAY 2021

GPA - 3.65/ 4

**Courses taken:** (Fall 2019)- Image Processing, Advanced Operating Systems, Modern Probability Theory and Stochastic Processes. (Spring 2020) - Independent Research under Dr. Yin Li, Computer Vision, Matrix Methods in Machine Learning. (Summer 2020)- Independent Research student at Dr. Yin Li's lab. (Fall 2020) - Independent Research student at Dr. Yin Li's lab, Intro to Artificial Intelligence, Topics in Database mgmt systems.

**PSG College Of Technology, Coimbatore, India** - *Bachelor of Engineering in Electronics and Communication Engineering*

2014 - 2018

Graduated with a Final CGPA of 8.23/ 10

## RESEARCH AND INDUSTRIAL EXPERIENCE

**Independent Research Student, University of Wisconsin-Madison (Under Dr. Yin Li, Assistant Professor, Biostatistics & Medical Informatics and Computer Sciences)**

DEC 2019 - PRESENT

I conducted preliminary research in Dr. Yin Li's new collaboration project with Dr. Andreas Velten to use deep learning to reconstruct Non-Line-of-Sight (NLOS) Images. I built a renderer using Blender 3D to create ground truth images from over 1000 categories in ShapeNet. These ground truth images formed the foundation of the deep reconstruction pipeline for NLOS imaging. I automated the whole process of Blender image creation to simplify the task of generating ground truth sets. I continued to work with Dr. Yin Li this past summer when I developed the deep learning backbone for the recovery of intensity images from the NLOS measurements. I implemented a UNET architecture supporting a 2D ResNet encoder with a 2D decoder. Later, I modified the 2D encoder to a 3D ResNet encoder to extract the low-level features from the volumetric input data.
Currently capturing NLOS video frames and developing models for 3D pose estimation, action recognition, and action classification

**Adori Labs, Bangalore, India** - *Engineering Intern*

SEPT 2018 - MAY 2019

Adori Labs is a startup working to enhance live and on-demand audio to be natively interactive.
I developed a Voice Assistant for the in-house built Adori Player: built a modular SDK-like voice assistant layer on iOS using Swift to control specific player functionalities. I built and released Google Home Actions and Amazon Alexa Skills for the Adori platform. Designed and developed a podcast audio search functionality using Elasticsearch.

**Thorogood Associates, Bangalore, India** - *Intern*

DEC 2017 - APR 2018

I developed an automation tool for data transformation and reporting using SQL Server, SSIS, and SSRS tools (Microsoft tools for ETL scripting) for an FMCG's supply-chain software. This internship was during the 8th (final) semester of my undergraduate study.

**IIT, Bombay, India** - *Research Intern*

JUN 2017 - JUL 2017

Worked on a VSLAM project under the guidance of Prof. Rajbabu Velmurugan, Associate Professor, Electrical Engineering Department, IIT Bombay. I developed a system to identify markers and distance of the markers from the video captured by a single camera rather than the conventional multi-camera approach. This was achieved by segmenting it into frames and analyzing each frame to find the position of the marker using Python and OpenCV. I had chosen the approach to identify markers from the video feed to make the solution as weakly supervised as possible. This was a summer internship post the 6th semester of my undergraduate study.

**IIT, Madras, India** - *Research Intern*

JUN 2016 - JUL 2016

Designed and built a State Of Health tester, which measures the health of the battery, efficiency percentage, number of charge cycles dynamically under the guidance of Dr. Ashok Jhunjhunwala, Professor, Electrical Engineering Department, IIT Madras. This was a summer internship post the 4th semester of my undergraduate study.

## PUBLICATIONS/ PATENTS/ PROJECTS

**Spacenet 7 -** Participated in Spacenet 7 and exhibited the results for the **Intro to Artificial Neural Networks (CS/ ECE 539 - Fall 2020)** course project. The unique challenge for this competition involves segmenting and tracking tiny, dense building footprints over time from satellite images. I implemented 4 different deep learning models (VGG-16, ResNet-50, DenseNet-121 and Yolov4) with a UNET decoder for the semantic segmentation of building footprints from satellite images. With these results, I finished within the top 7 percentile of participants in the competition.

**Spacenet 6 -** Participated in Spacenet 6 and exhibited results for the **Computer Vision (CS766 - Spring 2020)** course project. This involved developing deep models to segment building footprints from sparse number of SAR (Synthetic-aperture radar) images, instead of the usual optical (EO) images. I implemented data augmentation and extensive pre-processing, and transfer learning from optical data (EO) images. The deep neural network architecture used was Vgg-11 in a UNET structure. I tuned the hyperparameters for optimal results. With these, I finished within the top 50 percentile in the competition.

**Patent-published** - Human Interface System For Playing Virtual Percussion Instruments (Ref: Patent Application No: 201841021574 dated June 8, 2018 - Published at the Indian Patent office )
The patent filed is based on a Virtual Reality prototype developed. It is a learning environment built using the Arduino board, Unity 3D. Our in-house developed position tracking system help users learn to play percussion instruments by using VR cues along with providing a touch-sensory feel in the form of vibration through a haptic feedback glove. The tutorial mode has floating notes, the drum and corresponding notes are highlighted and reverse-karaoke to aid easy learning.

## AWARDS

- Won the 2nd prize for VRDrum kit (implementation of the above-patented idea) at NIT Trichy Pragyan's project exhibit **Ingenium 2017.**
- Won the Siemens PLM Award for Excellence at the Annual Forum 2017 PACE for a presentation Portability Assisted Mobility Access, a prototype for baby boomers.

## SKILLS

Python, PyTorch, TensorFlow, Tensorboard, Blender, Java, MATLAB, AWS & Google Cloud, SQL, C, Unity 3D.

## INTERESTS

Biking, painting, playing the piano and cooking.