Samarth Negi

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EDUCATION

University of Maryland, College Park
Hyattsville, MD

Masters (MPS), Machine Learning
2021 - 2023 (expected January 2023)

- Developed visualization methods for occupancy grids targeting lidar based distance sensors for the Occuviz project at UMD Gamma Labs.
- Current GPA : 3.61/4.0

MAIT, GGSIPU
Delhi, India

Bachelors (B.Tech), Electronics and Communication Engineering
2015 - 2019

- Implemented Bayesian and density based modelling to accomplish anomaly detection for an arduino based gas sensor network leading to 2 successful patents as part of a research group from Amity Incubation Center.
- Final thesis on "Analyzing crowd flow using vision models and their applications in high density areas" selected for Inter-Collegiate Innovation Competition (top 3 from college).
- Researched camera invariance and correction algorithms for sensors in different price ranges under Dr. Navneet Yadav, finally publishing and presenting a research paper.
- Graduated First Division.

EXPERIENCE

Computer Vision Engineer
August 2019 – October 2020

Phicode
New Delhi, India

- Developed and deployed an algorithm for LIDAR (Livox Horizon) based point cloud data to localize structural points of a windmill in GPS coordinate space for path planning implemented through ROS Melodic.
- Developed and deployed utilities for calibrating multiple cameras to non-rotating LIDAR sensors for generation of real-time pixel level depth maps using OpenCV and ROS.
- Developed an image stitching tool targeting images with sparsely identifiable SIFT/SURF features by creating synthetic features based on high accuracy metadata and adaptive parametric filtering which enabled to create high resolution images of windmill hulls for faster inspection.
- Collaborated with a team of botanists to create an image segmentation dataset for the task of leaf disease classification targeting features which are easier to identify using segmentation architectures for the Seggro Mobile App.
- Trained an ensemble model for leaf disease classification based on the MaskRCNN architecture as a proof-of-concept which achieved a mean F1 score of 0.69 for 10 disease classes on the test set.

Software Engineering Intern
May 2018 – July 2018

Ananth Technologies Limited
Hyderabad, India

- Developed a mathematical model based algorithm for detecting broken train tracks from drone footage using OpenCV.

PROJECTS

soccerEye | *Python, Scikit-Image, OpenCV,PyTorch*
August 2022

- Built modular components for analyzing soccer game footage for creating advanced stats and recognizing player patterns and tendencies by applying vanilla computer vision techniques with NN based models.
- Scraped and annotated an object detection dataset from soccer game footage which was used to train an AutoEncoder image segmentation model that outperformed traditional OpenCV based color thresholding pipelines for the task of multi-resolution field localization.
- Trained a FasterRCNN model and created a fuzzy matching post processor for accurate detection of players specially catering to occluded and overlapping instances which achieved 51 AP on the test set.
- Combined several NN based models to generate image anchors to transform a video feed into a 2D birds eye view interpolation of the feed.
- tigboatnc.github.io/soccerEye

Technical Skills

Languages: Python, C++, JavaScript (in order of proficiency)
Developer Tools: Git, Docker, Google Cloud Platform, VS Code, Visual Studio, Jupyter
Libraries: Scikit-Learn, Scikit-Image, OpenCV, PyTorch
Machine Learning Technologies: NNs, Model Training Pipelines, Feature Space Reduction

Research and Publications

An Efficient Image Processing Based Method for Detecting Discontinuities in Railway: ISSN: 2278-3075, Volume-8, Issue-9S, July 2019, Journal
An Effective Technique for Determining Fish Freshness using Image Processing: ICECEIC-2019, Conference