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Author: Mr. Belyeud Prado
Universidad Nacional de Ingeniería (Lima, Perù), Peru

Mr. Paulo Cesar Romero Aguilar
Universidad Nacional de Ingeniería (Lima, Perù), Peru
Mr. Diego Martin Arroyo Villanueva
Universidad Nacional de Ingeniería (Lima, Perù), Peru
Mr. Brayam Donayre Farfan
Universidad Nacional de Ingenieria, Peru, Peru
Mr. Freddy Dick Salazar Valverde
Universidad Nacional de Ingeniería (Lima, Perù), Peru

PERFORMANCE ANALYSIS OF SEGMENTATION MODELS OF COMPUTER VISION AND ITS INTEGRATION WITH ROS TO PICK UP ROCKS AND MINERALS USING A ROBOTIC ARM IN MARS

Abstract

In this paper, it focuses on a complete evaluation study of performances, in a Jetson Nvidia, when integrating Computer Vision segmentation models in a robotic arm using ROS. The main objective is to determine which model is more efficient to improve performance and speed in a robotic arm for future explorations on Mars. The algorithms to be evaluated are the latest version of YOLO (YOLOV9), DinoV2 and Fast-SAM. These models were trained with several images of rocks and minerals characteristic of Mars and the number of images was increased with Data Augmentation techniques to have better results. The first results indicate a significant improvement in performance and response time of the robotic arm since it segments the object to be picked up much faster. These results offer a valuable resource to consider for future explorations on Mars.