
Design of a Magical Fan (POV Display using Arduino Nano Micro-controller)

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Abstract

In this paper, we present the design & development of a magical fan. The persistence of vision, an optical phenomena that operates in the background to recreate a series of visual pictures in a motion picture, is the basis of how the Propeller LED Message Display operates. The majority of current display grids use many LEDs, which uses a lot of energy. Virtual grids are used in the current work to cut down on the amount of LEDs. By aligning eight LEDs in a row on a propeller, virtual grids can be created. The propeller is rotated quickly to produce virtual grids for showing brief messages that can be utilised as a display gadget in marketing and advertising campaigns. The POV display uses less power than traditional dot-matrix screens. The work presented here is the mini-project work of the 2nd sem students of electronics & communication engineering department of dayananda sagar college of engg., bangalore.

Keywords—Health, Wealth, App, Fit, Medicine, Biology

1. Introduction

In this section, the design & development of a magical fan using the concepts of POV display using an Arduino nano micro-controller board. We introduce the work's fundamental introductory concepts in this part. The persistence of vision, an optical phenomenon that operates in the background to recreate a series of visual pictures in a motion picture, is the basis of how the Propeller LED Message Display operates. Through a PC interface, the display will let users programme a group of characters for the LED grid. More than 10–12 images per second cannot be processed by the human eye. When several images are displayed quickly one after the other, the impression that they are moving is created. The eight LED array rotates quickly, providing the impression to our eyes that there is a constant flying message [1].

When visual perception of an item continues despite the object shifting positions, this is known as the Perception of Vision (POV) or Persistence of Vision and it is an interesting sighting phenomenon. Humans view images in fractions of a second intervals; these images are only briefly stored in the brain (an instant). When you see a lighting source, such LED's or bulbs, switched on and spun around, that is an illustration of this phenomena. All of us must have first seen POV as children by observing the haphazardly flying insects under streetlamps and their stretched tails. We can view movies, animations, or waveforms on CRO since the rate is 30 or more frames per second. POV works because of the way images are processed in our brains; the visual cortex holds the image for a few moments. Similar to how a rotating aeroplane propeller forms a continuous circle, the spinning light tricks our eyes into thinking it is a continuous circle [2].

Advertisements, entertainment, decorations, animations, and more uses for the display are possible. More people will be persuaded by a message the more appealing it is. When it comes to presenting messages, POV displays are far more appealing than LCD displays or dot matrix displays. Our project's primary goal is to improve the effectiveness of the advertising media. POV also has a special place in 3D displays, malls, toys and games, animation, education, entertainment, and other fields.

2. Summary of the Problem

Humans view images in fractions of a second intervals; these images are only briefly stored in the brain (an instant). We can view movies, animations, or waveforms on CRO since the rate is 30 or more frames per second. POV works because of the way images are processed in our brains; the visual cortex holds the image for a few moments. Similar to how a rotating aeroplane propeller forms a continuous circle, the spinning light tricks our eyes into thinking it is a continuous circle. Messaging and animations are regularly displayed on LED displays utilising POV, rotating them in 2D or 3D for various types of messages [3].

The enormous number of LEDs required by conventional dot matrix displays increases power consumption. In comparison to a conventional CRT, LCD, or LED display, a POV display has several benefits, including power savings, simplicity, ease of configuration, attractiveness, etc. Advertisements, entertainment, decorations, animations, and more uses for the display are possible. The message that was uploaded to the Arduino using the Arduino software is displayed on the POV display. There should be no alterations or faults in the message's appearance. POV LED displays aid with marketing and draw in a sizable audience [4].

3. Proposed Methodologies Adopted [10]

The mini-project's hardware and software tools include the following components, viz., Blue LED lights (8), a 150 Ohm resistor, a plastic ruler, and an Arduino NANO. Dotted PCB, Arduino programming, Jumper wire with a female port, a 5V power source, an IC 7805 (used to change 9 volts to 5 volts), a small switch, a 12-volt tiny motor, a fan blade, PVC pipes, a soldering kit, connecting wires, and a 12 volt adapter, Making the POV display involves soldering 8 led lights to the PCB board [5].

