Solar Tracking and Automatic Irrigation

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Contents

Summary of Stage 1

- Solar energy is tracked by the solar panels,solar panels get tilted towards the sun light and trap the energy.
- Automatic irrigation is done by using various sensors and controllers to automate the watering of plants based on factors such as soil moisture levels, weather conditons.
- LCD is output device in order to rotate or control the motor we use sensor .
- Motor driver control the direction of the motor.

Functionality

- Install and import required libraries in the Python environment,including Wifi Client Secure,Universal Telegram Bot,ArduinoJson,LiquidCrystal.
- The Daylight function checks if it's daytime based on the LDR reading.
- If it's daytime, the adjustSolarPanel function is called to move the solar panel.
- The soil moisture reading is checked against a threshold.If the soil moisture is below the threshold, the activate Irrigation function is called to start irrigation..

```
#include <WiFi.h>
#include <WiFiClientSecure.h>
#include <UniversalTelegramBot.h>
#include <ArduinoJson.h>
#include <LiquidCrystal.h>

LiquidCrystal lcd(13,12,14,27,26,25);

// Network credentials
const char* ssid = "dell";
const char* password = "12345678";

// Initialize Telegram BOT Token and Chat ID
#define BOTtoken "5982198371:AAEL3cD2U6IyORf9zlOD_sl5-X85MXyhKbc"

// #define CHAT_ID "969506549"
#define CHAT_ID "5365066054"

WiFiClientSecure client;
UniversalTelegramBot bot(BOTtoken, client);

const int LDRR = 16;
const int LDRL = 17;

const int moisturesensor = 4;

const int relay= 18;

const int motorP= 19;
const int motorN= 21;

const int TEMPSensor = 22;

int LDRStateR = 0;
```

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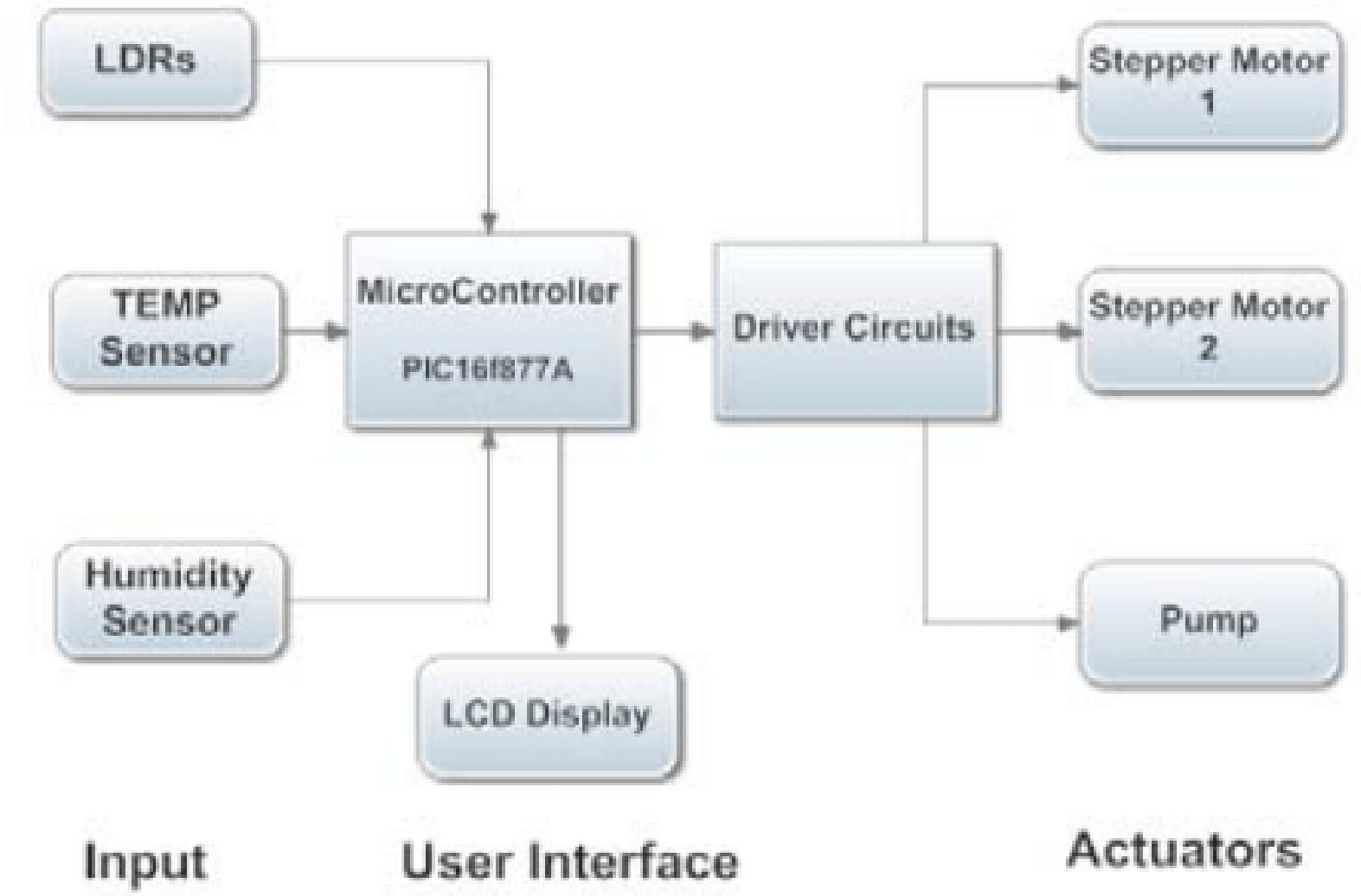
Figure: code

