Portable Conveyor Belt

A portable conveyor belt is a versatile and efficient tool used in various industries for easy transportation of goods. This technology has revolutionized the way materials are handled, making tasks more time-efficient and reducing physical strain on workers.

Components of a Portable Conveyor Belt:

- The stepper motor is a critical component of the portable conveyor belt. It converts electrical pulses into precise mechanical movement. Stepper motors are widely used in automation systems due to their high torque and ability to move in small increments.

- The A4988 driver is a motor driver module that controls the stepper motor's operation and responsible for converting electrical signals from the Arduino into precise motor movements and regulates the current flowing through the motor coils, ensuring accurate positioning and smooth operation also provides features like micro stepping, which allows for finer control and smoother motion.

- The Arduino microcontroller is the brain of the portable conveyor belt system. It acts as the interface between the user and the conveyor belt, receiving commands and controlling the stepper motor through the A4988 driver.

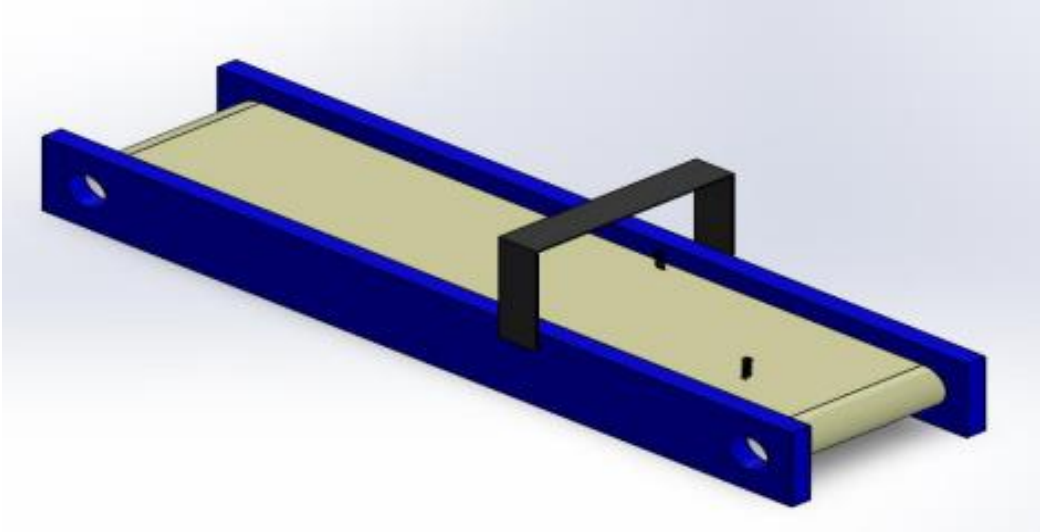
- The IR sensor modules play a vital role in the conveyor belt's operation. They detect the presence of a product on the belt by emitting and receiving infrared signals.

Other components

8mm linear shaft	2-Rollers
GT2 timing belt	Several screws and nuts
Stepper cable	Custom length time belt
Stepper pully	2 IR sensor module
Wooden body	Power supply 10V 2A

- The camera fixed on the conveyor belt enables image capture for further processing. It is used in conjunction with the Arduino and MATLAB to perform image analysis and apply relevant algorithms for quality control and product verification.

How it works



Conveyor Belt Operation

1. When the conveyor belt is powered on, the stepper motor receives a signal from the Arduino to start rotating. This causes the belt to move continuously.
2. As the products move along the conveyor belt, the IR sensor modules detect their presence. When an IR sensor detects a product, it sends a signal to the Arduino.
3. Upon receiving the signal from the IR sensor, the Arduino stops the conveyer for 2 seconds and triggers the camera to capture an image of the product which is Pepsi can here in this period.
   The image is then sent to MATLAB for further analysis and processing using image processing algorithms.
4. MATLAB analyzes the captured image using the implemented algorithms to determine whether the product is valid or invalid.
   MATLAB sends a result signal back to the Arduino indicating the product's status.

