Automatic Sanitizer Dispenser System

A Project submitted to

Vivekanand College, Kolhapur (Autonomous)

For the fulfillment of

Project under

Invention, Innovation and Incubation Lab

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Abstract:

The Automatic Sanitizer Dispenser System project aims to design and develop a touchless and automated hand sanitizer dispenser for public places, offices, colleges and other environments to promote hygiene and prevent the spread of germs. The system utilizes proximity sensor and a microcontroller to detect the presence of hands and dispense an appropriate amount of sanitizer without any physical contact.

1. Introduction:

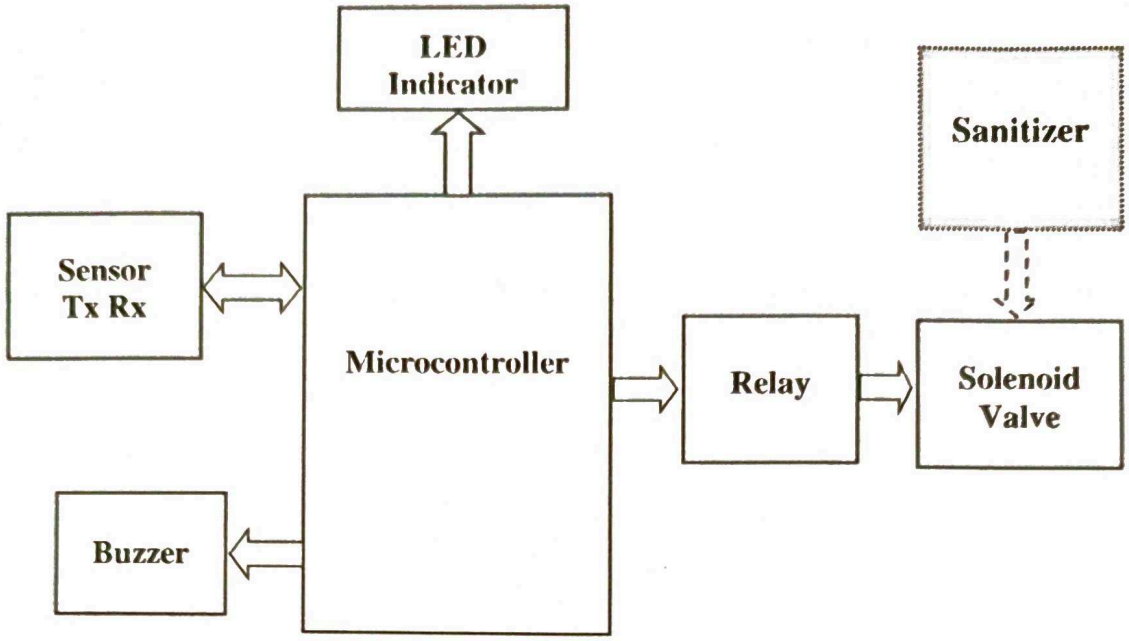
The project addresses the need for maintaining proper hand hygiene, especially in high-traffic areas where manual sanitizer dispensers might pose a risk of contamination. The automatic sanitizer dispenser eliminates the need to touch a common surface, reducing the chances of germs spreading through contact.

2. Objectives:

Design an automatic sanitizer dispenser system.
Integrate sensors for hand detection.
Develop a microcontroller-based control system.
Ensure accurate and controlled sanitizer dispensing.
Enhance user convenience and hygiene.

3. Block Diagram:

The block diagram of automatic sanitizer dispenser is shown below.



System Components:

Microcontroller

Ultrasonic proximity sensors

Sanitizer container and Solenoid valve mechanism

Power supply unit

User interface like LED indicators

Enclosure for protection

4. System Working:

The automatic sanitizer dispenser system employs proximity sensors that detect the presence of hands within a certain range. When a user brings their hands close to the sensor, it triggers the microcontroller 16F676 to activate the sanitizer solenoid valve. The solenoid valve dispenses a predefined amount of sanitizer onto the user's hands. LED indicators or a display can provide feedback about the dispensing process. The system is designed to be user-friendly and hygienic.

