ABC Smart Projector

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EGN 4952C Engineering Design 2

Introduction

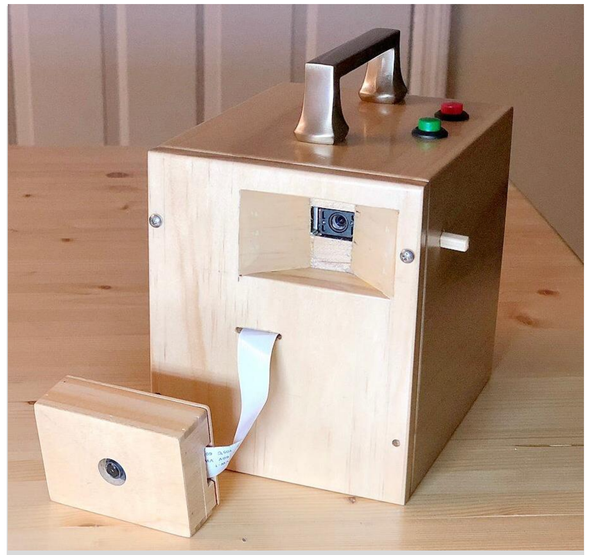
Smart Projector recognizes real word objects and projects meaningful information about the objects. The device is intended for use in a classroom environment. Students can move around and explore information on different objects with the device. This device is small, compact and affordable, it is easy to use for both teachers and students. Students can only use the device for learning, and projecting the information, which interested them. No more distractions to young children by other smart Internet devices such as tablets, and smartphones. Now students can get more excited to move around and learn.

Requirements

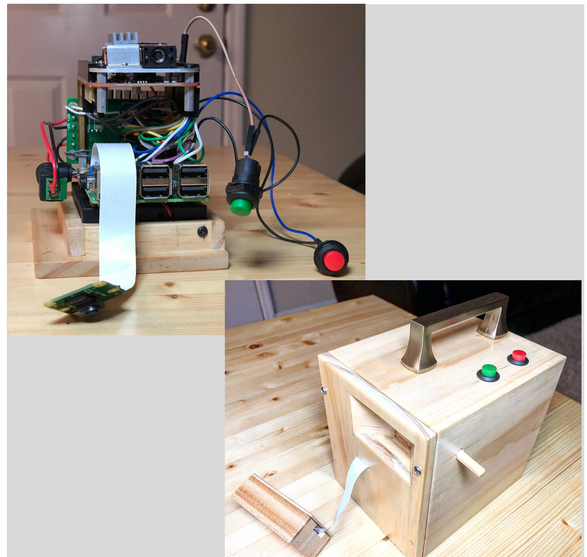
1. Battery power and connection to the internet.
2. Identify objects with the camera in real time.
3. Retrieve descriptions of objects.
4. Project out the descriptions of the object and focus the image.

Specifications

Material: wood, metal, and plastic
Weight: 500g
Dimensions: 5.5” x 5” x 4.25”



The ABC Smart Projector design includes all the major components as well as an electronic housing which contains the Raspberry Pi, DLP Light Crafter 2000, Pi Camera, and batteries.



The disassembly view of ABC Smart Projector includes the base made from custom wood housing the electronics. The top view shows the power buttons, and the handle. Lastly the side view has the focus pin for the projector.

Top View

Camera View

Front View

Left pic: Press green button to turn on the device
Middle pic: Point at the object and
Third pic: project definition, focus the image if needs be, and press the red button to shut down.

Overview of the ABC Smart Projector System

ABC Smart Projector operates by using a Pi Camera connected to the Raspberry Pi, which processes the camera image with OpenCV (Computer Vision Library). Then utilizes Tiny Yolo (Real-Time Object Recognition) to recognize the object in the camera’s field of vision. The name of the object detected is sent back to the control unit and Wikipedia API is used to search for the definition. The DLP Light Crafter 2000 Projector then project out the definition of the object.

Results

ABC Smart Projector outputs the search result with the object definition along side a small display of the objects being detected.