

# Noise Detection Security Camera

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## Project Description

We are creating a sound activated camera system to model modern home & camera security systems. The camera will housed be inside a 3D printed box, which is controlled by one Servo Motor. When a sound event occurs, our device will activate, revealing the camera, and taking a picture. The picture taken will then be displayed on a host computer in real time.

## Software

- Rock Pi 4 Libraries: cv2 (OpenCV), imagezmq, mraa (Servo PWM), time, sys, struct, binascii
- Arduino: string, Wire.h, PacketSerial.h

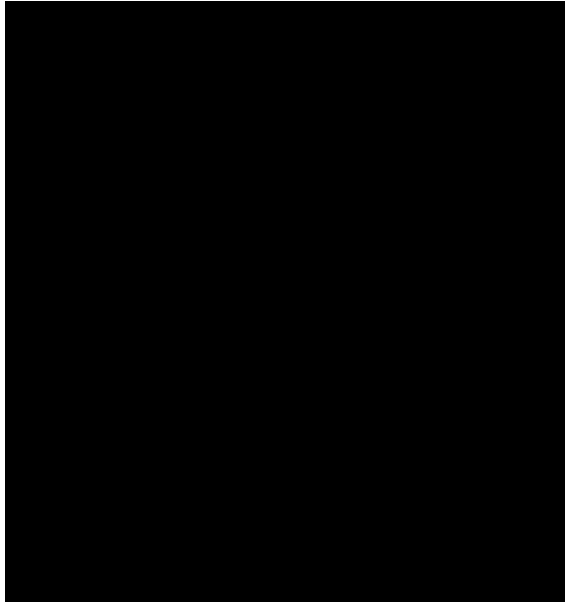
## Hardware Components

- Rock Pi 4B
- Servo Motors
- 3D Printed Box
- Arduino (Itsy Bitsy M0)
- Host Computer
- **Microphone (Adafruit MAX 4466)**

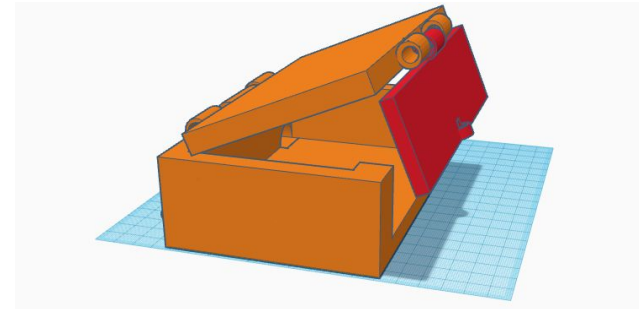
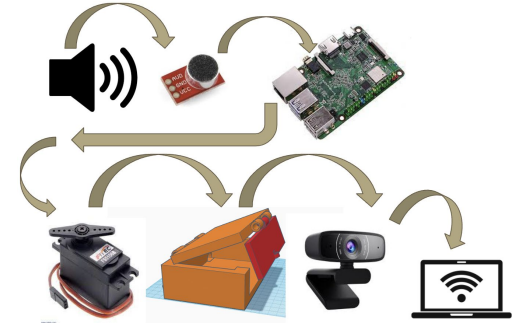


## Problem Addressed

FBI stats reveal that on average there are 2.5 million burglaries in the United States annually. In 2017, 57.5% of these incidents involved forcible entry. Our project helps prevent such attacks and store evidence when they happen.



## Process Flow Chart



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# Junior Design Project: Noise Detection Security Camera

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# Introduction

According to FBI and Safewise stats, You are more likely to be a victim of property crime than any other type of crime. Prevention is your #1 option to reduce your risk of victimization.

Property Crime makes up about 80% of all crime in the US whether it be burglary, larceny, vandalism, or home break ins.

FBI stats reveal that on average there are 2.5 million burglaries in the United States annually. In 2017, 57.5% of these incidents involved forcible entry.

## Incidence of property crimes 2020

Property crime	# of crimes reported	% of all property crime
Burglary	1,035,314	16.0%
Larceny-theft	4,606,324	71.4%
Motor vehicle theft	810,400	12.6%
TOTAL property crimes	6,452,038	-

# Project Overview

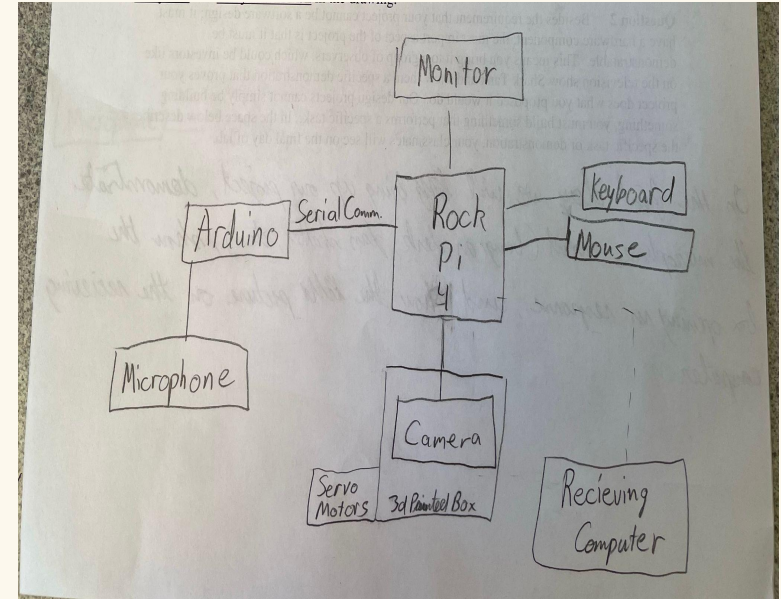
To help address this problem we are creating a sound activated camera system to model modern home & camera security systems. The camera will be inside a 3D printed box, which is controlled by one Servo Motor. When a sound event occurs, our device will activate, revealing a camera, and take a picture. The picture taken will then be displayed on a host computer in real time. Our project helps target and prevent such attacks.

