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Building an Affordable Smart Home Based on the Internet of Things

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Introduction

The Internet of Things (IoT) is made up of multiple Internet-connected devices with sensors. A smart home is one where you can control household devices remotely.

There are currently several smart home systems on the market. Some of the more popular ones include Google Home and Amazon Echo. However, both these systems are very expensive and only control devices that are compatible with them. For someone wanting to keep costs low and control devices they already have, Google Home and Amazon Echo are not practical options.

Our team has created a low cost smart home system which interfaces with devices people already have. Our system can turn on and off lights and fans, open and close blinds, and take pictures and videos from a security camera. A user can interact with our system using a web application that we developed.

Contribution

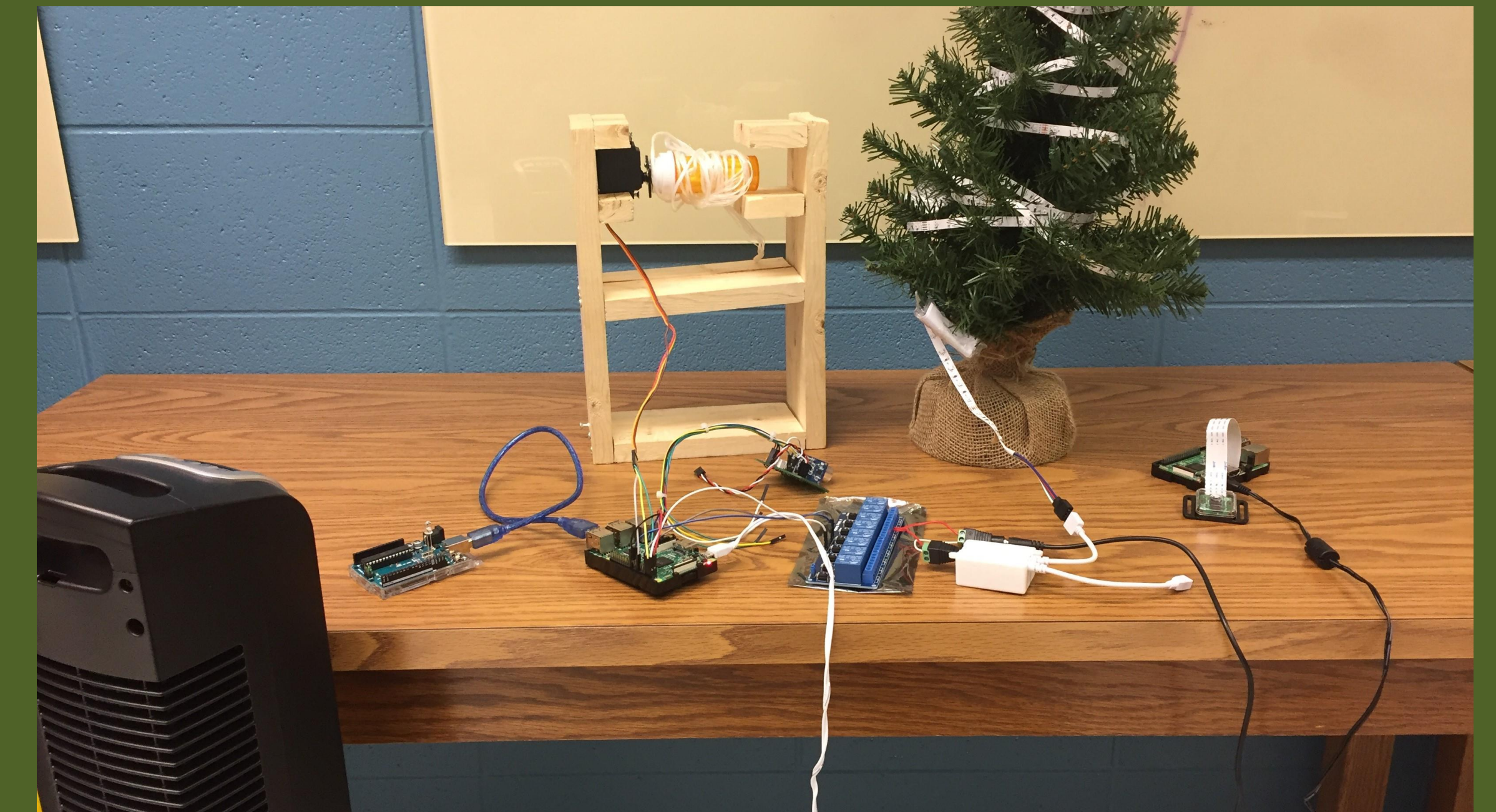
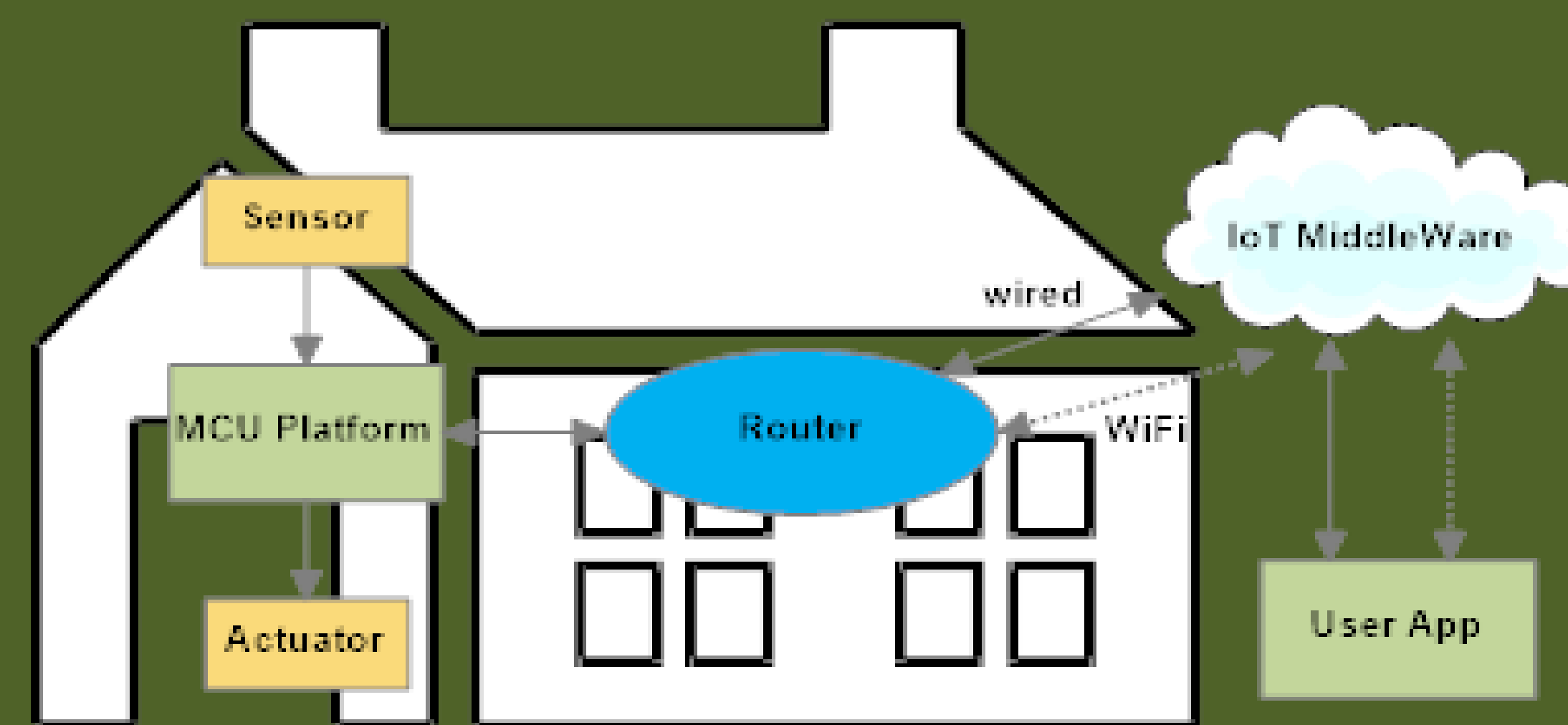
The main contribution of this research is to build a basic, affordable smart home system that, with a few modifications, can be used with most lights, blinds, and fans already in many homes, based on the technologies of the IoT. It also serves as a starting point for a more advanced system that controls more devices and provides more security alerts.

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Design



Design Components

The MCU platform used is a Raspberry Pi 3 Model B, which hosts a website and interfaces with sensors and actuators. The sensors include a temperature sensor and a security camera. The actuators are lights, blinds, and a fan. To obtain the high quality live camera feed, we use another dedicated Raspberry Pi to collect camera data. An Arduino interfaces with the fan. The user application is a web browser in the user's smart phone, tablet, or computer. A user can view the data from sensors and control the actuators through the web browser. For example, when a user clicks a button (e.g., "Turn on Light") in the web page, the request is sent to the MCU (i.e., Raspberry Pi), and the MCU interfaces with an actuator (e.g., light) to carry out the user's request.

