

# UNIVERSITY OF SOUTH FLORIDA

## *Defense of a Master's Thesis*

*Predicting the Number of Objects in a Robotic Grasp*

by

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*For the MSCS degree in Computer Science*

*Picking up the desired number of objects at once from a pile is still very difficult to do for a robot. The main challenge is predicting the number of objects in the grasp. This thesis describes several deep-learning-based prediction models that predict the number of objects in the grasp of a Barrett hand using the tactile sensors on its fingers and palm and its joint angles and torque (strain gauge) readings. The deep learning models include various architectures using autoencoders and vision transformers. We evaluated the models with a dataset of grasping 0, 1, 2, 3, and 4 spheres. Then, we train the model using the dataset generated from the simulation system and use it on real-system data through transfer learning. Finally, we predict the number of objects a robot might have grasped before lifting the hand. We achieved an overall accuracy of 79% on the simulation and 60% on the real system dataset.*

*Friday, March 11, 2022*

*12:00 PM*

*Online (Microsoft Teams)*

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**THE PUBLIC IS INVITED**

*Examining Committee*

*Yu Sun, Ph.D., Major Professor*

*Shaun Canavan, Ph.D.*

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*Robert Bishop, Ph.D.  
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