PERSISTENCE OF VISION USING ARDUINO

PROJECT REFERENCE NO.: 39S_BE_0215

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KEYWORDS:  
           POV (Persistence of Vision), Arduino Nano, DC Motor, Motor speed controller ,
           ATMega , 328 , USB Interfacing, Basic LED’s

INTRODUCTION:

The core phenomenon on which the entire project is based is the Persistence of vision. Persistence of vision is the phenomenon pertaining to the human eye by which an afterimage is thought to persist for approximately one twenty-fifth of a second on the retina. The way this phenomenon of persistence of vision works is based on the belief that human perception of motion (brain centered) is the result of persistence of vision (eye centered). Any motion that we see around us is the direct implication of persistence of vision phenomenon at work. Persistence of vision is still the accepted term for this phenomenon in the realm of cinema history and theory. Blinky POV [10] is a reprogrammable LED kit that uses persistence of vision to create the illusion of text or a small picture floating in the air.

The purpose of this project is to design and create a persistence of vision (POV) display. The display will allow the users to upload an image to be displayed through the wireless communication. A persistence of vision (POV) refers to the phenomenon of the human eye in which an afterimage exists for a brief time (10ms). A POV display exploits this phenomena by spinning in one dimensional row of LED’s through a two dimensional space at such a high frequency that a two dimensional display is visible.

METHODOLOGY:

Persistence of vision is an optical illusion in which many discrete images are blend into one single image on the human mind. This particular board has a set of 10 inline LEDs that you can program to display the POV effect. We have already implemented a POV display based on Arduino Nano. The display used is based on Arduino Nano that is used to control the switching of 10 red colored LED’s

The display consisted of the following components:

1. **Arduino Nano**: Processor used is ATMega328. Arduino Nano consists of 14 Digital input output pins and 8 Analog input pins. It is used for switching the LED’s at appropriate time.
2. **DC motor –12 V**: Used to rotate the assembly at high speed to induce the persistence of vision effect. We are using a DC Motor of 1500rpm.

3. **Motor speed controller**: it is used to control the speed of the motor.

4. **LED display**: 10 general purpose LEDs strip: Used as display agents.

5. **Battery**: We are using 9V battery.

**Block diagram:**

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TRANSMITTER  ARDUINO NANO  DC MOTOR  LED ARRAY
             ↓                ↓          ↓
                RECEIVER
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**OBJECTIVES:**

1. The purpose of this project is to design and create a persistence of vision (POV) display.
2. The display will allow the users to upload an image to be displayed through the wireless communication.
3. A persistence of vision (POV) refers to the phenomenon of the human eye in which an afterimage exists for a brief time (10ms).
4. A POV display exploits this phenomena by spinning in one dimensional row of LED’s through a two dimensional space at such a high frequency that a two dimensional display is visible.

**CONCLUSION:**

While we met all the specification detailed in our proposal and pleased with the performance we achieved, we have many plans for building on the initial foundation and continuing with additional refinement of the project. We succeeded in building a proof of concept, on the test bench, a rugged design; however, our project is only foundation on while many other interesting projects could be built.

The RGB LED’s have done a great job, however I would like to either get defused LED’s (we used a clear LED casing) or LED’s in which each color diode in LED housing was closer together. Sometimes, depending on the viewing angle, it can be difficult to tell that two different color diodes in the same LED aren’t two side by side LED’s.

In conclusion, this project really demonstrated competence combining a difficult integration of the mechanical and electrical system to build persistence of vision display. We built a general standalone system which can receive input from any device wirelessly to print out a display based on the pixel information. We demonstrated this by connecting with the alphabet character recognition system. The onboard system is fully contained system, capable of outputting the display varying RPM speeds and not carrying about what the system interfaces with it as long it follows a standardized wireless protocol developed by us.