Announcing the Final Examination of Md Shahriar Iqbal for the degree of Master of Science

Title: Learning to grasp unknown object using Random Forest Algorithm with selective image and point cloud features

This method demonstrates an approach to determine the best grasping location on an unknown object using Random Forest Algorithm. It uses RGB-D value of an object as input to find a suitable rectangular grasping region as the output. To accomplish this task, it uses a subspace of most important features from a very high dimensional extensive feature space that contains both image and point cloud features. Usage of the important features enable the system to be computationally fast while preserving maximum information gain. In this approach, the Random Forest operates using an optimum number of trees which ensures optimization in learning with highest possible accuracy in minimum time in an advanced practical setting. The Random Forest Algorithm chosen over Support Vector Machine (SVM), Decision Tree and Adaboost for implementation of the grasping system outperforms the stated machine learning algorithms both in training and testing accuracy and other performance estimates. The grasping system utilizing Random Forest Algorithm detects the rectangular grasping region after selecting the top rectangle that has the largest feature value. The system is tested after creating a 3D model of the object whereas grasping is performed with a Baxter Robot in a simulation environment.

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Bachelor’s of Electronics and Communication Engineering, BS, 2011, University of Dhaka

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Approved for distribution by Aman Behal, Committee Chair, on November 4, 2014.

The public is welcome to attend.