

Two Inspire Manak Winning Awards

Recommended by Ms. Santosh Vyas

The Principal of Sadhu Vaswani International School For Girls, New Delhi, Session 2020-21

Shristi Shukal and Vanshika Dogra of Sadhu Vaswani International School for Girls worked on INSPIRE-MANAK award winning projects individually in the year 2020-21 under the leadership of the Head of the School - **Ms. Santosh Vyas**.

The reputed INSPIRE-MANAK award being executed by the Department of Science and Technology (DST) with National Innovation Foundation – India (NIF) aims to motivate and promote the best ideas and innovations designed and developed by students of classes VI to X nationwide.

Shristi Shukal of IXA, thought about the problem of old age people who may trip and fall in the dark. She tried to solve this problem and came up with the idea of “Automated Lights at home”. She won a cash prize of INR 10,000 under the INSPIRE –MANAK award scheme for her project.

Vanshika Dogra of XB, suggested an “Eco-Friendly Sanitizer for Personal Belongings” in the areas where there is a large footfall like airport, market place and railway station. She too won a cash prize of INR 10,000 under the INSPIRE –MANAK award scheme for her project.

Automated Lights At Home

Shristi Shukal

IX –A, Sadhu Vaswani International School For Girls, New Delhi, Session 2020-21

Objective

To detect human motion in the house during night time and turn on the lights automatically.

Introduction

Infrared waves are not visible to the human eye. In the electromagnetic spectrum, infrared radiation can be found between the visible and microwave regions. The Passive Infrared (PIR) sensor is used to detect the presence of human. **PIR sensor** detects a human being moving around within approximately 10m from the sensor. But this detects the human only if they are in motion. The Grid-EYE sensor detects the human, using the infrared radiation radiated by the human body. Every human radiates the infrared energy of specific wavelength range. Since infrared energy is present and can be detected regardless of the amount of light in the environment, a PIR motion sensor will work just fine in the dark.

Materials required:

- 1 Arduino Uno,
- A **PIR sensor**,
- Jumper wires and
- LED bulb.

Procedure:

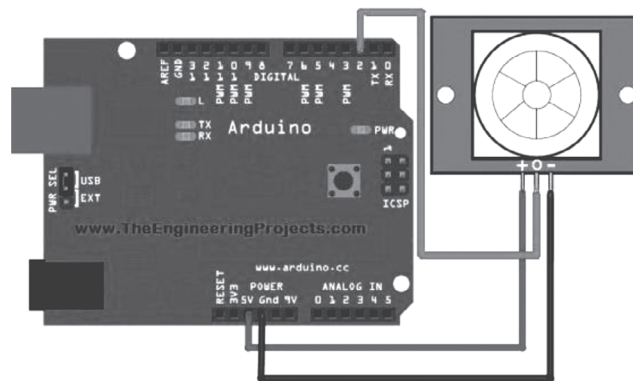
A PIR sensor has only 3 pins – one is Vcc which is a +5 volts input, a ground pin and finally the digital output pin. The steps of the procedure followed are:

1. Connect +5V from Arduino to Vcc of PIR sensor module.
2. Connect a GND from Arduino to ground of PIR sensor.
3. Connect the output pin (marked as ‘out’) to any digital pin of Arduino.
4. The positive pin of LED to digital pin 13 of Arduino and negative to ground of Arduino.
5. Connect Arduino to laptop using USB cable.
6. Use the code downloaded to make the PIR sensor work.

Construction

The wiring is done in the following way:

**PIR Interfacing with Arduino
Wiring Diagram**



The Code used

The code which we need to upload to the Arduino so that it

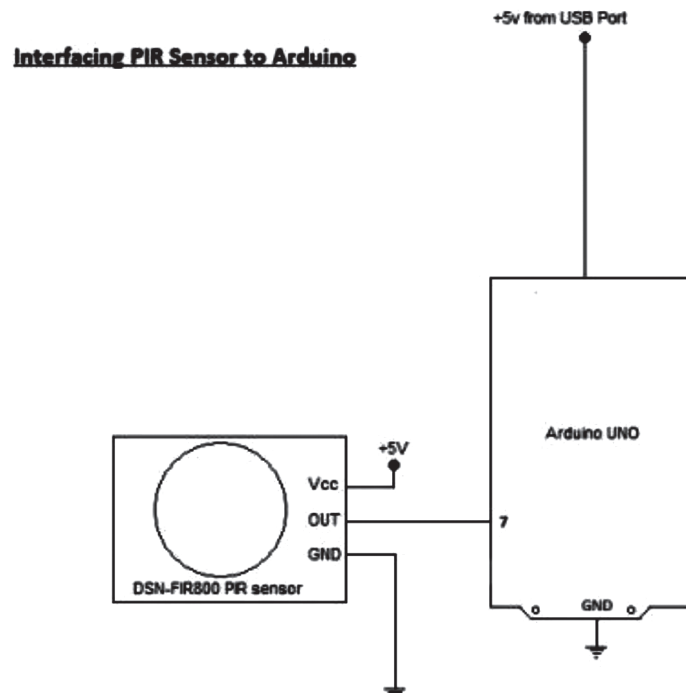
```
int sensor=7; //The output of PIR sensor connected to pin 7
int sensor_value; //variable to hold read sensor value
void setup()
{
  pinMode(sensor,INPUT); // configuring pin 7 as Input
  Serial.begin(9600); // To show output value of sensor in serial monitor
}
void loop()
{
  sensor_value=digitalRead(sensor); // Reading sensor value from pin 7
  Serial.println(sensor_value); // Printing output to ser
}
```

Data collection

The LED glows for 15 seconds after it detects motion. This time can be increased or decreased.