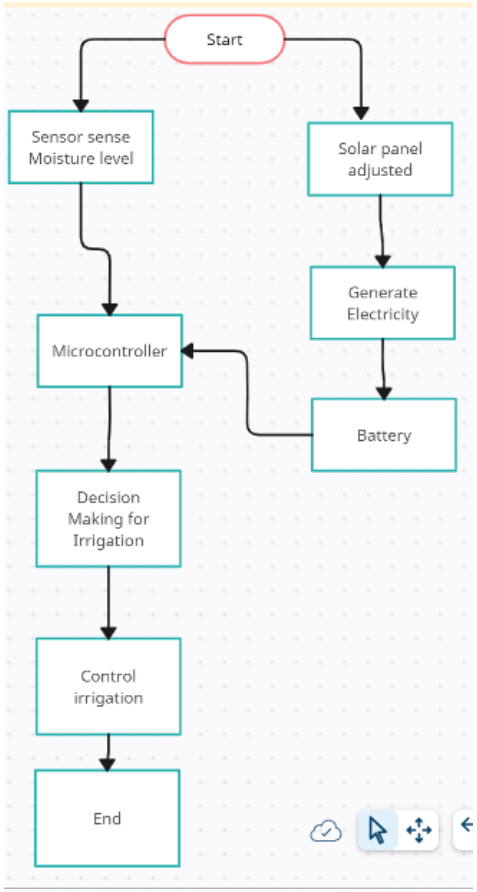
- Architecture



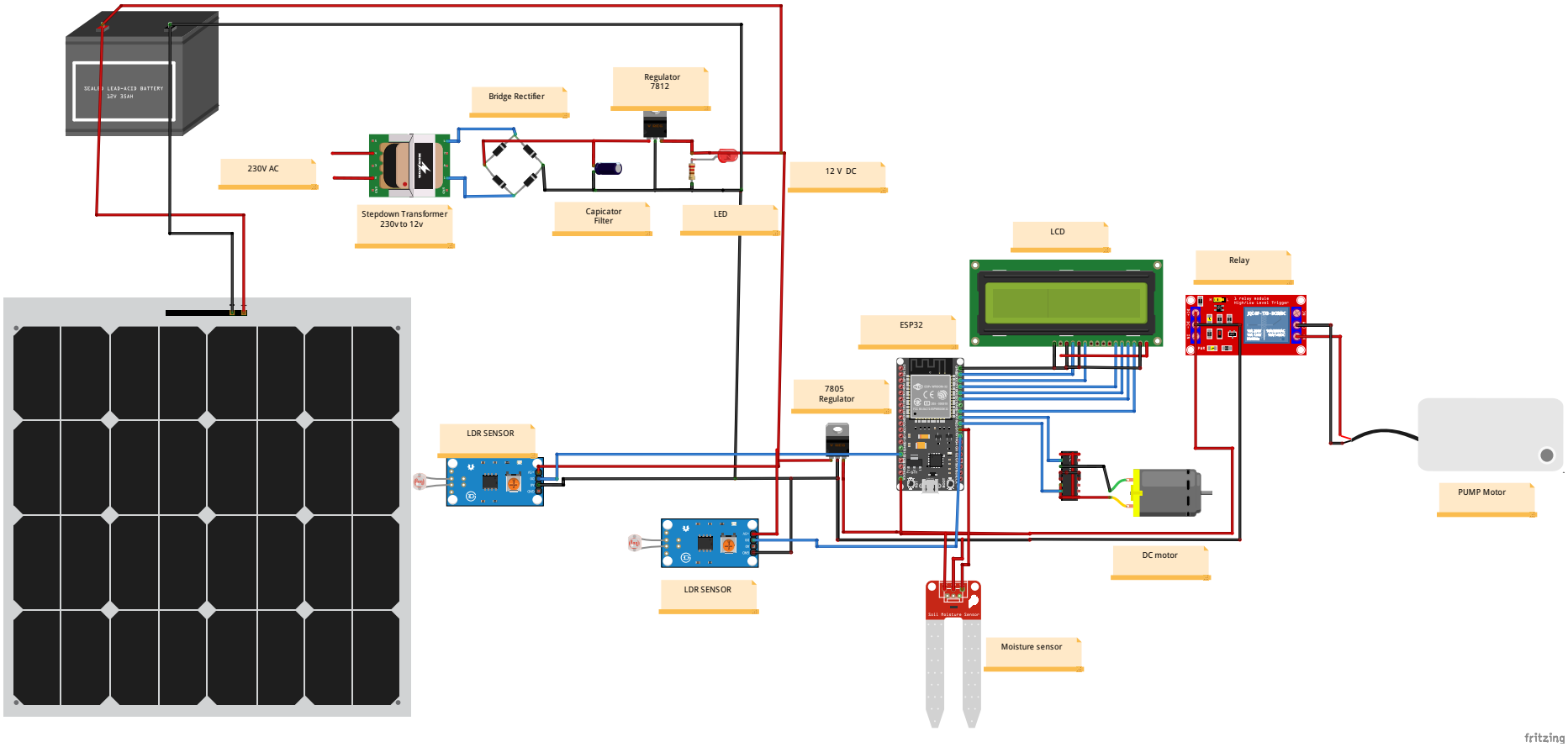
Implementation

1. Connect Sensors to Microcontroller.
2. **C**onnect Water Pump and Sprinkler to Relay Module.
3. **B**attery Integration and LCD Screen Integration.
4. **S**olar Panel Orientation Adjustment.

- Flow Chart


Start
Sensor sense Moisture level
Solar panel adjusted
Generate Electricity
Microcontroller
Battery
Decision Making for Irrigation
Control irrigation
End

