Kautilya Chenna

Contact Information

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Skills

Languages: C++, Python, MATLAB.

Tools: PCL, ROS, Gazebo, OpenCV, Tensorflow, Keras, SQL.

Robots: KUKA LBR4+, Rethink Robotics Baxter, SimLab's Allegro Hand, Quanser HD2.

Education

University of Utah, Salt Lake City, Utah — GPA: 3.40
Master of Science in Robotics — **Aug 2016 – Aug 2018**

BMS College of Engineering, Bangalore, India — GPA: 3.52
Bachelor of Engineering in Mechanical Engineering (Robotics) — **Sept 2011 – May 2015**

Relevant Coursework: Probabilistic Modeling, 3D Computer Vision, Artificial Intelligence, Motion Planning, Machine Learning, Robotics, Robot Control and System Identification.

Publications

"Planning Multi-Fingered Grasps as Probabilistic Inference in a Learned Deep Network"; Qingkai Lu, **Kautilya Chenna**, Balakumar Sundaralingam, Tucker Hermans; *International Symposium on Robotics Research (ISRR),* 2017. [PDF] [CODE]

Experience

Learning Lab for Manipulation Autonomy (LL4MA Lab), University of Utah
Graduate Research Assistant — **August 2016 – present**

- Built a fast object detection and tracking pipeline, which is used by multiple teams in the Lab.
- Implemented Grasp Controllers and end-to-end Grasping Pipelines with motion planning and execution.

NMCAD Lab, Indian Institute of Science
Research Intern — **January 2015 – July 2016**

- Worked on the design and fabrication of a Flapping Wing Micro Aerial Vehicle (MAV).
- Developed autonomous navigation and collision checking algorithms for the MAV.

Selected Projects

Extrinsic Calibration of Stereo Camera and Velodyne LiDAR — **June 2018**

- Developed a ROS package to automate calibration between Velodyne VLP-16 and ZED stereo camera.
- Reduced the mean point to point error by **72%** compared to manual feature based calibration.

Real-time Semantic Segmentation on Low-Power Android Devices — **May 2018**

- Developed a fast background subtraction for portrait video based on modified **SegNet** model.
- Model achieved a **mean IoU of 87.3% at 30 FPS** on Google Pixel 2.

Estimating Depth from a single image using FCN Network — **March 2018**

- Implemented a modified **FCN Net** and trained it on NYU Depth Dataset and KITTI Dataset.
- Model achieved a mean **RMSE error of 0.294** on NYU Depth and **0.312** on KITTI Dataset.

Object Detection and Segmentation in Point Cloud data using PointNet — **January 2018**

- Trained modified **PointNet** model on **YCB object dataset** and **BigBird dataset**.
- Model runs at **24 fps** on a NVIDIA GeForce 1060 GPU with an accuracy of 88.3%.

Grasp Collision detection using Convolutional Neural Networks — **Ongoing**

- Developed a CNN model to detect collisions btw robot and environment using PointClouds and JointState.
- Model classifies collisions with an **accuracy of 84.7%** and is ~30% faster than FCL.

Simultaneous Robot State Estimation and Object Tracking — **December 2017**

- Implemented an **Extended Kalman Filter** algorithm to estimate the object pose from noisy JointState.
- Used a **Gaussian Mixture Model** to plan a trajectory for Baxter arm to the object for grasping.

Video Action recognition using Deep Learning — **October 2017**

- Implemented a **Bi-Directional LSTM Model** on **VGG16** Net using Keras to classify actions in scenes.
- Achieved a Mean Average Precision of **15.7 mAP** compared to the State of the Art of 21.4 mAP.

Autonomous Grasp Inference and Execution using Baxter and KUKA lwr4 Robots — **January 2017**

- Designed an end-to-end grasping pipeline to grasp objects on a table autonomously.
- Training data was collected in Gazebo simulation and tested in real world. [ISRR 2017]

Others: Motion Planning: TrajOpt, RRT and Variants, RealTime RRT*; Image Segmentation with GMM, Image De-noising using MRF;

Links

Website: https://chenna.me **Linkedin**: kautilyachenna **Github**: hashb