ITSP 2k16 Abstract

Team Id:-131
Team Name :- For Fun
Project Name :- Propellor Fan Clock cum Display
Club under which the project comes: Electronics club.

Reason for Choosing this project:- When we were discussing the ideas for the ITSP-2016 with the team leader we shortlisted many ideas. This was one one of them and this one seemed to apply many concepts. That could give us a good amount of learning at this beginning stage (Since all of us team members are perfect beginners.)

Team Members

[Name]	[Roll Number]	[Stab Id]	[Post in team]
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Introduction:-
The propeller clock is a linear array of light emitting diodes, rotating at a high angular velocity to generate a circular screen.
Now by synchronising these light emitting diodes, and keeping in mind the concepts of persistence of vision and limit of resolution, we can display a clock or whatever we want.

Inspiration Sources:-
The working of the fan clock cum display is similar
to the one shown in the link
And also a similar video we had seen on facebook

New Ideas and Development of the model proposed:-
We plan to improve the model so that it can display any data sent to it via wireless or wired data communication mechanism and act as a display..
We have tried to study about as much as we could according to permission of time before end-semester examinations and will complete it soon.

Working:-
The display unit at centre rotates at high speed with the led lights flashing at varying rates according to the rpm of motor. What we see is a blend of what we are viewing and what we viewed a fraction of a second before due to the flashing of led light.
The flashing and other factors will be controlled via microcontroller programming
and also a motor to which the rotating rod is connected.

Components required:

A list of all the components that we could think of that we may need is here:

1.)Arduino
2.)Motor
3.)Stand
4.)Led lights
5.)Resistors
6.) Few Wires

Cost Estimate:(In indian rupees)

1.) Arduino ~ 800
2.) Motor ~ 1500-2000
3.) Led lights ~ 100
4.) Miscellaneous (wires, pcb , etc..) ~ 500
5.) Stand ~ 200
6.) Display ~ 1600-2000

Therefore approximate cost: ~ 5000 INR

Salient features:-

Impressive design

Ease of storage (takes less space)Since it is a rotating assembly so it is like a rod so it can be stored in less amount of space than conventional displays and used to display the desired data when we want.

Flexibility of data displayed(anything can be displayed)

User friendly(can be turned on/off any time)

Skills we shall learn:-

We will be working as a team for the first time in this technical institute and this comes with a load of learning opportunities. So far as we can see we expect that we will learn the following skills:

1.)Arduino and microcontroller programming :

The project involves use of a microcontroller for proper functioning. So for that we need to learn how to program an arduino and the basics of it.

2.)Some more Coding:

Since we have already done CS101 so we have a taste of coding so this project will give us some more experience in coding.

3.)Error handling:

The project is bound to have errors and we may make blunders so this project will teach us how to rectify the errors and how not to do some circuit task that we need to do.

4.)Mechanism of illusion:

The project's basic principle is the illusion it creates due to the rotating series of LED lights that rotate and the illusion is created when a rapid sequence of glowing or off led are presented. For

efficient functioning of the project the rate of flicker has to be well in matching to the rotation speed thus we will learn how to vary the flicker rate with rotation speed.

Working Plan:

Here is our detailed working plan.:

Week -1 to 0:

Study of the project model in detail from sources and also plan that how exactly we will make the project and make more tight deadlines in our minds for ourselves so that we do not lose momentum while working And also we will discuss with the seniors on any loopholes in hour thinking that may have escaped our notice. Also the need of Arduino and AVR coding that we need to use in the project will be learnt by us in this phase. There is a requirement of calculating of various factors that will vary with the rotation speed (like the glow rate of leds) that calculation will be attempted in the most basic conditions. Also we will plan the algorithm here.

Week 1:

A few days (2-3 days):

Study the working in more detail if anything is required and procure all components .

A few more days (3-4 days):

In the first week we will finish any pending studies left (if any at all, however it is highly unlikely) and try to dive in deeper into the idea and try to figure out anything we may have missed out (by critical thinking and discussion with seniors/mentors which also if is left to do since we will try to do it in the above 2-3 days and week -1 to 0). Else we will start to do the planning of the working model of the device. We will start developing planning the circuit structure of the project. If time permits we will start doing trials with simple ideas in this week itself and make all circuit diagrams required and start making the prototypes. Also the mathematical calculations that were remaining shall be completed in this week so that the prototypes can be made. We will work more to develop the algorithm of the working model of the project .

Week 2, 3:

Design electronics, work on the circuit, program AVR,Arduino , print PCB , debug the circuit, first working prototype made:

Project working (actual thing after planning) starts here and and it involves many things.

The project is essentially an electronics thing. So here is the main work that we will do.

We will start to give a practical look to the so called theoretical circuit that we had planned and check it for errors.

We will now make the prototypes and also code the AVR/Arduino (microchip) and implement the algorithm into it and debug it so that all undesired output are eliminated. We will then start making the sample prototypes and develop them and keep testing them for the desired output and keep improving them.

When all the possible errors have been removed we will run a few tests and get our progress reviewed by mentor/seniors and ask for suggestions.

We will implement the suggestion by the seniors and then print the Circuit Board , debug it (take help from mentors if required) and now the first working actual prototype that looks like our desired will be made.

Week 4:
Debugging and Final Submission:
We will start improving on the prototype and debug it, get it reviewed and implement all the changes required and complete debugging.
Once debugging is over , the we will make the final model and test it properly and submit it finally.

Challenges that we may face:
1.) Connecting the circuit to the power source and motor since it's a rotating assembly.
2.) Synchronisation problem if speed of propellor is not exact (the required angular speed).
3.) Led array may not be sufficient to display images so we may need to add some smaller displays.
4.) Synchronisation of the glowing pattern of led and display with the rotating speed.