Usage of charts/diagrams

The circuit diagram is given below:



Utility of the project

PIR sensors can be used for opening and closing of doors in shopping malls, hotels and theatres.

Cost effectiveness

The total cost of this project which includes the cost of Arduino, USB cable, jumper wires and PIR sensors is Rs 650.

Conclusion/ result

The LED will glow when it detects IR rays from the human body.

Further research/ development of the project/model

This project was designed keep the senior citizens in mind. They sometimes stumble after entering a dark room. These automated lights will save the elderly people from the trouble of looking for switches in the dark. With further additions and inputs which can be done to this basic model discussed above, such lights can be made accessible at low costs.



Eco-Friendly Sanitizer for Personal Belongings

Vanshika Dogra

X-B, Sadhu Vaswani International School For Girls, New Delhi , Session 2020-21

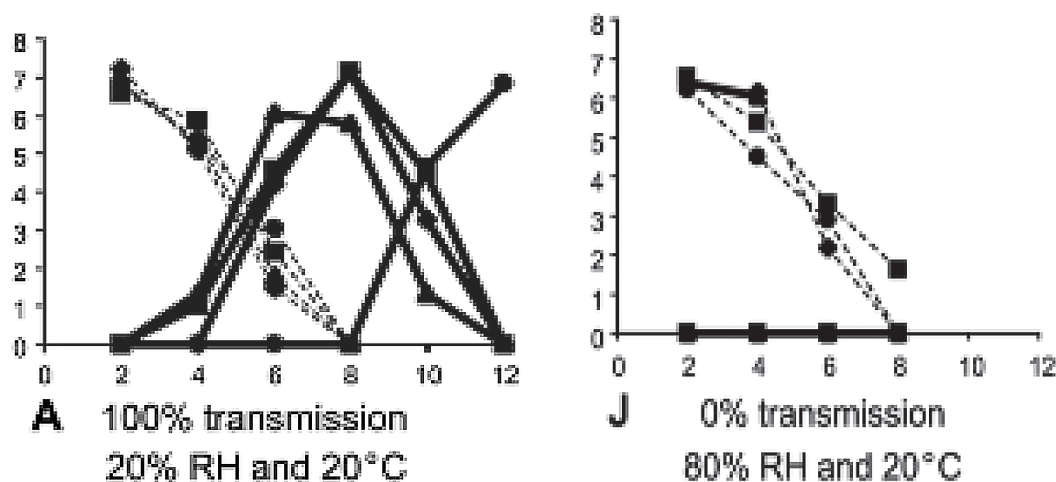
Aim/ Objective

Eco-friendly sanitizing for personal belongings like purses, handbags, etc. to kill viruses in high footfall areas like airports, railway stations and market places.

Introduction

A virus is a submicroscopic infectious agent that replicates only inside the living cells of an organism. Viruses can infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea.

To safeguard ourselves from viruses we can use vaccines and antiviral drugs. However, when vaccines are not available for new kinds of virus, sanitation and disinfection is most effective. In places like airports, railway stations, offices and other departments, the rate of transmission of virus increases as each and every person in the crowd cannot be kept under supervision. Thus, installing sanitizing units at the entrances of these places can help to avoid the virus infecting people. The modification in the existing conveyor belt will help in achieving the desired objective.



From research it has been found that virus viability was rapidly lost at higher temperatures and higher relative humidity (e.g., 38°C, and relative humidity of >95%). So, viruses can be killed by raising temperature and humidity above this limit. Thus, making steam an ideal constituent in sanitizing, as it increases both of above without harming the environment.

Materials Required

- Conveyor belt with the canopy similar to x-ray system in airport.
- Container of sanitizing chemical and steam generator.

