

Design Persistence of Vision Control Using Arduino

Prabhu Mamarde¹, Uddhav Thakare², Shubham Rangari³, Saurabh Sambhare⁴, Chetan Dahapute⁵, Prof. M. K. Shriwas⁶

^{1,2,3,4,5}Department of Electronics & Telecommunication, Prof. Ram Meghe Institute of Technology & Research, Badnera, Amravati, India

⁶Assistant Professor, Department of Electronics & Telecommunication, Prof. Ram Meghe Institute of Technology & Research, Badnera, Amravati, India

Abstract - This paper mainly emphasizes on the Persistence Of Vision technology. In current era in which energy is the main factor in designing all the applications, maximum and efficient use of the energy is very important. A POV display has many advantages over a traditional CRT, LCD or LED display, like power savings, less complexity, easy configuration, attractiveness etc. To overcome the drawback of old processor we have decided to implement the same display atop a new and advanced microprocessor, the Arduino nano. This platform brings with it newer coding and a different understanding of peripherals. ARDUINO INTERFACE BOARDS provide us with a low-cost, easy-to use technology to create the project. We also aim to build the newer display to work with modern forms of interfaces. To accomplish this, we will be interfacing the display with an Android device. This project can be implemented with help of any Android Smartphone/tablet running Android 4.0+.

Key Words: POV, Arduino nano, Android, ATmega 328, USB Interfacing, Piranha LED

1. 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 after image 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 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 after image 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.

2. WHAT IS PERSISTENCE OF VISION

Persistence of vision refers to the optical illusion whereby multiple discrete images blend into a single image in the human mind. Our eyes offer one of the five specialized means by which our mind is able to form a picture of the world. The eye is a remarkable instrument, having certain characteristics to help us process the light we see in such a way that our mind can create meaning from it. Take the motion picture, the scanning of an image for television, and the sequential reproduction of the flickering visual images they produce. These work in part because of an optical phenomenon that has been called persistence of vision and its psychological partner, the phi phenomenon; the mental bridge that the mind forms to conceptually complete the gaps between the frames or pictures.

3. SYSTEM DESIGN

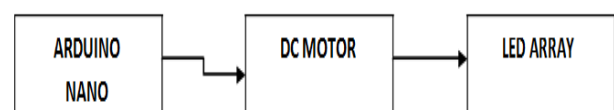


Fig - 1: Proposed Block diagram

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 8 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 8 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. Gear Motor: Used to rotate the assembly at high speed to induce the persistence of vision effect. We are using a DC Motor of 300rpm.

3. LED display: 8 general purpose LEDs strip Used as display agents.

4. Battery: We are using 3.7V (LiPo) battery.

4. CURCUIT DESIGN

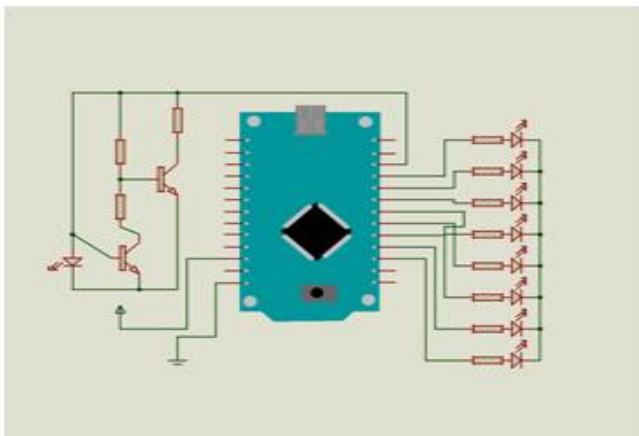


Fig – 2: Module Schematic

First we have to give a power supply of 12v 1Amp is given to the Gear Motor which is 300rpm and another supply from the Battery which is 3.7v LiPo Battery given to the Arduino Nano, LEDs, Opto Sensor. Whenever we turn ON both Power supply then motor starts rotating with his actual speed. Here we connect a small obstacle for that obstacle the IR rays of Opto sensor will be breaks this breaking of IR rays transistor will be trigger and because of this transistor LEDs start to blinking after every 2milliseconds. When the motor are rotating LEDs are also rotating and generate actual name acts like display this vision is called as Persistence of Vision

5. SYSTEM MODEL



Fig – 3: Final assembly of mounting piece and POV Display

6. CONCLUSIONS

The conventional LED displays used in advertisements and information display uses an individual matrix of LEDs for each character. For example in a display using 8X4 Led matrix for a single character, 10X8X4 LEDs would be required to display a word consisting of 10 characters, increasing the circuit complexity. Our circuit uses a low power Arduino nano board, with 7 multi-color LEDs and a low power motor. This technology saves power monumentally. The display is configurable to show any pattern in any color through an Android device that dictates its output as shown in figure 3. The display is extremely attractive to look at and gives a sense of being a transparent display. By using a motor of higher RPM, one can achieve more clarity in the display.

REFERENCES

- [1] Aditya Patel¹, Ashish Kumar Khandual², Kavya Kumar³, Shreya Kumar⁴, "Persistence Of Vision Display- A Review", IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE) e-ISSN: 2278-1676,p-ISSN: 2320-3331, Volume 10, Issue 4 Ver. III (July – Aug. 2015), PP 36-40
- [2] Mr. Tushar Bedke , Mr. Susmith Charantimath, Ms. Rashmi R Awaradi, Mr. Suneel Lamani, Mr. Amit Kodachawad, "Persistence Of Vision Using Arduino",

[3] Abhishek Singh, Prasad Thakur, Pravin Mote, "Persistence of Vision based display",

[4] Arthur C. Hardy, "A Study of the Persistence of Vision", Proceedings of the National Academy of Sciences of the United States of America, Vol. 6, No. 4 (Apr. 15, 1920), pp. 221-224. <https://www.jstor.org/stable/84382>

[5] Robinson P. Paul, Ghansyam B. Rathod, Vishwa R. Trivedi, Punit V. Thakkar, "Persistence of Vision Control Using Arduino", IJ. Intelligent Systems and Applications, 2014, 01, 102-111.

[6] Rathnayaka Mudiyansele Chanaka Prabhath Karunarathna, W. K. I. L. Wanniarachchi, "The persistence of vision (POV) LED globe", Proceedings of the Research Symposium of Uva Wellassa University, January 29-30, 2015.