**SMART PEN STAND**

1. **Abstract:**

The project involves the making of a simple pen stand but with a twist. It is an electronic gaming enabled pen stand that is capable of interacting with many of the user’s interactions with the pen stand. This pen stand can be placed on the worktable and can provide refreshing breaks from work.

The pen stand will be automated with an Arduino fitted with an Adafruit neopixel shield, and consist of 3 LED matrices, powered by a battery, all enclosed within an acrylic dome of the appropriate size to fit all the components inside, as well as be small enough as other pen stands to occupy minimum space on the worktable. The program will be basically built using the libraries MD Parola and FastLED, and many others according to the requirements faced.

Every time a pen is removed from the stand, it will be able to display a LED animation, count how many times pens have been removed, and even capable of playing Slot machine game, and other small games like ‘Hit the Moles’ using the pens as instruments.

This project can infinitely be extended by attaching more components and extending its functions easily, such as – timer/clock on the LED, solar powered battery, alarm clock with a beeper, voice recognition commands, buttons to operate/play games.

I wish to explore the feasibility of all these functions by experimentation.

1. **Objectives:**

* Pen stand with LED matrices to count the number of pens
* Slot machine game
* Other games like “Hit the Moles” using pens
* Buttons
* Timer + Alarm clock

1. **Motivation / Origin of the project:**

* I wish to make a simple but complete product in itself, rather than assuming conditions to simulate an environment, to better understand the technology and components that I would be using and immerse myself in them
* To make a product useful in regular usage
* The convenient positioning of the product – the pen stand - on my worktable could serve as a reminder of what I have already made, further motivating me to follow my passion of electronics.
* To experiment on my own with sensors and components and understand and discover the limitations and capabilities, rather than just following instructions previously written by somebody else, and believe that this toy project would definitely be a perfect learning experience.
* The project would not incur much costs as I would require no special equipment, and hence I would have lesser obstacles for experimentation.

1. **Basic state-of-the-art:**

Cited work (paper / patent / product):

<https://www.hackster.io/AdiK/pen-stand-gaming-enabled-c6fb49?ref=channel&ref_id=424_trending___&offset=8> by AdiK

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| *Highlights* |
| * Slot machine game (every time the pen is removed, each of the LCD matrices scroll through different figures and randomly end up on one figure. If all the three LCD matrices en up on the same figure, you have won the game, else you have lost.) * Pens counter (Counts the number of pens that are removed from the pen stand) |

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| *Challenge(s)* |
| Not mentioned any as such. But there is a serious size restriction to fit all the equipment on a normal-size pen stand, and power constraints too. |

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| *How can you overcome the challenge with your proposed work?* |
| For the power constraint, I might experiment with solar powered batteries, piezoelectricity or other sources of energy. The size constraints can be dealt with by testing different positional arrangements of the components, and using smaller advanced equipment. I intend to extend the idea – by expanding the project for other purposes, such as an alarm clock, as well. |