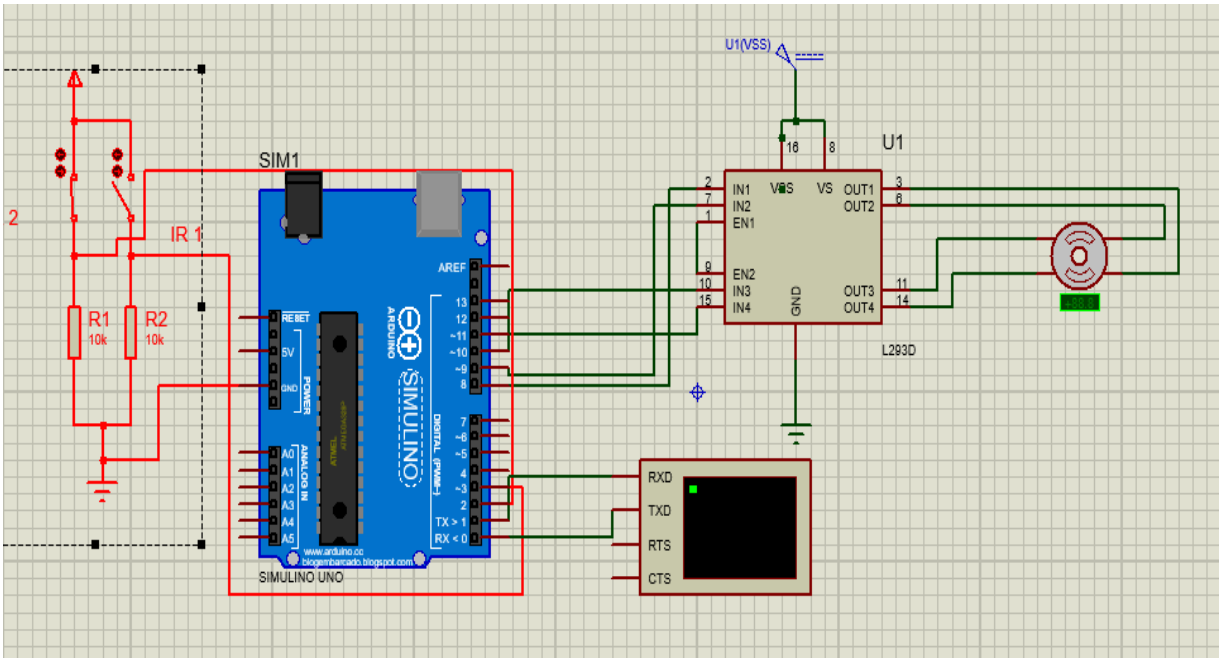
5. Conveyer will stop at second IR sensor module for 15 sec waiting the robot arm to deliver the product to the garbage if it is in valid or other working station if it is valid.
6. The conveyor belt continues its operation, repeating steps 2 to 6 for each product detected by the IR sensor modules.
   This allows for continuous material handling and quality control throughout the process.

Assembly Process

1. Begin by mounting the stepper motor securely to the conveyor belt frame. Ensure that it is aligned properly and can rotate freely. Next, connect the A4988 driver to the stepper motor using the appropriate wiring from datasheet.
2. Connect the Arduino microcontroller to the A4988 driver using jumper wires or a compatible connector.
   Ensure that the connections are secure and correctly aligned according to the pin configurations specified in the manufacturer's documentation in datasheet.
3. Position the IR sensor modules on the conveyor belt frame, ensuring they are aligned with the product's expected location.
   Connect the sensor modules to the Arduino using jumper wires, following the provided pin configurations.
4. Mount the camera securely above the conveyor belt, ensuring a clear view of the products. Connect the camera to the Arduino using the appropriate interface, such as USB or GPIO or built in camera, based on the camera's specification.
5. Connect the power supply to the conveyor belt system, ensuring the voltage and current ratings are compatible with the components.
6. Power up the system and upload the necessary code to the Arduino microcontroller.

The code should include instructions to control the stepper motor, communicate with the IR sensor modules, and interface with the camera and MATLAB.

Wiring



Code

Appendix A