5. Implementation:

Interface the proximity sensor with the microcontroller to detect hand proximity accurately.

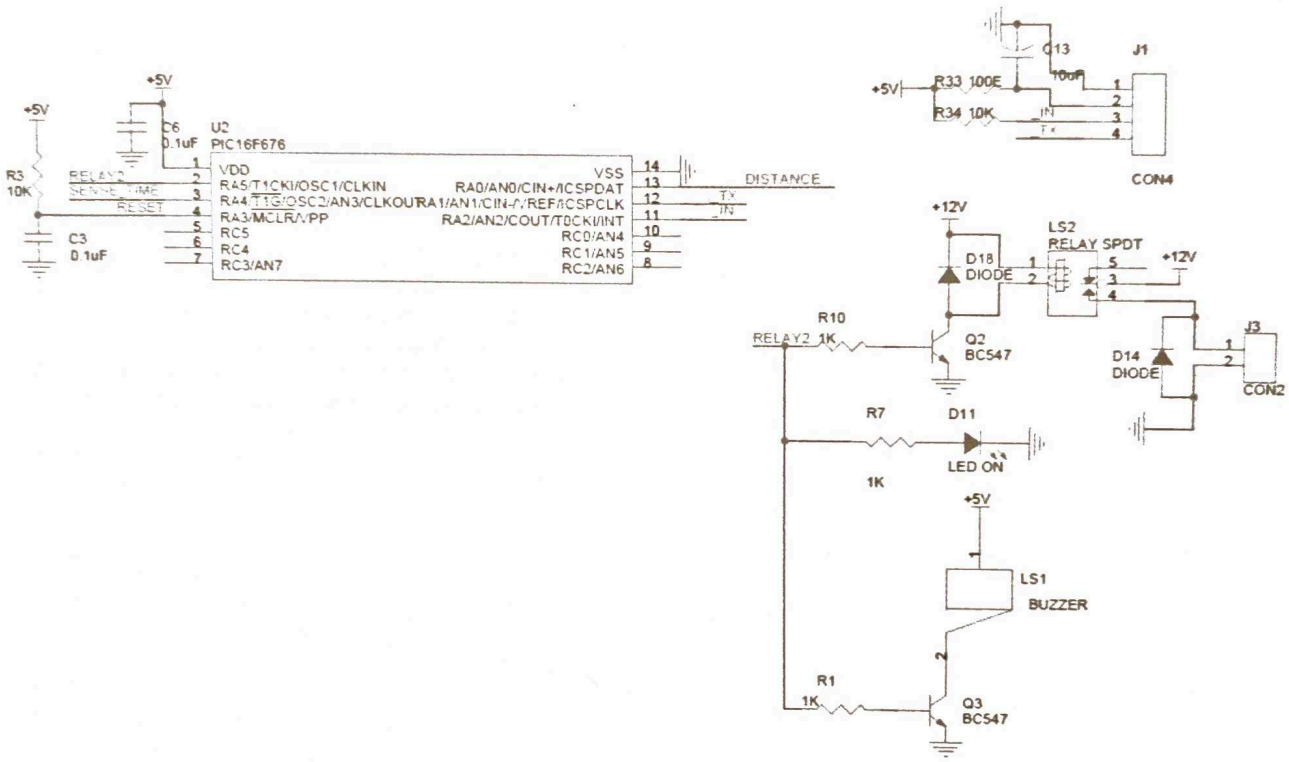
Connect the sanitizer solenoid valve to the microcontroller for controlled dispensing.

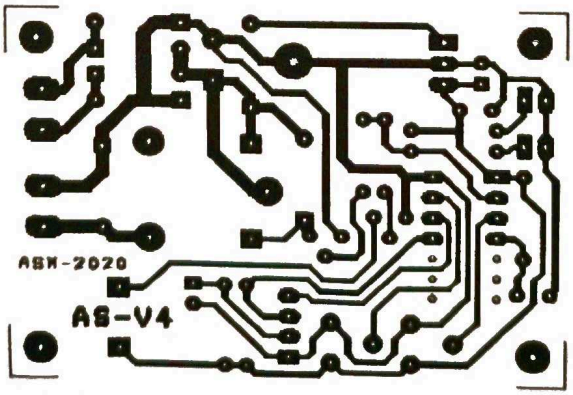
Program the microcontroller to respond to sensor inputs and control the solenoid valve duration.

