

Creative Electronics

Idea

We wanted an advanced alarm, an alarm based on reality that could actually be used. One that is good enough to protect the valuable art of "La Louvre", one of the most famous museums in the world. In this case, our system is used for the best of the best the Mona Lisa. To ensure that nobody can even come close, let alone touch it. We used a pressure sensor. When people come to close a light goes on and when they cross the physical line the alarm is set off. This is impossible to circumvent and can warn the public during the day when they get too close. Therefore this alarm does not only provide safety for the product, but also provides interaction with the public and social control in the form of a light.

When people don't follow the rules and come too close, a light goes on. This addresses people on their behavior and give the public the opportunity to get help if necessary. Beside that we have also integrated a potmeter in this system. This ensures that we can adjust the distance. So that it could be used for different art pieces. Because the distance of the public for less popular pieces would be smaller. As an extra, the alarm is easy to maintain. It can be turned on 24 hours a day and is easy to reset with a button in the control room.

Requirements

- When a person gets too close to the Mona Lisa, the alarm will go off.
- Once the alarm went off, it will keep on until a required action is executed.
- The system needs that are almost getting too close by a certain indication, a lamp or led.
- The 'too close' limit has to be adjustable.

Components

- A buzzer, for the alarm
- A sensor that measures the distance from the Mona Lisa.
- An operational amplifier, to compare the input of the sensor and the limit-value.
- A potmeter, to adjust the limit-value.
- A button to reset the alarm.
- A led, to indicate someone is getting too close.



```
const int ledPin = 13;
const int resetButton = 14;
const int opamp = 15;
const int buzzer = 16;

void setup() {
  Serial.begin(9600);
  pinMode(ledPin, OUTPUT);
  pinMode(opamp, INPUT);
  pinMode(resetButton, INPUT);
  pinMode(buzzer, OUTPUT);
}

void loop() {
  int booleanvalue = digitalRead(opamp);

  if (booleanvalue == HIGH)
  {
    digitalWrite(ledPin, HIGH);
    tone(buzzer, 1000);
  } else if (digitalRead(resetButton) == HIGH) {
    digitalWrite(ledPin, LOW);
    noTone(buzzer);
  }
}
```



Electronics

The potmeter:

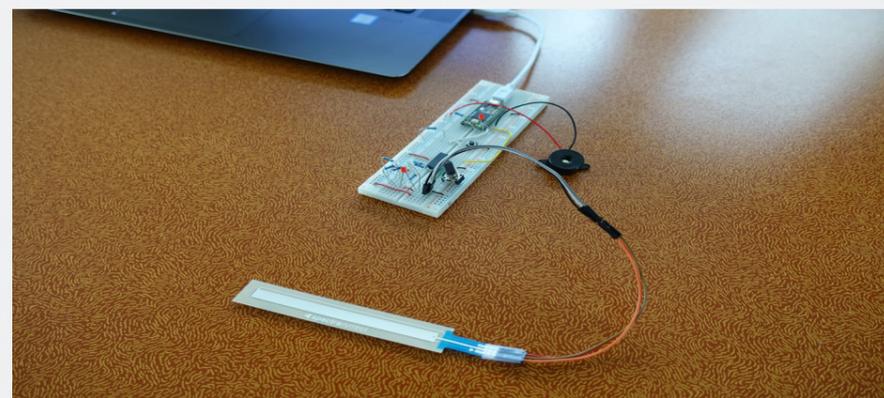
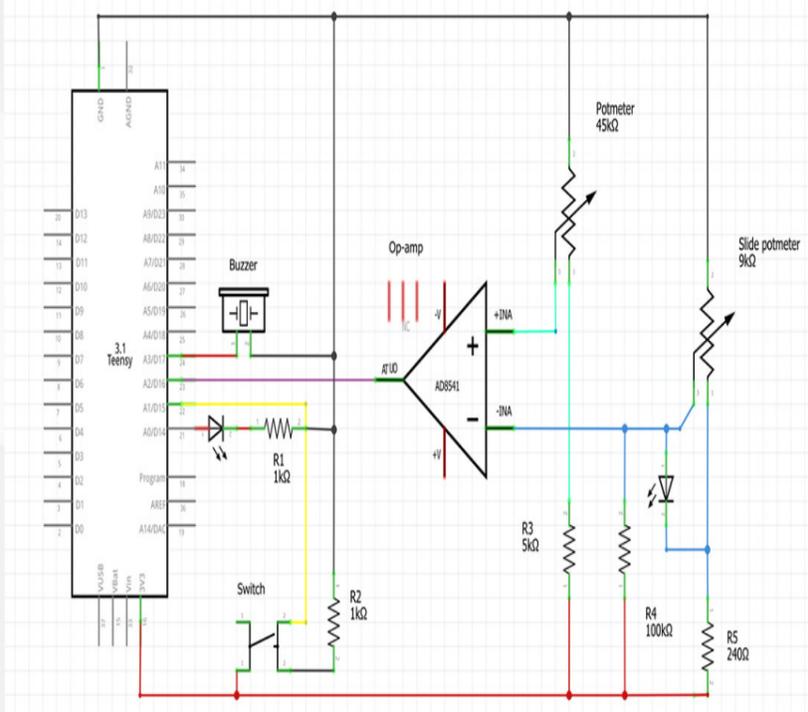
The potmeter is based on pressure and measures how far away something is pressing on the sensor. It is 10 cm long and the datasheet can be found in the appendix.

With these components we made the following scheme.

As you can see, the op-amp compares the values from the slide potmeter and the potmeter. Also the slide potmeter influences the led, the closer a person gets, the brighter the LED becomes. When the slide potmeter exceeds the voltage value of the potmeter, a signal is sent to the teensy.

This signal sets a boolean value to true and then the teensy sends another signal to the LED and the buzzer, to turn them on, and to make sure they stay on, until the button is pressed. When the button is pressed, a signal goes to the teensy, sets another boolean value to true and the teensy stops sending signals to the LED and buzzer, this resets the system.

We used different resistors to make sure the slide potmeter, the potmeter and the LED have about the same range, so we could use the optimal range of each potmeter. And to make sure that the LED had the right voltages. We processed our system into a scale model of the Louvre museum.



Jesse Pepping
Paul Roelen

1254758
1255576