Text On 4X64 Dot Matrix Display Through Arduino Nano

Rakib-Ul-Islam ID:1931283642

Abstract- With the technological advancements there have been advancements in ways of a displaying marketing and advertising of information. Dot matrix display boards are used for displaying advertisements and notices. These boards have become a primary thing in educational institutions, shops & various public places for displaying information regarding public transport timings, platforms numbers, various advertisements of products and many more important notices.

I INRODUCTION

A Dot matrix display is a display that we used to display information or notices on machines, clocks, departure indicators and many more devices requiring a simple alphanumeric display device of limited resolution. These Dot matrix display systems are specifically designed to be used at the colleges, universities, share-market, railway station, bus station, shopping malls etc. for displaying day-to-day updates, important notices and other necessary information continuously. It offers flexibility to display scrolling news or announcements faster than the any other programmable system. It is very easy to use and it has no harmful affecting on the surrounding environment.

On the other hand, the Arduino nano is Arduino's classic breadboard friendly designed board with the smallest - dimensions. It features of two RAM and a more powerful ATmega328P processor. It is the oldest member of Arduino nano family and it's similar to the Arduino Duemilanove but made for to use in the breadboard. It comes with pin headers that we used to attach with the breadboard and a feature of Mini-B USB connector. By using it we can build many useful projects that can make our life easy.

II OBJECTIVES

It is a very easy project. School or college students can do this kind of project easily. It is a very low-cost project and very few components are needed to build this project. The hardware section of this project is very much easy to build. We also can find tutorials in the internet about this project. The software or the coding part is little tuff, because we have to write many kinds of functions and loops. If any of the functions or loops doesn't run then no massage will be shown on the display.

III RATIONALE

We chose this project because it is easy and user friendly. It causes no harm to our environment. This dot matrix displays and Arduino's are broadly used by the students for their mini school or college projects. Now-a-days, these types of projects are more popular in the industrial segment for its low cost and durability compared to other projects. Advantages of choosing this project displays are:

1. We can easily compile the code through Arduino and uploaded in it.

2.We can update the massage and dynamic message display to audience.

3. Very few components are required for this project.

4. This project is durable and practically no maintenance cost needed.

5.It has low cost compared than other projects.

IV BACKGROUND STUDIES

At first, we didn't have any idea of this project. So, we use internet and find information about it. After that, we come to know that it is a very easy project. We also find out a tutorial of this project. This tutorial helps us a lot to understand the project. How the Arduino work, how the display work etc. We followed those instructions and build our project.

V COMPONENTES

To build these 4X64 dot matrix display we need these components:

1. **MAX7219 4 in 1 Dot Matrix Display**
   - A 4 in 1 dot matrix display module is a display board arranged in series form four 8x8 Dot Matrix which can print characters using LEDs or the group of LEDs.
   - It's easy to interface with the microcontrollers.
   - This display made of 32 columns and 8 rows of LEDs. Then, it has total of 32×8 = 256 numbers of LEDs.

   - Each 8X8 LED matrix has a MAX7219 common-cathode display driver IC with serial input and parallel output.
   - So, the display module has four MAX7219 display driver IC.

2. **Arduino Nano**
   - It is a small, complete, and breadboard-friendly board based on the ATmega328P

- It has 22 input or output pins in total. 14 of them are digital pins. And other 8's are analogue pins.
- It has 6 PWM pins among the digital pins.
- It has a crystal oscillator of 16MHz.
- Operating voltage 5V to 12V.

3. 5 lines jumper wire

These wires are used to stablish connection between the dot display and the Arduino Nano.

4. USB Cable

This cable is used to power and input data from laptop or pc to Arduino.

VI WORKING PROCEDURE

At first, gathering the parts was our top priority. So, we started to collect the knowledge of every component that we have to use to build our project from Google. Then we ordered the necessary components (like. Dot matrix display, Arduino Nano, jumper wire, etc.) from an online based shop. When we got the components we started our hardware section work. First, we attach the dot matrix display to 5 lines jumper wire through the sequence of its color code. Like, red cable is the VCC line, orange cable is the ground pin (GND), Yellow cable data input pin, green cable is the chip selection pin, brown cable is the clock pin (CLK). Secondly, we connected the jumper wires to the Arduino nano pins sequentially. Like, red cable connected with the 5volt, then orange cable connected with the ground pin, brown or clock pin connected with 13 no. pin, data pin connected with 11 no. pin, cs pin connected with 10 no. pin. Thirdly, we connected one side of the USB cable to Arduino Nano and the other side to our laptop. When we connected the USB cable to the laptop all the lights of the dot matrix display blown up, it means our hardware part works properly. Finally, our hardware section work was finished. Then we began writing code. In the code we have to do many things because the hardware part was completely dependent in that code. If we didn't write the code properly the Arduino will not compile it and it will show nothing on the display. In the code we write the code about scrolling effects, align, dead-band speed, scrolling, pause, display massage etc. these are the functions in which our display massage was dependent. If any of the function didn't run properly then our display will be blank, no massage will be shown. We write a function called scrolling, which

work is to control the display massage whether it will go right to left side or left to right side. Then, we write a loop for cur-massage and new-massage. Cur-massage is the welcome massage that will be shown just once in the display but the new massage will be shown multiple times until it's false. Then another code we write for the scrolling speed that will control the speed of the display massage like how fast it will move or how slow it will move to show the massage or information on the display. We write a code about the pause function that control how much time it will pause the scrolling and show the new massage on the display for some milliseconds. We also write the code for dead-band speed, effect and align etc. We can also fix the scrolling that only show a specific massage or information without scroll it. After finished to write our code we upload the code into the Arduino nano through the USB cable and find out that it (Arduino nano) compiled our code and it was then programmed by it. After some time, we noticed that the cur-massage and the new massage we entered into the code began to appear on the dot matrix display perfectly. Finally, all of our work's done and our project is ready.

VII CONCLUSION

This kind of project is very helpful for our daily life. Because we don't need to be anxious about the information or massage to deliver to our audience. We just write it in the code and upload it into the Arduino and it will display our massage to the audiences. It saves our time and energy. It has no harmful effects on our environment. By using this dot matrix display and Arduino we can build many more interesting projects like.

- Nano Automated plant Watering system
- Color-Changing Coffee Table
- Motion Activated Light
- Sensor Controlled Guard Lights Arduino Nano Security System

REFERENCES

1. https://www.engineersgallery.com/led-dot-matrix-display/
2. https://www.youtube.com/watch?v=SIlLj4thyso
3. https://microdigisoft.com/8x8-led-dot-matrix-interfacing-using-arduino-board/
4. https://www.embien.com/blog/dot-matrix-displays/
5. https://create.arduino.cc/projecthub/M-V-P/arduino-nano-clock-with-4x64-led-matrix-new-version-409730
6. https://lastminuteengineers.com/max7219-dot-matrix-arduino-tutorial