- Circuit Daigram



- **Result**

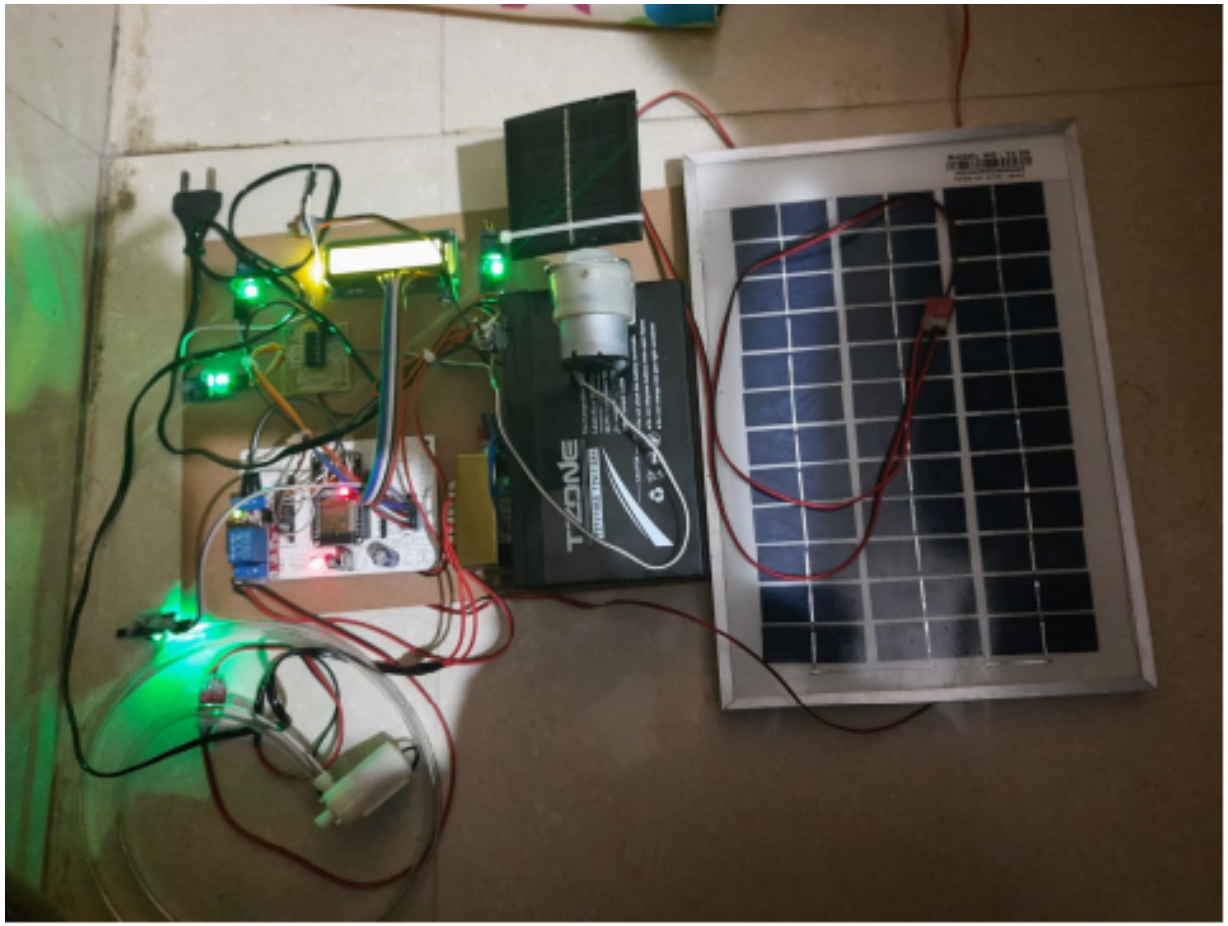


Figure: Starting the System with Microcontroller

- **Status of LCD**

Figure: Moisture Sensor

- **Pumping of Water**

Figure: pumping of water based on soil moisture

- **SMS to Farmer**

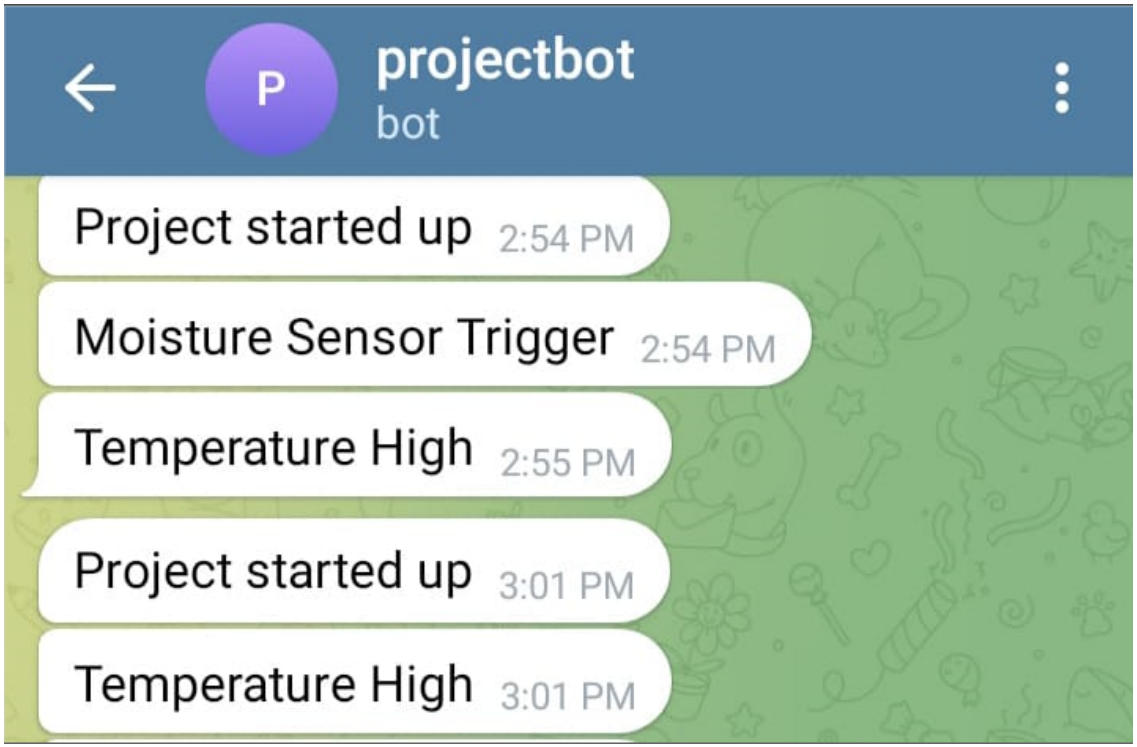
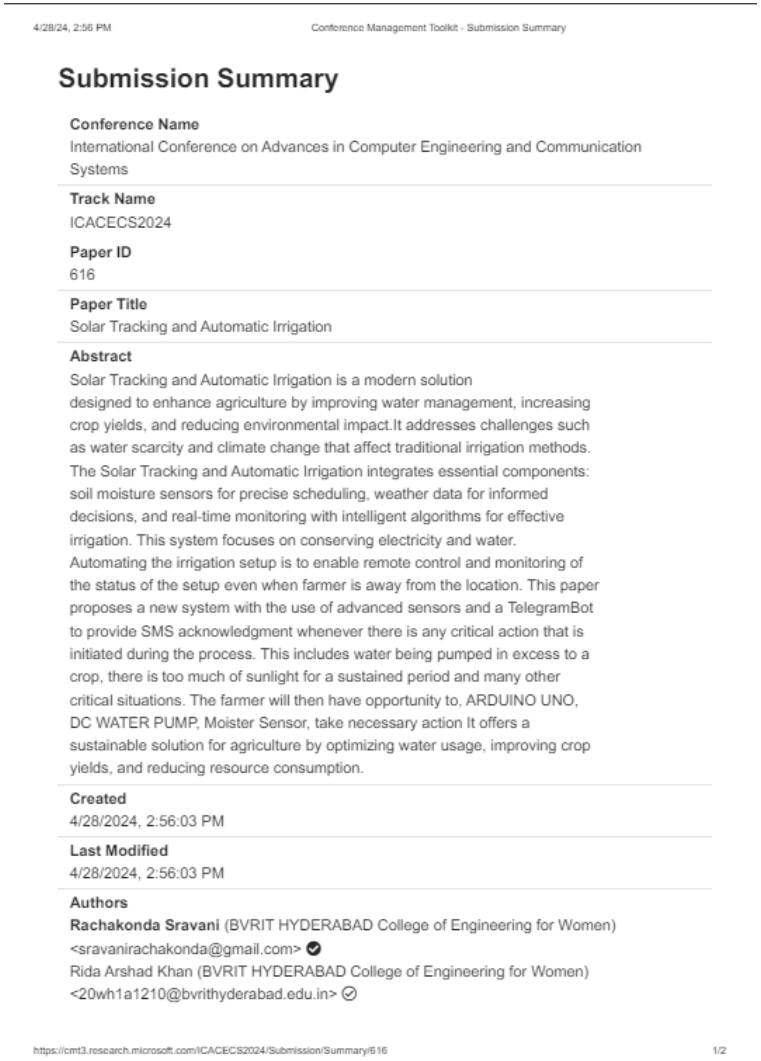


Figure: SMS to Farmer

Project Execution

To view the implementation video, click **Project Execution**

Submission Proof



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Submission Summary

Conference Name
International Conference on Advances in Computer Engineering and Communication Systems

Track Name
ICACECS2024

Paper ID
616

Paper Title
Solar Tracking and Automatic Irrigation

Abstract
Solar Tracking and Automatic Irrigation is a modern solution designed to enhance agriculture by improving water management, increasing crop yields, and reducing environmental impact.It addresses challenges such as water scarcity and climate change that affect traditional irrigation methods. The Solar Tracking and Automatic Irrigation integrates essential components: soil moisture sensors for precise scheduling, weather data for informed decisions, and real-time monitoring with intelligent algorithms for effective irrigation. This system focuses on conserving electricity and water. Automating the irrigation setup is to enable remote control and monitoring of the status of the setup even when farmer is away from the location. This paper proposes a new system with the use of advanced sensors and a TelegramBot to provide SMS acknowledgment whenever there is any critical action that is initiated during the process. This includes water being pumped in excess to a crop, there is too much of sunlight for a sustained period and many other critical situations. The farmer will then have opportunity to, ARDUINO UNO, DC WATER PUMP, Moister Sensor, take necessary action It offers a sustainable solution for agriculture by optimizing water usage, improving crop yields, and reducing resource consumption.

