

Architectural model of a bus stop with automatic sunshade using ARDUINO

<https://www.youtube.com/watch?v=NEEy8Nqw9xE>

The Automatic Smart Bus Stop Sunshade System is designed to provide improved protection and comfort for passengers waiting at bus stops during different weather conditions. Conventional bus shelters provide only fixed coverage and may not effectively protect passengers from changing sunlight directions or rainfall. The proposed system uses an intelligent motorized sunshade mechanism that automatically adjusts its position according to environmental conditions.

The system uses Light Dependent Resistor (LDR) sensors to detect the direction and intensity of sunlight. Based on the sensor readings, the microcontroller controls a servo motor to rotate or adjust the sunshade towards the appropriate direction, providing maximum protection from direct sunlight. A rain sensor is also incorporated to detect rainfall and automatically adjust or expand the sunshade to provide better coverage for passengers.

The microcontroller acts as the main controlling unit and continuously monitors the inputs from the LDR and rain sensors. According to the programmed conditions, it controls the motorized mechanism automatically without requiring human intervention. The system is programmed using Embedded C language. This proposed smart bus stop system improves passenger comfort, provides protection from sunlight and rain, and offers an efficient and automated solution for modern public transportation infrastructure.

Objectives:

- ☐ To design an automatic smart sunshade system for bus stops.
- ☐ To provide protection for passengers from direct sunlight.
- ☐ To automatically track the direction of sunlight using LDR sensors.
- ☐ To detect rainfall using a rain sensor.
- ☐ To automatically adjust the sunshade during rainy conditions.

- ☐ To control the sunshade movement using a servo motor.
- ☐ To reduce manual operation through automation.
- ☐ To improve the comfort and safety of passengers waiting at bus stops.
- ☐ To develop a low-cost and efficient smart public infrastructure system.

The main blocks of this project are:

1. Micro controller (PIC16F872).
2. Reset button.
3. Crystal oscillator.
4. Regulated power supply (RPS).
5. LED indicators.
6. Servo motor.
7. Rain sensor.
8. LDR.

Software used:

1. PIC-C compiler for Embedded C programming.
2. PIC kit 2 programmer for dumping code into Micro controller.
3. Express SCH for Circuit design.

Block Diagram:

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