Autonomous Paddock Mucking Robot

Longhopes Donkey Shelter

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Background Information

Located in Bennett, Colorado, Longhopes Donkey shelter was founded in August 1999. Kathy Dean and her husband Alan Miller have an unwavering passion to rescue unwanted donkeys, often destined for slaughter. Kathy recognized the need for a dedicated facility where donkeys could receive rehabilitation and training until suitable homes were found. A testament to their dedication, Longhopes became the first donkey shelter in the United States to be accredited by the esteemed Global Federation of Animal Sanctuaries. This prestigious recognition affirms their adherence to the highest standards of animal care and welfare. A critical component of humane animal care is keeping their environment clean of excrement. The donkey paddocks require daily attention to remove manure.

Project Goal

The ultimate goal is an autonomous paddock mucking robot. The robot will be a combined effort of CSCI 370 and EDNS 490/491 Capstone students. It will be equipped with LiDAR and cameras and be controlled with a Robot Operating System (ROS). The robot will identify, pick-up and deposit manure in the paddock. The robot will operate in the paddock with donkeys present so it is imperative that the robot does not have contact with the donkeys.

The first step during Summer 2024 was to identify donkey manure and create a preliminary ROS environment. Still to be determined is the ROS platform and the LiDAR and camera hardware.

Fall 2024 CSCI 370 Objectives

- Identify required hardware for operating system
- Identify periphery hardware such as LiDAR, cameras and sensors
- Create a code suite to identify the different paddocks
- Create a code suite to map paddocks of obstacles including donkeys
- Create a code suite to identify the manure drop location
- Create a code suite to scan the entire paddock for manure
- Create a code suite to maneuver robot and operate mechanism
- Integrate the above code modules and operate in a virtual environment
- On-site visits to become familiar with the paddock environment
- At the end of the field session, a code base to operate camera, LiDAR and mapping features should run in a virtual environment and be portable to actual hardware. As the Capstone 491/492 develop the hardware the software will be ported to the system.

Suggested Review:

https://longhopes.org/ – client website