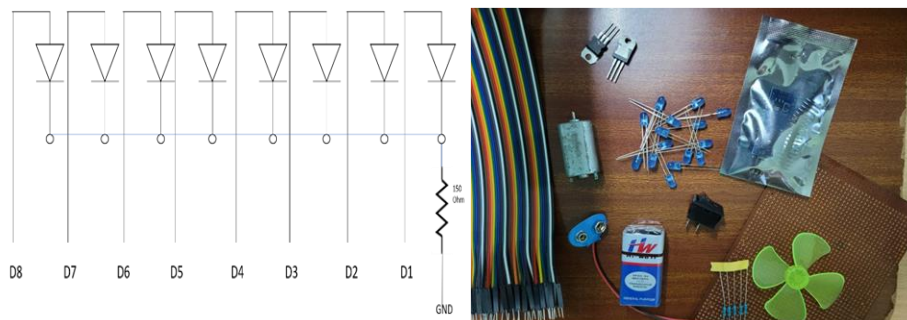


Fig. 1 : Constructing the electronics circuit diagram for the magical fan

4. Use of Arduino Micro-controller Nano S/W

Arduino IDE is the software programme used to complete the mini-project. On the laptop, the software is installed, and the settings are modified as necessary. You can obtain compilers and other drivers from the internet. The C++ code needed to operate the display is entered into the programme, then it is compiled and uploaded to the Arduino Nano [6].

5. Conclusions & Results

Finally, we present the hardware module of the rotating magical fan, which works on the principle of persistence of vision like in the mirage. The rotating LED display, often known as the POV display, uses the straightforward idea of lighting LEDs in different patterns to create the appearance of displayed text. The message is displayed in its entirety on the POV screen without any hiccups or

mistakes [8]. Compared to other displays, POV LED displays are superior in terms of power savings, simplicity, ease of configuration, attractiveness, etc. POV LED displays may draw a sizable crowd and aid with marketing. Note that if we type the text, it rotates & display is seen.

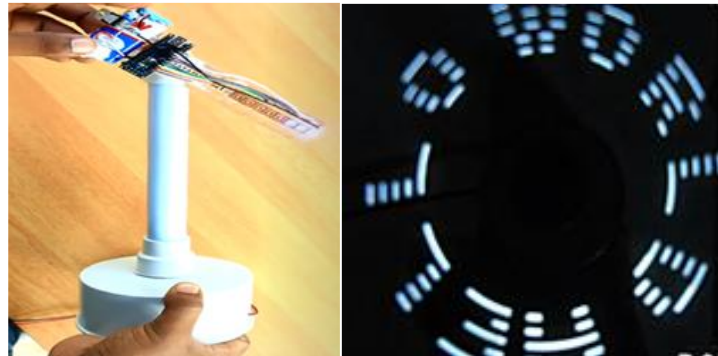


Fig. 2 : Designed & developed magical fan by the mini-project team

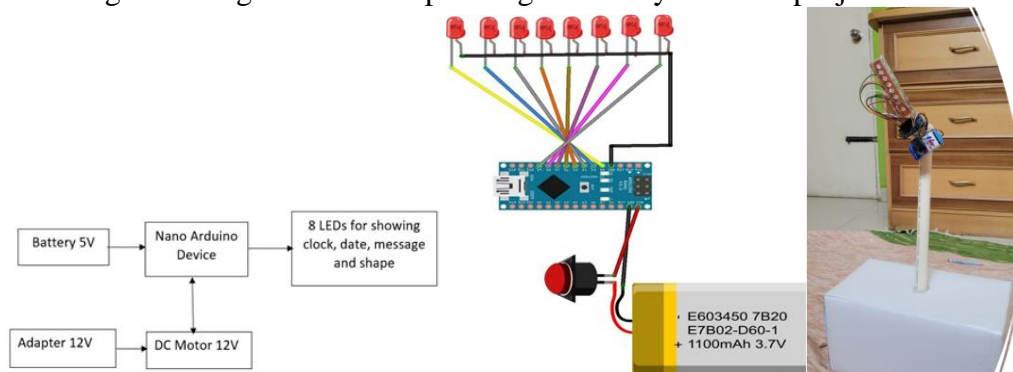


Fig. 3 : Block-diagram of the proposed magical fan display

6. Advantages

POV LED displays are superior to other displays in terms of power savings, less complexity, easy configuration, attractiveness, etc. POV LED displays are more attractive than LCD or dot matrix displays and are more eye-catching than those displays. They are also more attractive when compared to those displays [7].

More people will be persuaded by a message the more appealing it is.

When showing messages, POV displays are substantially more appealing than LCD or dot matrix panels.

POV LED displays are capable of drawing sizable crowds.

Our mini-project's primary goal is to improve the effectiveness of the advertising media.

Applications include advertising, entertainment, 3D displays, clocks with propellers, decorations, toys, and video games.

Soldering the wires, LEDs not blinking owing to loose connections, and creating connections were issues encountered during building.

Scale rotation brought on by excessive weight.

Because of the slow motor speed, the word could not be read.

Battery was depleting quickly, thus a BLDC motor with a controller had to be installed in its stead [9].

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