



THE ELDERLY ASSISTANCE DEVICE

E.A.D

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E.A.D

The Elderly Assistance Device (E.A.D)

For my project I constructed an assistance robot. My device aims to improve independence and accessibility for those with mobility issues. 15% of the world is disabled or in a wheelchair, this means this makes them in able to do basic things for example carry, lift and clean. My robot, E.A.D, assists people with mobility issues by doing these activities for them.

Aim: To create an easy to use assistance robot to help the elderly and disabled.

I was inspired to do my project as I saw how hard it was for less mobile people to do basic tasks. So I thought of a robotic solution, this was E.A.D. E.A.D is designed to come to you or to follow you around. It is capable of hoisting up objects and carrying them.

The two main problems that I encountered whilst creating my robot are as follows.

1. Design:

Design was made challenging as I had to consider three essential factors. These being design, size and weight.

I was also challenged by the lifting mechanism and the programming.

The construction of the casing demanded precision. The hoist and my cables were only a certain length therefore, I had to carefully measure the length of the cables before drilling holes. This was to ensure that they could reach the motors and sensors and could centre the hoist.

2. Weight.

The issue that was most prominent was the weight of the body and frame. I learnt that it was crucial that it be light enough to be supported by the tracks. It also had to be proportioned properly to prevent it from falling.

E.A.D is made of recycled wood, pipe lines and an old dust pan.

I also used the EV3 Mindstorm infrared sensor, four motors, colour sensor, touch sensor, ultrasonic sensor, lego power function lights, mindstorm parts such as axles and gears and EV3 program. The function of these are listed below.

1. **Ultrasonic sensor.** This sensors purpose is to when it sees an object on the floor it will immediately pick it up. This will prevent tripping on fallen objects you do not know about and will help clean the floor.
2. **Touch sensor.** If in the event it crashes the axle will press the touch sensor causing the robot to reverse. This is to avoid any further damage.
3. **Lights.** The lights purpose are to provide better visibility in dark areas.
4. **Infrared Sensor.** The infrared sensor has two purposes The first one is to track the beacon remote and follow it when turned on. The secon it to play a beep as a safety measure in the event it is too close to an object.
5. **Colour Sensor.** The colour sensor is so when it recognises a colour it will automatically go to lift it. This can be used in setting E.A.D around the house to pick up items.
6. **EV3 program.** The EV3 program is what I used to code my robot.

HOW DOES IT WORK?

In order for E.A.D to move you must use the remote. This in turn creates a beacon which follow you as you move. The remote also assists you in hoisting up objects and holds them on a platform. The use of colour sensor means it can identify the colour of pills. The infrared sensor helps prevent a crash. The brick will beep as a safety measure thus preventing it from crashing. Once the touch sensor is pushed it will reverse.

SUGGESTED USE

The E.A.D device may be of use whether you are living at home or with a partner. The design is recommended for people who are less mobile or over the age of 80.

RESEARCH

My research involved the following:

1. Programming

Prior to this project my knowledge of EV3 programming was limited. Therefore, before and throughout the process of creating E.A.D I took part in many online courses.

2. Hardware Skills and use of tools

The project challenged me to develop new skills. To build the model I had to learn to use a variety of different hardware tools such as the ones listed below.

1. Hack saw

2. Power drill
3. Hammer
4. Wrench

HOW DO YOU USE THE ELDERLY ASSISTANCE DEVICE?

E.A.D is controlled by an app that I programmed. One of the joystick is used to hoist up objects and carry them. While the other joystick controls the wheels.

WHAT DID YOU LEARN?

During the creation of E.A.D I learnt a variety of new skills. The major skills can be classified under the following categories.

Programming.

In programming I learnt about loops, variables and waits.

Construction.

I had to apply mathematics and physics to my construction and design. I was also able to learn the skill set needed for construction e.g. sawing.

WHAT WOULD YOU DO DIFFERENTLY NEXT TIME?

I have thoroughly enjoyed and felt challenged creating and designing E.A.D. However, with my new knowledge of coding I would make E.A.D more complicated and incorporate more auto-pilot features.

THE FINAL PRODUCT



A LABELED MODEL OF E.A.D.