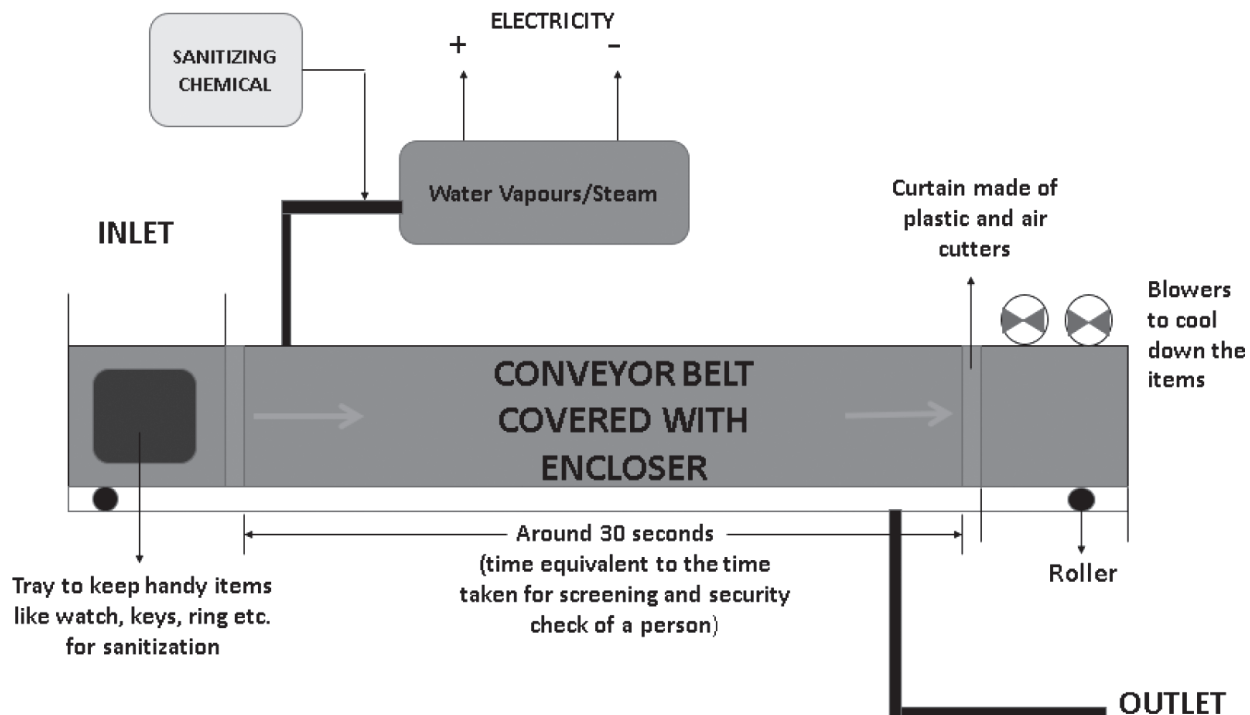
- Blowers at the end of the conveyor belt.
- High speed air cutters and plastic curtains on both sides of the chamber as are being used in air conditioning systems.
- Connecting piping system and disposal dispenser.
- Chemical and steam regulators. Safety paraphernalia (temperature gauge, pressure gauge etc.)

Procedure:

- Person will put all his/her handy belongings, watches, glasses, keys, ring etc. over the conveyor belt in the tray, before going for a security check.
- Conveyor belt will take this tray inside the steam chamber which is isolated from outside by air cutter and plastic curtains on both sides, as used in air conditioning.
- Speed of the belt and its length will be set in such a way that it will take minimum 30 seconds, which is equivalent to the time duration of a person's screening and security check and time required to kill the virus, in a controlled environment before it comes out of the steam chamber.
- Air blower will be installed at the other side of the system to cool off the belongings.
- Steam coming out of this system can be easily stored after converting into water through condenser in cans and subsequently disposed of or otherwise it can be discharged into the atmosphere through a pipe system as virus has already been killed. So therefore, steam coming out of the arrangement is not dangerous.

Construction

The material gathered have to be arranged in this manner:



Utility of the Project

Following benefits can be acquired with the adoption of this arrangement:

- It can cater for a large number of people.
- It can be easily made by modifying the existing systems and know-how.
- As steam is the main constituent, therefore no psychological stigma.
- No human interference is required and is user friendly.
- No hazardous chemical is used. Only water and sanitizing chemicals are being used. These are very easy and safe to handle. Further these are environment friendly.
- No special training is as such required for its operation.

Cost Effectiveness

Operating cost is very low. It just requires a few modifications in the existing system, therefore it will be easy to maintain. Also, the materials required are easily available and inexpensive.

Conclusion/Result

Eco friendly Sanitizer for Personal Belongings can be used in the places handling large crowds to avoid public transmission of a disease. This arrangement will help prevent viruses from not affecting people due to their contact with the handy belongings of an infected person.

This model will not only prove effective against the COVID-19 virus however for most viruses also. This change in our existing system of screening will help to maintain hygiene. If practiced in the right spirit and manner then it would save lots of lives lost due to ignorance and negligence of not following social distancing and disinfection.

Further Research/ Development of the Project/ Model:

This model can be replicated for:

- By online shopping platforms like Amazon, Flipkart, etc. for delivery of goods at their go downs.
- Food items can also be sanitized on a very large scale without compromising its nutrition and freshness.
- A smaller model can cater for common household needs for day-to-day lives.
- A modified version can be used for sanitizing railway coaches, buses, etc.

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