Wireless Power Meter

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CSE 3204

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1/11/2017

Objectives:

- To learn about Arduino UNO and its different Pin functionalities.
- To learn about Current Sensor, LCD display, Bluetooth Module and their different functionalities.
- To measure Voltage and Current of a DC Power Source.
- To acknowledge Users the measurement of the Power unit and Energy Unit of the Power Source via Android Phone.

Introduction:

The Arduino, an open-source platform used for building electronics projects, has become quite popular with people just starting out with electronics, and for good reason. It is designed for artists, designers, hobbyists, hackers, newbies, and anyone interested in creating interactive objects or environments and can interact with buttons, LEDs, motors, speakers, GPS units, cameras, the internet, and even your smart-phone or your TV. Among the projects based on Arduino, interfacing a character LCD to it is one of the most popular thing where LCDs can be used to display information from the arduino or any sensor (Like Current Sensor) connected to it. Another thing is HC-05 Bluetooth Module which is used to build communication between Arduino and Android for various purposes like display information from Arduino on smartphone screen.

OverView:

In this Project, We are dealing with Current Sensor taking measurement of current, connecting wires taking Voltage, LCD monitor and android device via Bluetooth Module displaying the data connected with an Arduino UNO. This project is actually designed to make peoples see the power unit data easily and flexibly. The project aims to provide a clear picture of a Source's current usage, and through this data provide an estimate to power consumption. The project also aims to identify which devices turn on and off by analysis of this current data.

Apparatus:

Hardware:

- Arduino Uno (Rev-3)
- Bluetooth Module Breakout (HC-05)
- 16×2 Character LCD
- ACS 712 Current Sensor
- Resistors (10k ,330ohm)
- Potentiometer (10K)
- Jumper Wire Set
- Breadboard

Software:

- Arduino IDE
- Arduino Bluetooth Terminal

How Does It Work:

