IOT Solar Power Monitoring System

Abstract

The Internet of Things (IoT) Smart Mirror is an intelligent device that functions as both a mirror and an information display system. It shows real-time temperature, weather updates, and news headlines using internet connectivity, providing users with useful data while getting ready. The system enhances user experience by integrating daily utilities into a compact and smart reflective surface, making it an ideal addition to smart homes and offices.

Aim

To design and develop an IoT-based Smart Mirror that displays real-time temperature and news updates using internet connectivity and a display integrated behind a mirror panel.

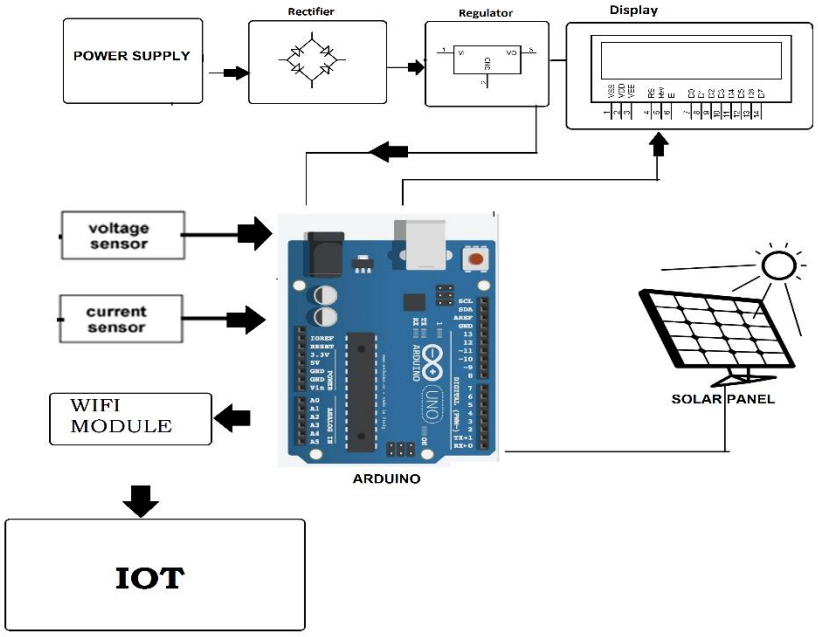
Objectives (5 Short Points)

- To display real-time temperature using an IoT temperature sensor.
- To fetch and show live news headlines from an online API.
- To create an interactive and modern mirror using Raspberry Pi.
- To integrate hardware and software for seamless smart display.
- To design a compact, user-friendly, and low-power smart device.

Working

The Smart Mirror uses a Raspberry Pi to connect to the internet and fetch live weather and news data using APIs. A monitor or display is placed behind a two-way acrylic mirror. The Raspberry Pi processes the data and sends it to the display, which appears as if it's embedded in the mirror. The user can see both their reflection and the displayed content simultaneously.

Block Diagram:



Components

Hardware:

- Raspberry Pi (3/4)
- Two-way acrylic mirror
- HDMI-compatible Monitor/Display
- DHT11/DHT22 (Temperature & Humidity Sensor)
- Wi-Fi dongle (if not inbuilt)
- Power supply
- Frame/Case

Software:

- Raspbian OS
- Python (for sensor and API scripts)
- OpenWeatherMap API (for temperature)
- News API (for headlines)
- MagicMirror² platform or custom Python GUI

Advantages

- Displays useful information in real time
- Saves time by combining multiple utilities
- Compact and aesthetically pleasing
- IoT-enabled and customizable
- Energy-efficient operation

Disadvantages

- Requires continuous internet connection
- Limited display size
- Dependent on APIs, which may change or become unavailable
- Initial cost may be high due to hardware

Applications

- Smart homes and bathrooms
- Office lobbies and reception areas
- Hotels and luxury rooms
- Gyms and fitness centers
- Personal grooming stations

Future Scope

- Integration with voice assistants like Alexa or Google Assistant
- Facial recognition for personalized display
- Gesture-based interaction
- Display calendar, to-do lists, reminders
- Support for home automation control (lights, AC, etc.)

Conclusion

The IoT Smart Mirror merges utility with innovation, transforming a simple mirror into an intelligent interface. By displaying real-time temperature and news, it enhances daily productivity and user experience. This project lays the foundation for future smart home integration and automation features.