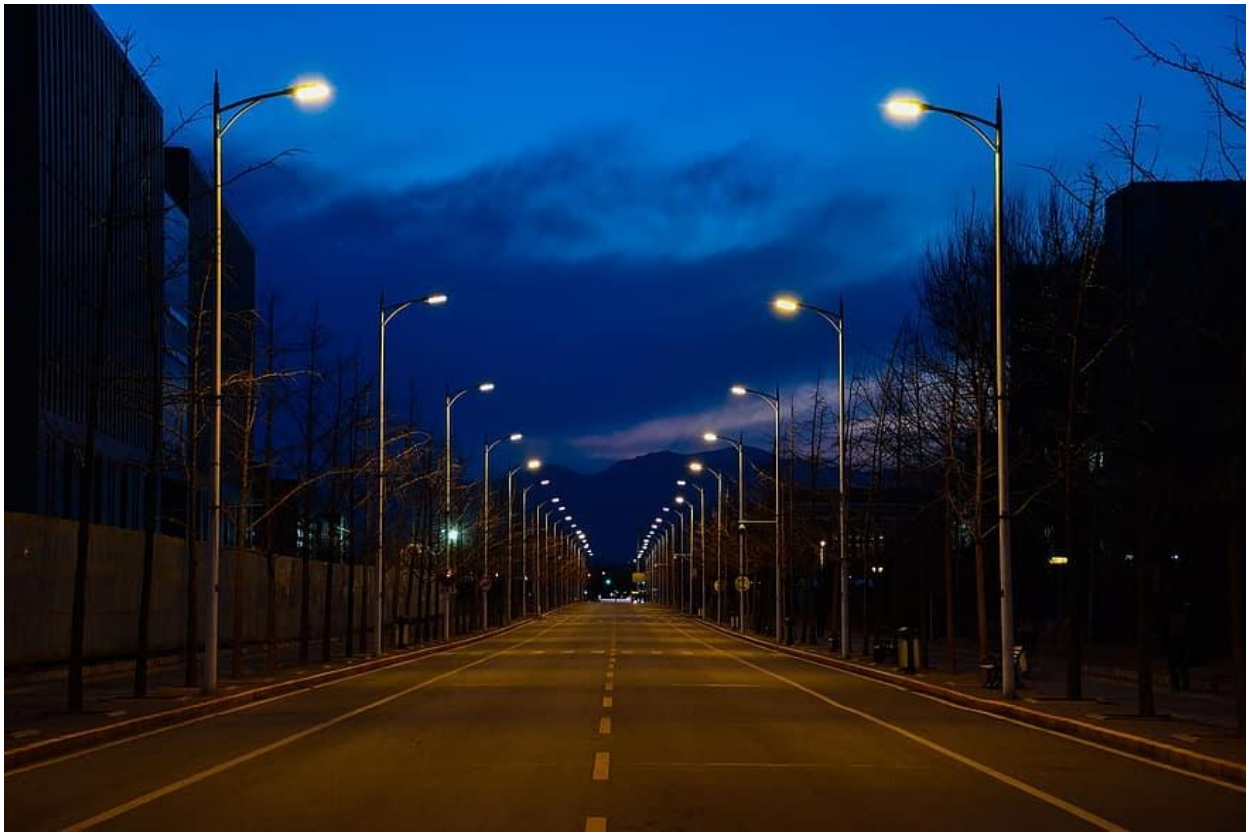

Smart street lighting project

Based on Cortex-M

08/01/2022

Wave 6 NTI

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Contents

Overview

Our Street Lighting Project is based on Arm Cortex-M STM32F401VET manufactured by ST Microcontrollers , It can be a part of any Light control based system . This is a base model of what we believe can be a Mega System that offers tons of benefits to society with being Nature friendly .

