EMBEDDED SYSTEMS LAB

PROJECT DOCUMENTATION

DUAL-AXIS CAMERA STABILIZER WITH SECURED AUTHENTICATION.

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Introduction

This is the documentation about the Dual-axis camera stabilizer. This device is generally called as Gimbal. The main feature of Gimbal is to stabilize a camera mounted on it in all degrees of freedom with free motion and stable image and video capturing. This device can be used to capture shots where humans can't reach or very turbulent situations where camera is needed to be held stable. The device comes with secured authentication.

Gimbal

A **gimbal** is a pivoted support that allows the rotation of an object about a single axis. A set of three gimbals, one mounted on the other with orthogonal pivot axes, may be used to allow an object mounted on the innermost gimbal to remain independent of the rotation of its support (e.g. vertical in the first animation). For example, on a ship, the gyroscopes, shipboard compasses, stoves, and even drink holders typically use gimbals to keep them upright with respect to the horizon despite the ship's pitching and rolling.

Our project mainly focuses on stabilizing camera movement on a dynamic state of turbulence and maintains a clear picture and video frame with any camera device. The device is authenticated with a safe and secured authentication system which only allows the authenticated users to use the system.

Materials Required

- Tiva C Launchpad(1) Rs. 3164/- https://www.amazon.in/TEXAS-INSTRUMENTS-EK-TM4C123GXL-TM4C123G-LAUNCHPAD/dp/B00HKIDHI2
- Servo Motors(2) Rs. 299/- https://www.amazon.in/Easy-Electronics-Servo-Motors-color/dp/B077TQD1N4/ref=sr_1_5?keywords=servo+motors&qid=1554045042&s=gateway&sr=8-5
- Keypad(1) Rs. 176/- https://www.amazon.in/Robodo-MO14-Matrix-Membrane-Arduino/dp/B073Q33R6K/ref=sr_1_6?keywords=arduino+Keypad&qid=1554045096&s=gateway&sr=8-6
- Light Emitting Diode(5) Rs. 10/- https://www.amazon.in/REES52-100Pcs-Emitting-Highlight-Arduino/dp/B075VZFVCS/ref=sr_1_10?keywords=led+for+arduino&qid=1554045214&s=gateway&sr=8-10
- LCD Display Screen(1) Rs. 180/- https://www.amazon.in/Silicon-TechnoLabs-Alphanumeric-Display-JHD162A/dp/B00XT53RI0/ref=sr_1_6?keywords=lcd+display+module&qid=1554045372&s=gateway&sr=8-6
- MPU6050 Module Rs. 200/- https://www.amazon.in/REES52-GY-521-Mpu6050-Accelerometer-Arduino/dp/B008BOPN40

How to use Gimbal?

Gimbal starts with a Welcome message printed on the LCD Display followed by the System Configuration in which the MPU6050 configures itself to the horizontal position. User should hold the device horizontal and still while system config. is running to ensure a stable angle at setup. Now user is authenticated on the basis of a 5 digit numeric password entered by the Keypad passing which the user gets authenticated and can use the Gimbal. Now the Gimbal is set-up and ready to use. User mounts the camera on the top base plate and can start using the device for a seamless stable image/video stability.