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https://cmt3.research.microsoft.com/ICACECS2024/Submission/Summary/616 1/2

Figure: Paper Submission

One Page Report

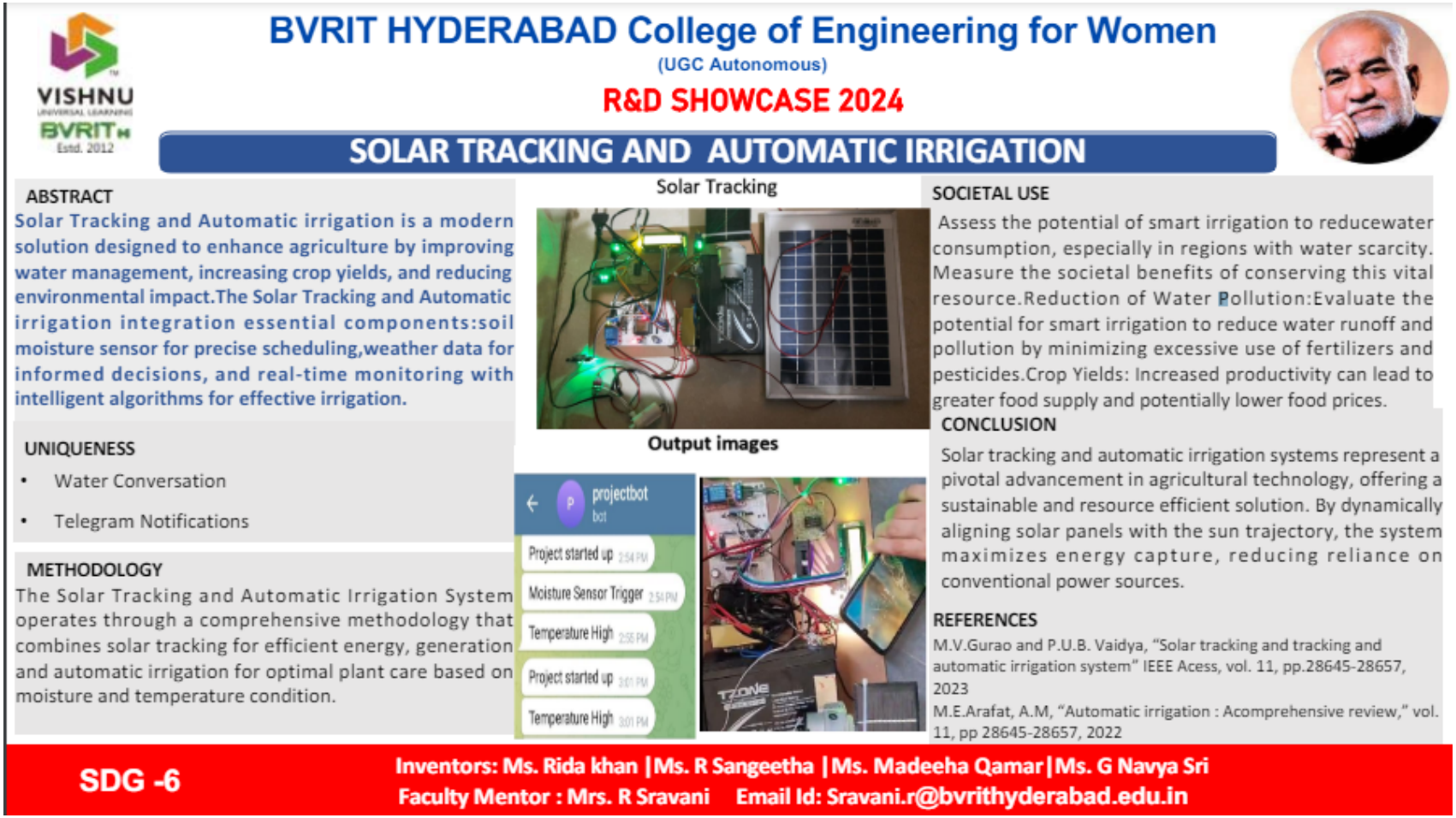

Figure: One Page Report

Conclusion

- Implemented real time solar tracking and automatic Irrigation system using Arduino and related Technology.
- Simultaneously, it is automated irrigation functionality, responsive to real-time soil moisture levels, ensures judicious water usage, fostering optimal crop growth and yield.
- The convergence of these technologies not only enhances farm productivity but also contributes to environmental conservation. challenges.
- As agriculture continues to evolve, this integrated system stands as a beacon for precision farming, promising increased efficiency, reduced environmental impact, and a pathway towards sustainable and resilient agricultural practices.

Thank you