Goals

1. Save Energy
2. Save Time
3. Save Lives
4. Lower Pollution Levels
5. Data Collection

Hardware Components

- LDR
- LED
- Infrared Sensor
- LCD Display
- Push Button
- Temperature Sensor

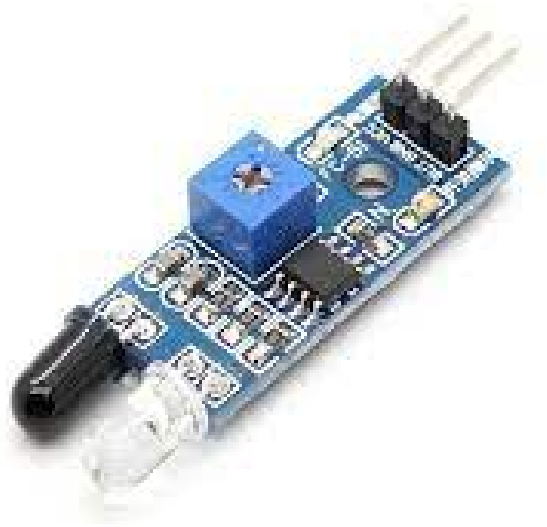
Hardware Description

- LDR (Light dependent Resistor) : This is a resistor that is sensitive to light (Photoresistor) this helps us to sense the surrounding lights to decide how strong our LEDs light should be .

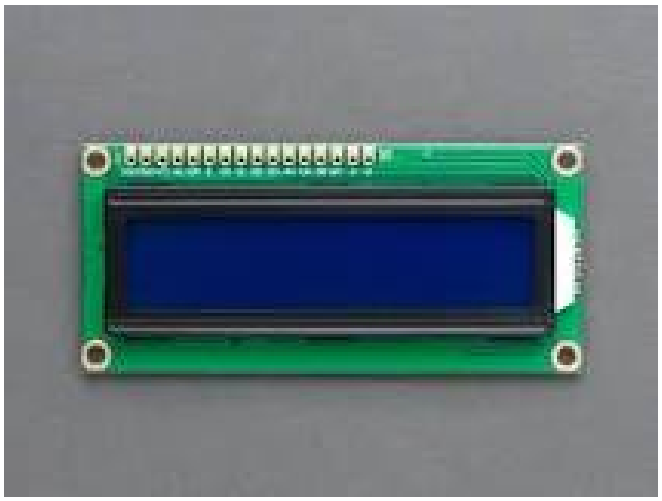
- LED (Light Emitting Diode) : This is our Lighting source which can be controlled to offer different levels of lighting .

- Push Button : A button that can be pressed to do a certain Task .

- **Infrared Sensor** : An infrared sensor (IR sensor) is a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm … 50 µm. IR sensors are now widely used in motion detectors