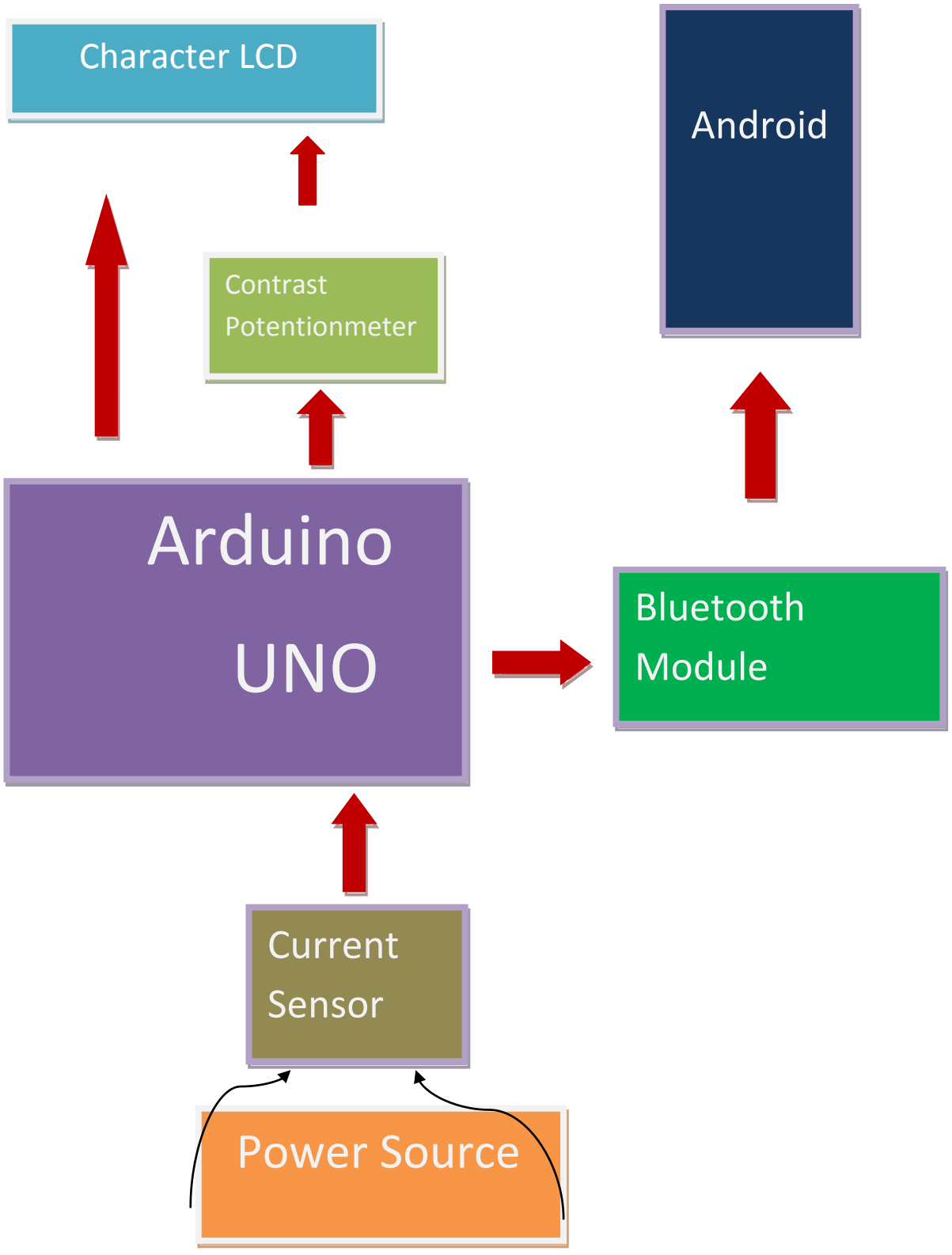

Figure 1: Basic Structure of Wireless Power Meter

Features:

- User can easily find out the voltage and current.
- They can also find out the Power and Energy Unit.
- They can see data from both LCD display and smartphone display.

Circuit Diagram:

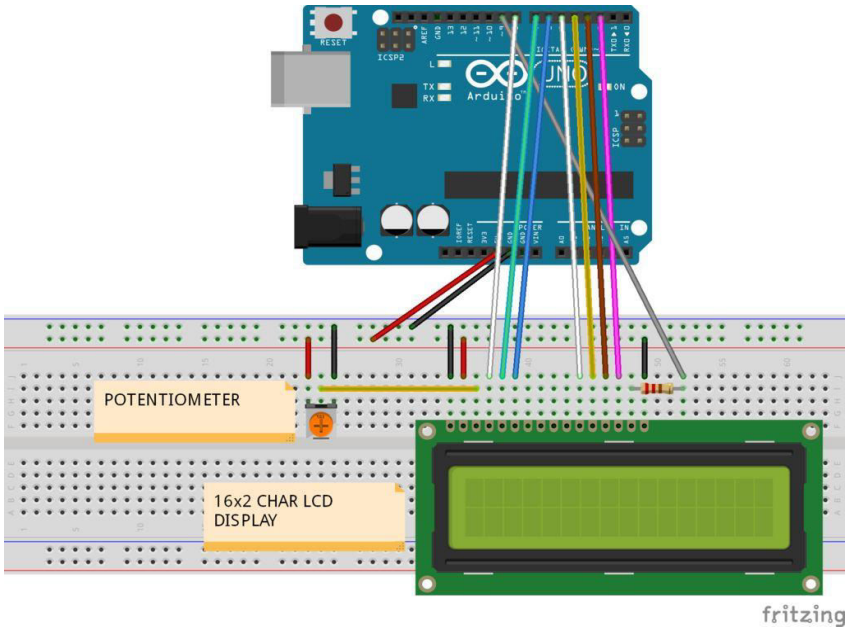

Figure 2: LCD Interfacing with Arduino

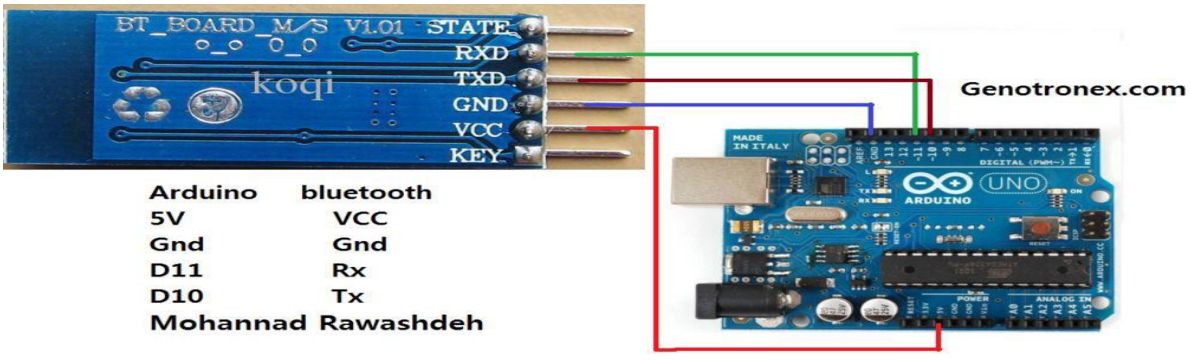

Figure 3: Bluetooth Module Interfacing with Arduino

Some Snaps of Project:

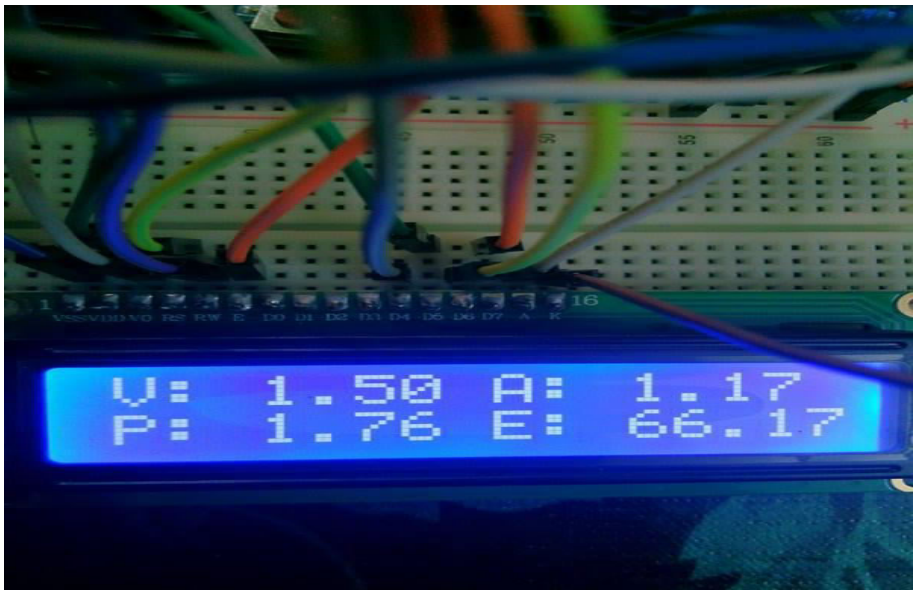

Figure 4: Output in LCD

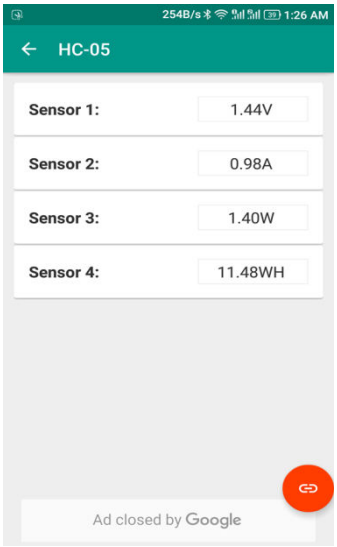

Figure 5: Output in Smartphone

Code:

```
#include <LiquidCrystal.h>
#include <SoftwareSerial.h>
// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
SoftwareSerial BTserial(10, 9);
void setup() {
  BTserial.begin(9600);
  lcd.begin(16, 2);
}
void loop() {
int f=0;
  int v=0;
  float vv;

  while(1){
  v=analogRead(A0);
  vv=2*v*(5.0/1024.0);
  lcd.setCursor(0,0);
  lcd.print("V: ");
  if(vv>1.4){
    lcd.print(vv);
      f++;
      break;
    }
    else lcd.print("?");
 }
  int a=0;
  float aa;
 while(1){
  a=analogRead(A1);
  aa=a*(5.0/1024.0)-2.5;
  aa*=10;
  lcd.setCursor(8,0);
  lcd.print("A: ");
```

```
  if(aa>.9){
    lcd.print(aa);
      f++; break;    }
      else lcd.print("?");

  }

  if(f==2){
    lcd.setCursor(0,1);
    lcd.print("P: ");
  lcd.print(vv*aa);
  lcd.setCursor(8,1);
    lcd.print("E: ");
  lcd.print(vv*(millis()/1000));
  }
  BTserial.print(vv);
BTserial.print("V ,");
BTserial.print(aa);
BTserial.print("A ,");
BTserial.print(vv*aa);
BTserial.print("W ,");
BTserial.print(vv*(millis()/1000));
BTserial.print("WH ;");
delay(10000);
lcd.clear();
  delay(1000);
}
```

Discussion:

From this project we have learnt how to work with arduino,LCD display a CT Sensor and Bluetooth Module. we are successfully completed our project.It can display any character. But there arose some problem while implementing yet. Sometimes, It stops showing data. But overall we tried to implement the process as in detail as possible.