## Inspirations

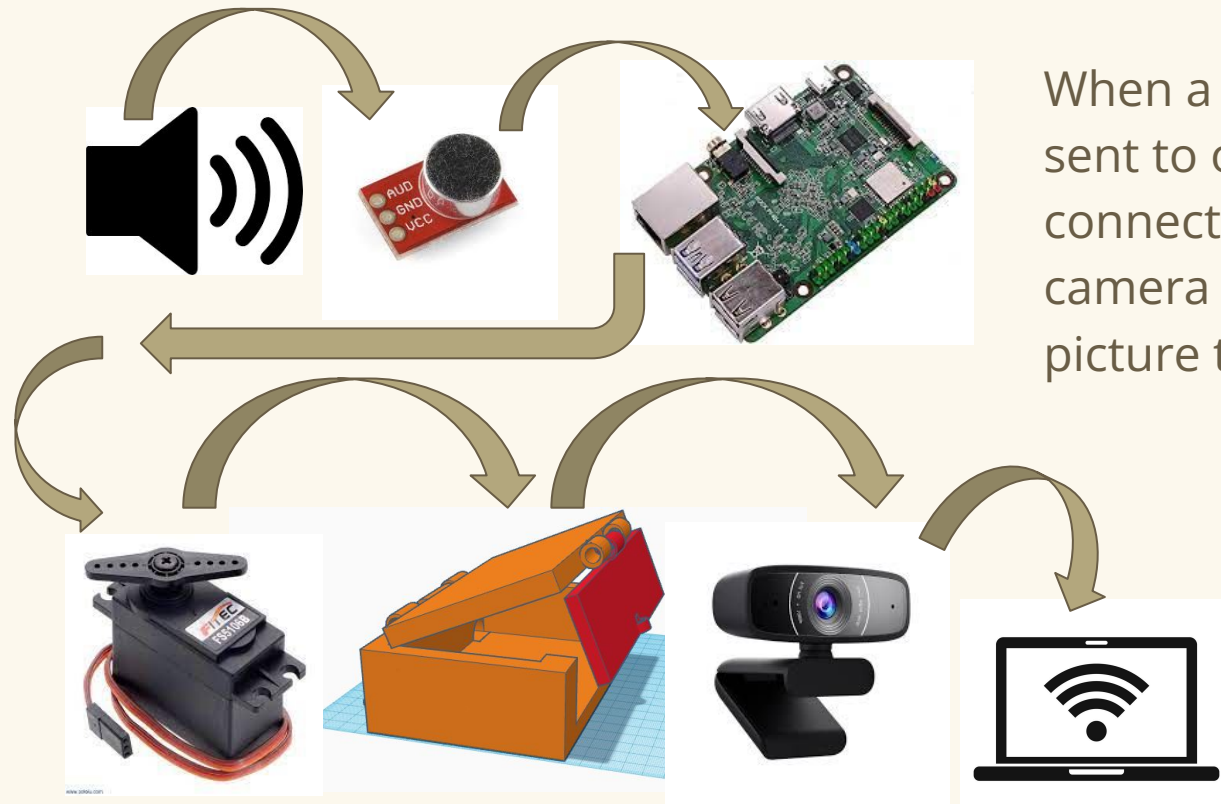
- Smart sensor Doorbell Camera
- Property Security Systems (ADT, Link Interactive, Car Dash Cams)

# Materials, Software & Hardware Layout

- Arduino Microcontroller (Itsy Bitsy M0)
  - Camera (Webcam)
  - Servo Motor
  - Rock Pi 4B
  - Microphone (Adafruit Max 4466)
  - MacBook (Host Computer)
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- OpenCV Python
  - COBS Decoder
  - Imagezmq



# What Will Our Project Do?



When a sound is detected, signal is sent to our computer to move a servo connected to the door. This reveals a camera to take a picture and send this picture to the hosts laptop.

# Real World Applications

Real World Applications of our project are Smart Sensor Doorbell Camera Systems and Home Security Systems. Our design is small and could be modified for use in vehicles as well. Really we can adapt to anything that the user does not want broken into.

Our design has some other great features such as having a hidden camera and storing the image remotely.

# Project Impact

## Pros

- Widespread use will deter crime
- Capable of remotely storing evidence
- Increased peace of mind and reduced stress for users

## Cons

- Data must be handled in a careful, transparent way to protect privacy
- Increased reliance on tech (another IoT device)



# Recap/Overview

We will be creating a sound activated camera system to model modern home & camera security systems.

1. The camera will be inside a 3D printed box, which is controlled by one Servo Motor.
2. When a sound event occurs, our device will activate, revealing a camera, and take a picture.
3. The picture taken will then be displayed on a host computer after being sent through the internet in real time.

# THANK YOU

ANY QUESTIONS?