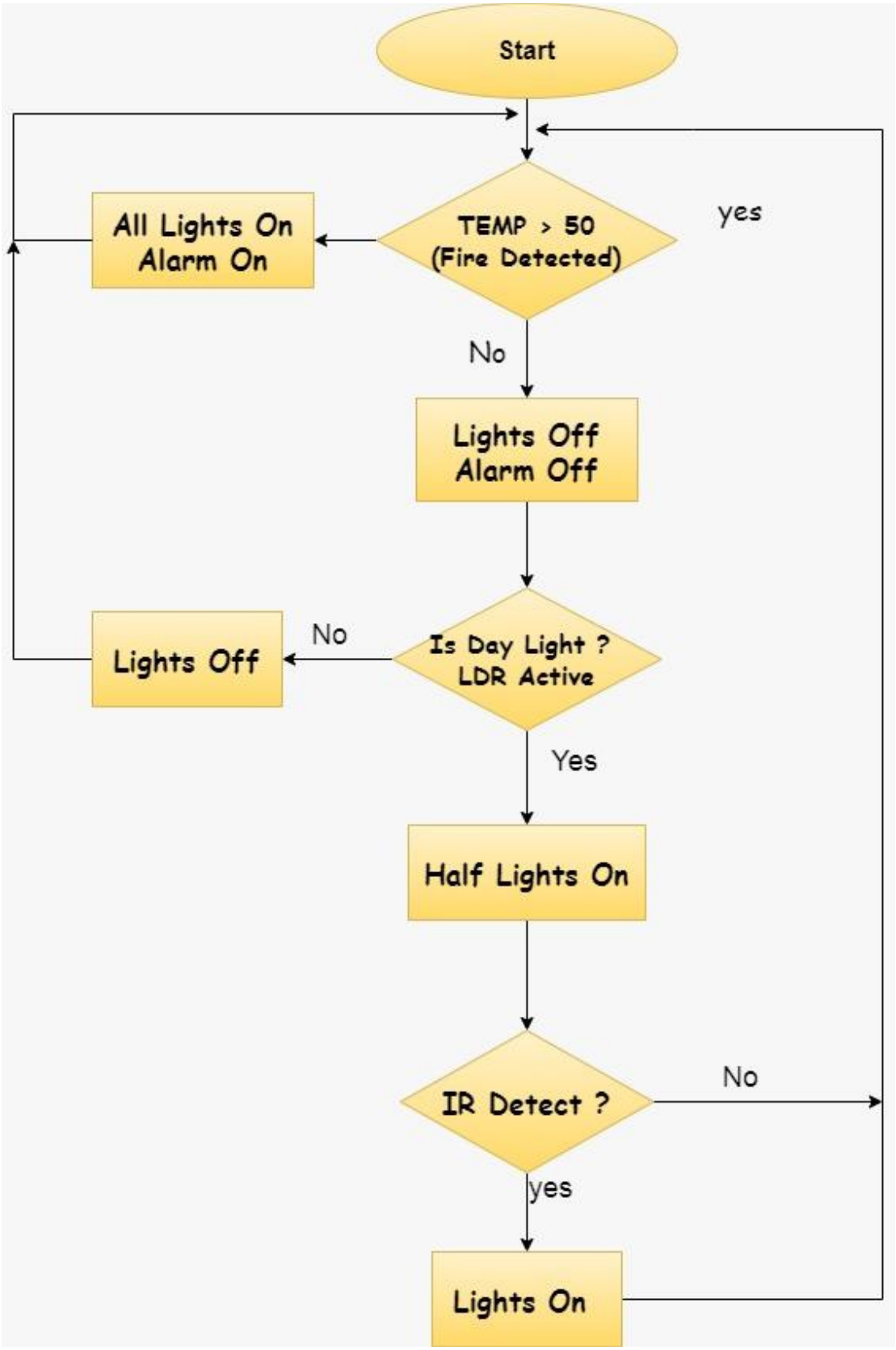


- **16x2 LCD :** it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols.



- **LM35 Temperature Sensor** : LM35 is a temperature sensor that outputs an analog signal which is proportional to the instantaneous temperature. The output voltage can easily be interpreted to obtain a temperature reading in Celsius. The advantage of lm35 over thermistor is it does not require any external calibration.

Flow Chart


Start
TEMP > 50
(Fire Detected)
yes
All Lights On
Alarm On
No
Lights Off
Alarm Off
Is Day Light ?
LDR Active
No
Lights Off
Yes
Half Lights On
IR Detect ?
No
yes
Lights On

Code Summary:

Project is consisted of four main blocks:

1-Initialization block.

- Initiate system clock.
- Initiate peripherals clocks.
- Enables peripherals.

2-Task 1 block which handles the LDR sensor readings.

- At day all lights are off.
- At night half of the lights are on.

3-Task 2 block which handles the IR sensor readings.

- When there is someone passing by (Car or Person) the corresponding lights will be led on then turns off again.
- A push button will simulate the action.

4-Task 3 block which handles the temperature sensor readings.

- If temperature exceeds certain level (Fire exist) all lights are on and alarm starts(RED LEDs ON).

Proteus Schematic Simulation Circuit :