

Shasa Antao

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EDUCATION

CARNEGIE MELLON UNIVERSITY - SCHOOL OF COMPUTER SCIENCE
MASTER OF SCIENCE IN ROBOTIC SYSTEMS DEVELOPMENT

PITTSBURGH, PA
May 2021

SELECTED COURSEWORK

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

CAPSTONE PROJECT: AUTONOMOUS DRIVING FOR ADVERSE PERCEIVED TERRAIN

- Project advised by John Dolan, Dimitrios Apostolopoulos and David Held
- Worked on a 1/5th 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

CURRENT PROJECT: OBJECT DETECTION WITH FEW SHOT LEARNING ON 3D DATA

- Changing the architecture of PointRCNN that takes in point cloud data, to be able to perform few shot learning
- Optimizing the sparsity of input 3D data to maximize the performance of a few shot learner

CURRENT PROJECT: MULTI-ROBOT COLLABORATIVE SLAM IN THE WILD

- Implementing an ORB-SLAM3 pipeline to use non-overlapping visual data to generate maps of GPS-denied environments.

PROJECT: FAST AND ACCURATE CAMERA POSE ESTIMATION IN DYNAMIC SCENES

- 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).

PROJECT: SINGLE VIEW AND MULTI VIEW GEOMETRY

- 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.

AMRITA UNIVERSITY

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

BANGALORE, INDIA
Aug 2013 - May 2017

CAPSTONE PROJECT: 3-REVOLUTE ORIENTATION SENSING MECHANISM

- 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

WORK EXPERIENCE

ALERT INNOVATION

MACHINE VISION INTERN

NORTH BILLERICA, MA
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.
- 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

PRODUCT DEVELOPMENT ENGINEER

BANGALORE, INDIA
Sep 2017 - Jun 2019

- Team lead for 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
- Founding member of an internal start-up using a customized accelerator program from University of California, Berkeley

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), Sydney, 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)

Languages: Japanese