

Elderly Assistance Storage and Retrieval Robot (EASR)

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PROBLEM STATEMENT

EASR was created with the goal of assisting senior citizens, a growing group at-risk of limited mobility and injury, with the safe storage and retrieval of their personal items.

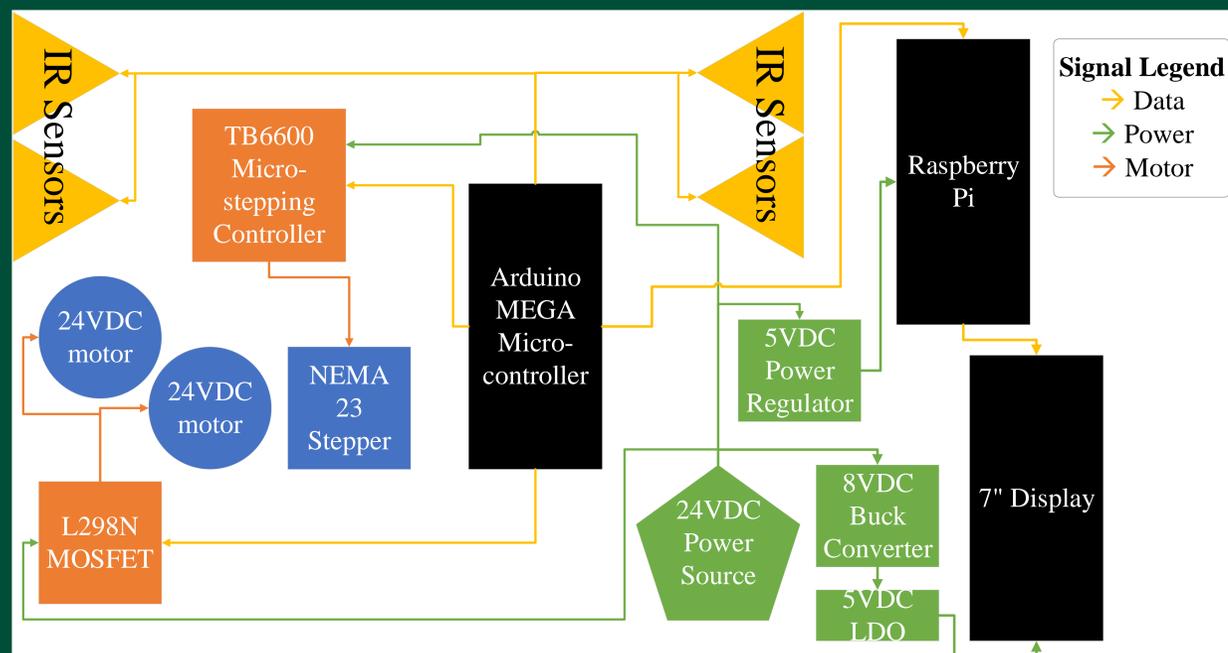


Figure 1: Block diagram of the software and hardware interconnections

BACKGROUND

A slip or fall for an older person can be potentially fatal. Although having an in-home helper can greatly reduce the risk of catastrophic injuries amongst this group, many older Americans often find themselves without any help due to monetary restraints and other practical limitations. We feel a solution may be provided from the field of robotics. Here, a robot laborer is proposed, specified, and detailed, for the purpose of bridging the gaps in care. Ultimately, we plan to deliver a semi-autonomous robot, capable of simple object retrieval and storage. This will allow those in need of assistance a reasonable alternative to an in-home caregiver with the added benefit of keeping their personal belongings organized and easily accessible.

SUMMARY OF WORK

The robot's prototype started with the assembly of the chassis and lifting arm. After the basic hardware was finished, the pathing logic was iteratively developed until it could perform its duties. An Arduino Mega served as the primary logic controller and I/O hub of the robot, tying together all of the elements – the motor controllers, the IR sensors, and GUI. The GUI was made in Python 3 using the Tkinter library to create a simple, image-based interface. It is run on a Raspberry Pi, assisted by a basic webcam to provide a visual gallery of the items stored in the system.

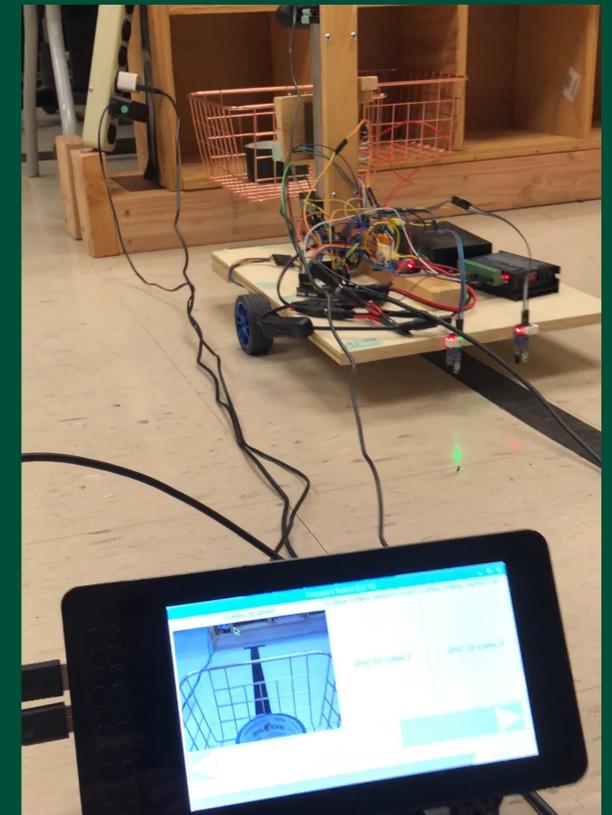


Figure 2: EASR in action

IMPACT ON COMMUNITY

Americans above the age of 65 are the largest growing demographic in the country. As this population group continues to expand, the need for assistant robots such as EASR will grow as well. The EASR project has the added benefit of helping others who have similar needs, such as:

- People with disabilities which reduce their mobility.
- People with neurological diseases or damage who have trouble remembering where they placed their belongings.
- People or companies who need a way of managing items & inventory semi autonomously.