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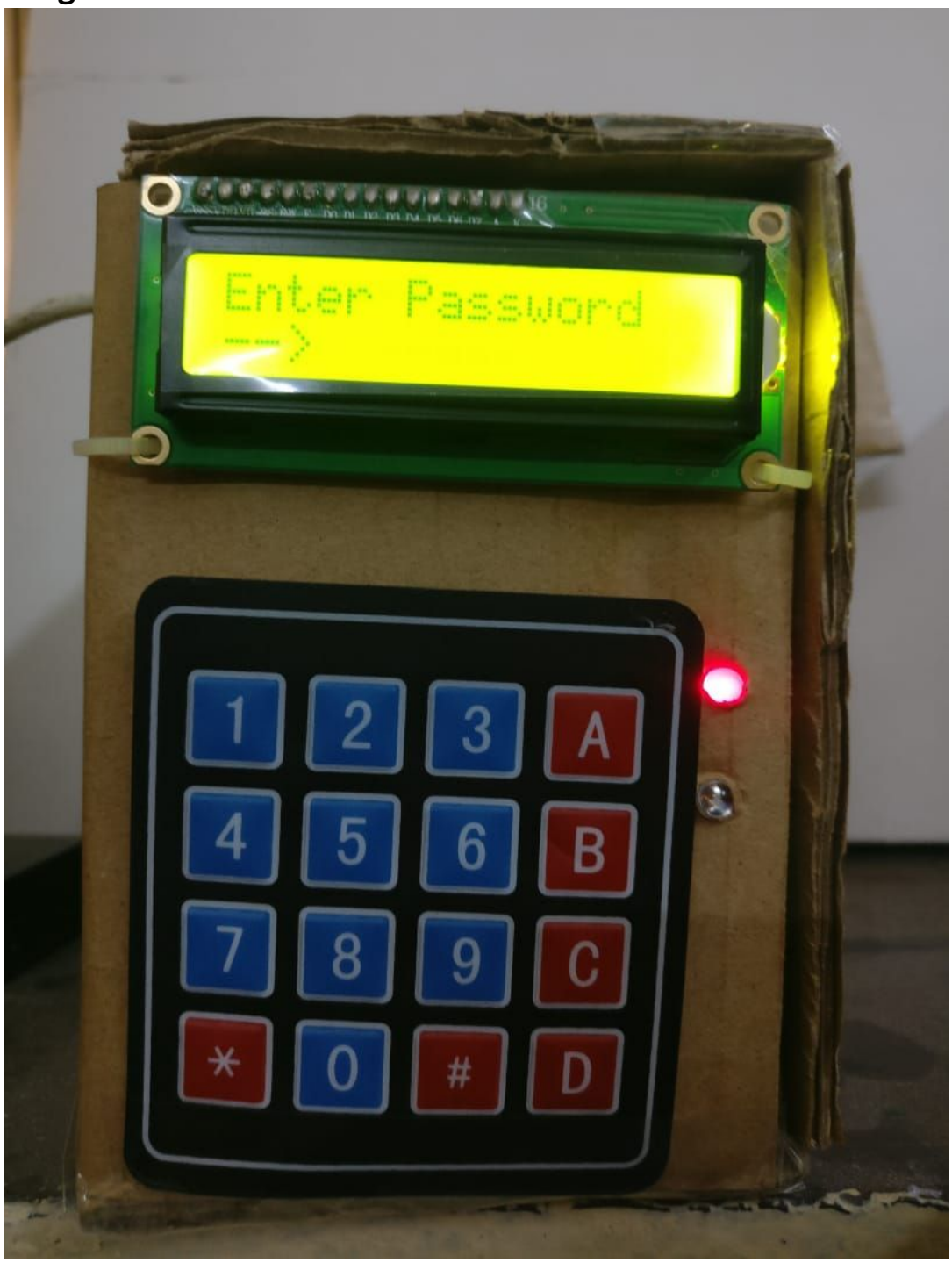
