Developments in machine learning and computing capability in recent years have created opportunities that were previously not cost effective. One such area is image recognition and computer vision. In general, this is the process in which a machine analyzes a digital image and decides how to classify the information. After classification, the machine can pass the information off to a different algorithm for other decision making. However, before a machine can classify parts of an image as a human does, it must break down the image in a process called image segmentation. The way the machine can complete this task is an open research area. Many algorithms exist to determine just how a machine will decide to group the pixels in an image. This research poster details a validation study of related papers on image segmentation algorithms for machine learning. The first author has selected three different image segmentation approaches to be tested against one another. Algorithms for this study will be reproduced in Python and utilize many pre-existing libraries. The use of pre-existing libraries should improve the later utility of our findings. Our team has acquired a small robotic research platform to provide a real world effectiveness evaluation of our research. A Robot Operating System (ROS) based turtle-bot type robot will be assembled and tested with the three different algorithms to assess their real-world effectiveness. Given that ROS has been used on multiple robotic platforms, our algorithm study may lead to further research for other related applications. Many fields have great use for computer vision, including human assistive glasses, in home robotics, and smart homes. Because of the many areas of applications for computer vision, an improved understanding will be beneficial for many future applications and the people who use them. Additionally, this undergraduate research study opens opportunities for students to work with and learn from sophisticated code and problem solving techniques first-hand. These types of skills will be beneficial for students that explore research careers in this area with NASA or other technical leaders.

This research was funded in part by the Dr. Snowden Memorial Scholarship with the NASA Oklahoma Space Grant Consortium. This material is based upon work supported by the National Aeronautics and Space Administration issued through the Oklahoma Space Grant Consortium.