Design a user interface to indicate the system status, such as power on, sanitizer availability, and dispensing process.

Assemble the components into a secure and user-accessible enclosure.

Schematic and Printed Circuit Board (PCB) files of automatic sanitizer dispenser:





Working Module:

Firmware Program:

```
sbit RTX        at PORTA.B1;
sbit RTX_Dir    at TRISA.B1;
sbit R_IN       at PORTA.B2;
sbit R_IN_Dir   at TRISA.B2;
sbit RELAY1      at PORTA.B5;
sbit RELAY1_Dir at TRISA.B5;

#define RTIME_POT 3
#define DIST_POT  0

#define DISTANCE_MIN      10
#define DISTANCE_MAX      40
#define SCANCOUNT         20
#define CHKCOUNT          15

unsigned char SetDispenseCount=10;
unsigned char dCount=0;
unsigned int Distance=0;

void ReadADC();
unsigned char CheckSensor(unsigned char Chk);
unsigned int GetDistance(unsigned int expdist);
unsigned char CheckLogic(unsigned char lval);
bit Flag;
void main()
{
     Flag=0;
     TRISC.B1=1;
     RELAY1_Dir = 0;                    // 0=o/p 1=i/p
     RTX_Dir = 0;                      // 0=o/p 1=i/p
     R_IN_Dir = 1;                      // 0=o/p 1=i/p
     ANSEL = 0x20;                      // Configure AN5
```

```
    RELAY1=0;
    Delay_ms(100);

    while(1)
    {
       while(1)
       {
           if(CheckSensor(1))
               break;
           Delay_ms(50);
       }

       ReadADC();
       RELAY1=1;
       for(dCount=0;dCount<SetDispenseCount;dCount++)
           Delay_ms(10);
       RELAY1=0;
       Delay_ms(200);

       while(1)
       {
           if(CheckSensor(0))
               break;
           Delay_ms(50);
       }
       Delay_ms(500);
    }
}

void ReadADC()
{
   unsigned int AdcCount;
```

```
  AdcCount = ADC_Read(RTIME_POT);
  SetDispenseCount = AdcCount/4;
  if(SetDispenseCount < 10) SetDispenseCount=10;
  if(SetDispenseCount > 250) SetDispenseCount=250;
}
unsigned int GetDistance(unsigned int expdist)
{
    unsigned int dist=0;
    RTX=1;
    Delay_us(11);
    RTX=0;
    Delay_us(100);
    while(1)
    {
        if(R_IN)
        {
            dist=0;
            while(1)
            {
                dist++;
                Delay_us(10);
                if(!R_IN) break;
                if(dist > expdist) break;
            }
            break;
        }
        else
        {
            dist++;
            Delay_us(10);
            if(dist > expdist) break;
        }
    }
    return(dist);
}
```

6. Benefits:

- Promotes touchless hand sanitization,
- reducing the risk of cross-contamination.
- Provides a convenient solution for maintaining hand hygiene in public spaces.
- Minimizes wastage of sanitizer by controlled dispensing.
- Supports infection control measures, especially in times of health crises.

7. Conclusion:

The Automatic Sanitizer Dispenser System project presents an innovative and essential solution for promoting hand hygiene in various environments. By eliminating the need for physical

contact during the sanitizer dispensing process, the project contributes to minimizing the spread of germs and diseases.

8. References:

1. https://cdn.sparkfun.com/datasheets/Sensors/Proximity/HCSR04.pdf
2. https://www.sparkfun.com/datasheets/Components/BC546.pdf
3. https://www.farnell.com/datasheets/2171929.pdf
4. http://ww1.microchip.com/downloads/en/devicedoc/40039f.pdf