Shasa Antao

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EDUCATION

CARNEGIE MELLON UNIVERSITY - SCHOOL OF COMPUTER SCIENCE — Pittsburgh, PA
Master of Science in Robotic Systems Development — Aug 2019 - May 2021

Selected Coursework
Computer Vision, Geometric methods in Vision, SLAM, Machine Learning, Visual Learning & Recognition, Computer Graphics

AMRITA UNIVERSITY — Bangalore, India
Bachelor of Technology in Mechanical Engineering — Aug 2013 - May 2017

WORK EXPERIENCE

ALERT INNOVATION — North Billerica, MA
Machine Vision Intern — Jun 2020 - Aug 2020

- Developed a "Product Dimensioning" algorithm in Python using point cloud information from a Time-of-Flight camera for an automated warehousing application. Product dimensions are calculated with millimeter precision and a max error of 15%
- Created approach that trims the point cloud to a specific region of interest, uses RANSAC to calculate the base plane equation of the tote, and uses Principal Component Analysis (PCA) to establish the axes of measurement

ROBERT BOSCH — Bangalore, India
Product Development Engineer — Sep 2017 - Jun 2019

- Oversaw the development of a Deep Learning based Aerial Crop Protector to identify and accurately spray weeds. Applied business model innovation and customer development techniques in the project
- Established an internal start-up using a customized accelerator program from University of California, Berkeley

PROJECTS

Object Detection with One Shot Learning on 3D Data (Link) — CMU | Feb 2021 - May 2021

- Changed the architecture of VoxelRCNN that takes in point cloud data, to be able to perform one shot learning
- Novel use of non-local feature map generation by performing block matching on query and target 2D feature maps

Depth Estimation-aided Monocular SLAM — CMU | Feb 2021 - May 2021

- Integrated VNL, a depth estimation CNN, with ORB SLAM3 to boost accuracy of monocular SLAM systems.
- Increased trajectory tracking accuracy by 23% over traditional RGB SLAM, when tested on TUM- RGBD dataset

Autonomous Driving for Adverse Perceived Terrain (Link) — CMU | Oct 2019 - Dec 2020

- Augmented a $1/5^{th}$ scaled vehicle with a custom built enclosure that can perceive wet road conditions, localize itself, and autonomously plan and navigate extreme traversals
- Implemented geometry-based puddle detection algorithm using polarization filters on a ZED stereo camera obtaining image features from disparity map and a Gaussian Mixture Model (GMM) classifier
- Setup working compute environment on NVIDIA Jetson Xavier, on-board computer for the autonomous vehicle

Fast and Accurate Camera Pose Estimation in Dynamic Scenes — CMU | Aug 2020 - Dec 2020

- Observed the change in performance of a geometry-based object-level pose estimation method with use of different instance segmentation masks (Mask R-CNN, YOLACT and BlendMask)

Single View Geometry and Multi View Geometry — CMU | Aug 2020 - Dec 2020

- Detected vanishing points in outdoor and indoor scenes for camera auto-calibration
- Built a 3D reconstruction pipeline using Structure from Motion (SfM) and Stereo Matching

3-Revolute Orientation Sensing Mechanism — AMRITA | Jan 2014 - May 2017

- Conceptualized passive balancing using counterweights in a prototype of a novel orientation sensing mechanism
- Designed, fabricated, and tested prototypes to validate the theory of the manipulator concept

PUBLICATIONS

- "Applications of a 3-Revolute Orientation Sensing Mechanism (3-ROSM) in Controlling a Camera"; ***Antao, S. A.*** , Nair, V. S., Chittawadigi, R. G., **5th IFToMM International Symposium on Robotics & Mechatronics (ISRM2017),Australia** ,(2017)
- "Passive Balancing of a Novel 3-R Orientation Sensing Mechanism"; ***Antao, S. A.*** ,Vishal, S., Rajan, S., Nair, V. S., Chittawadigi, R. G., **8th Asian Conference on Multibody Dynamics (ACMD 2016), Kanazawa, Japan** ,(2016)

SKILLS

Programming: Python • C++ • Matlab • OpenCV • Open3D • Pytorch • scikit-learn • ROS
Project Management: Git • Jira • Confluence • Bitbucket
Software: SolidWorks • Fusion 360 • Eagle • Ultimaker Cura • Linux (Ubuntu, CentOS)