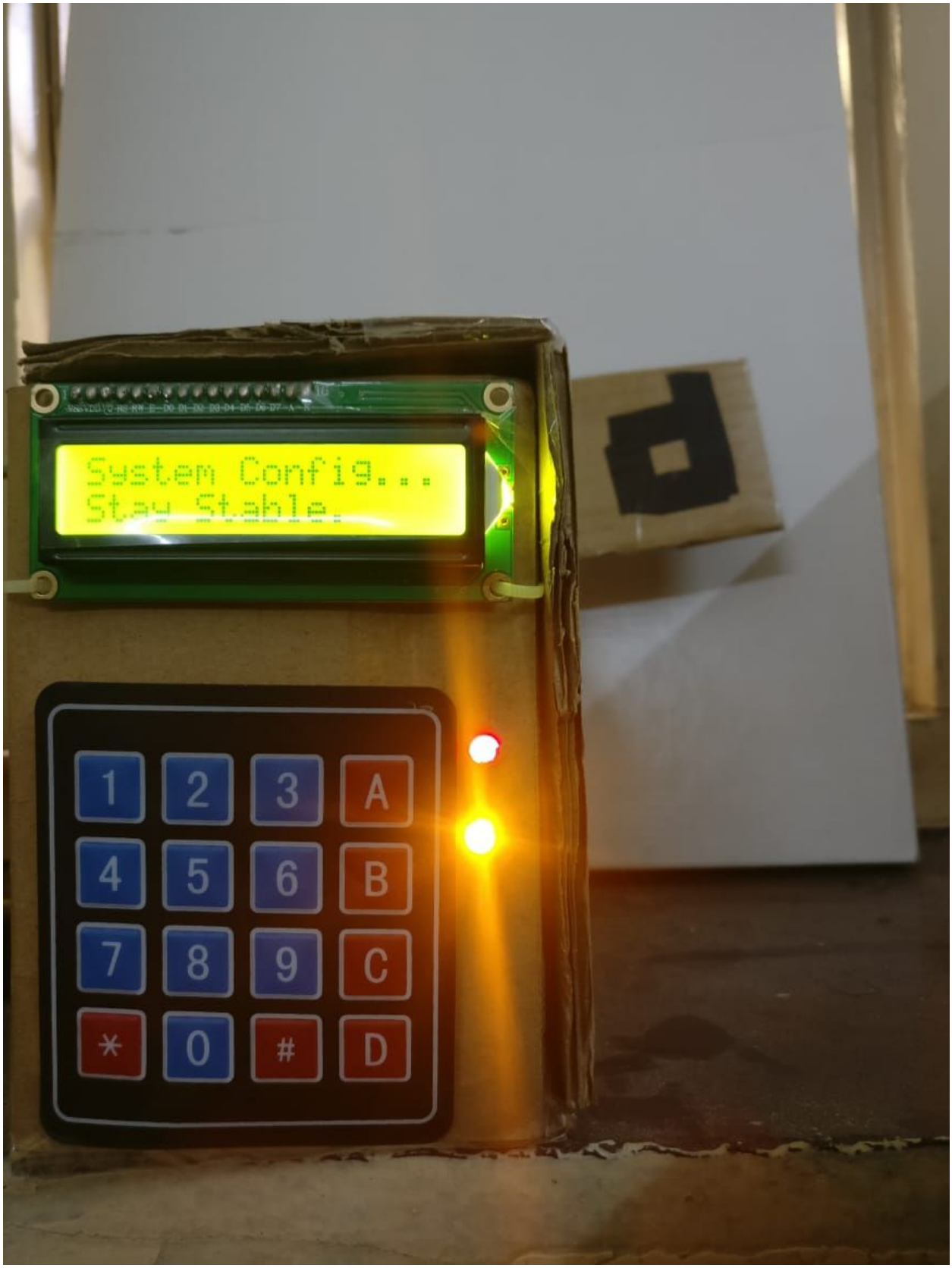
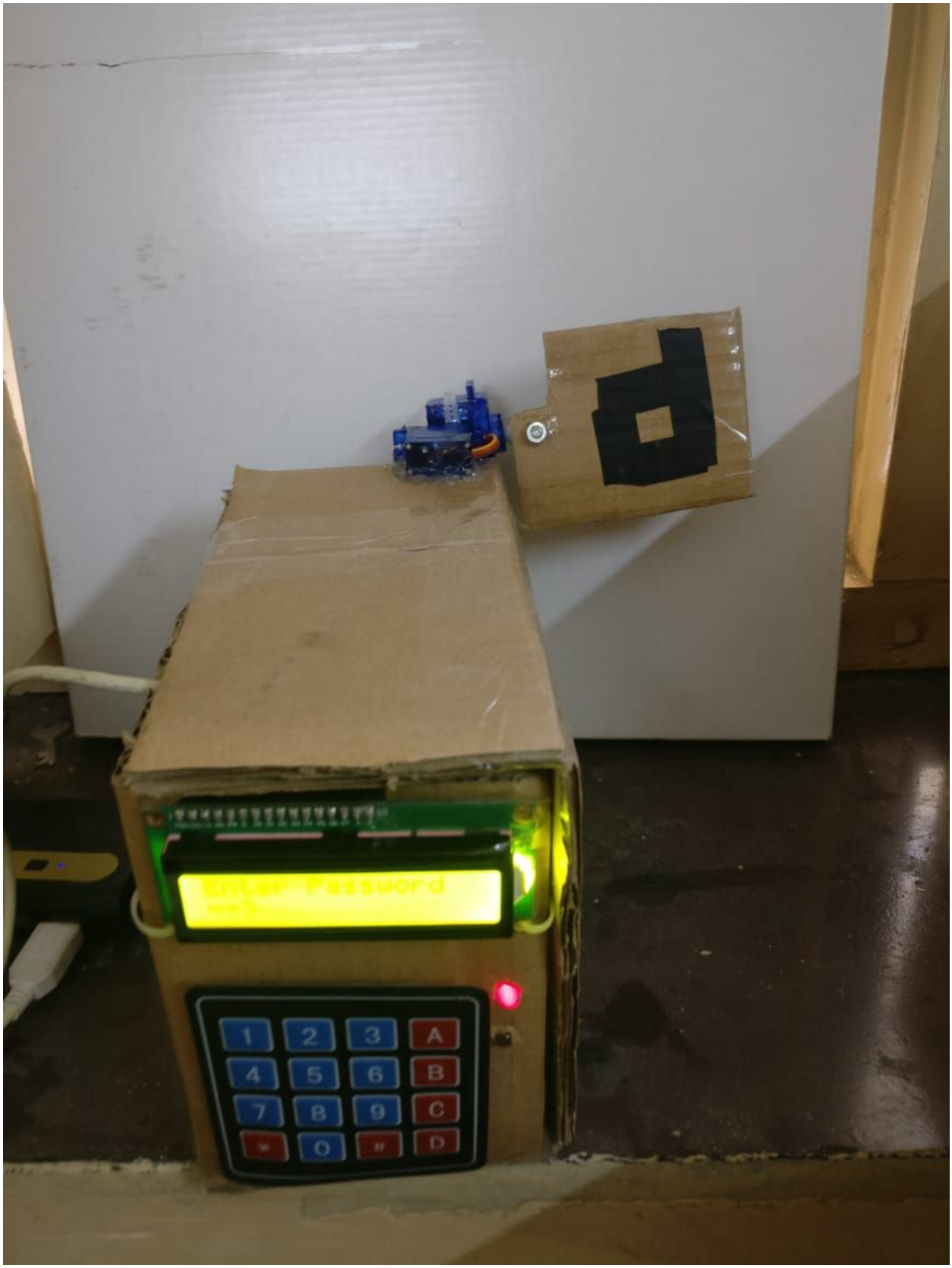
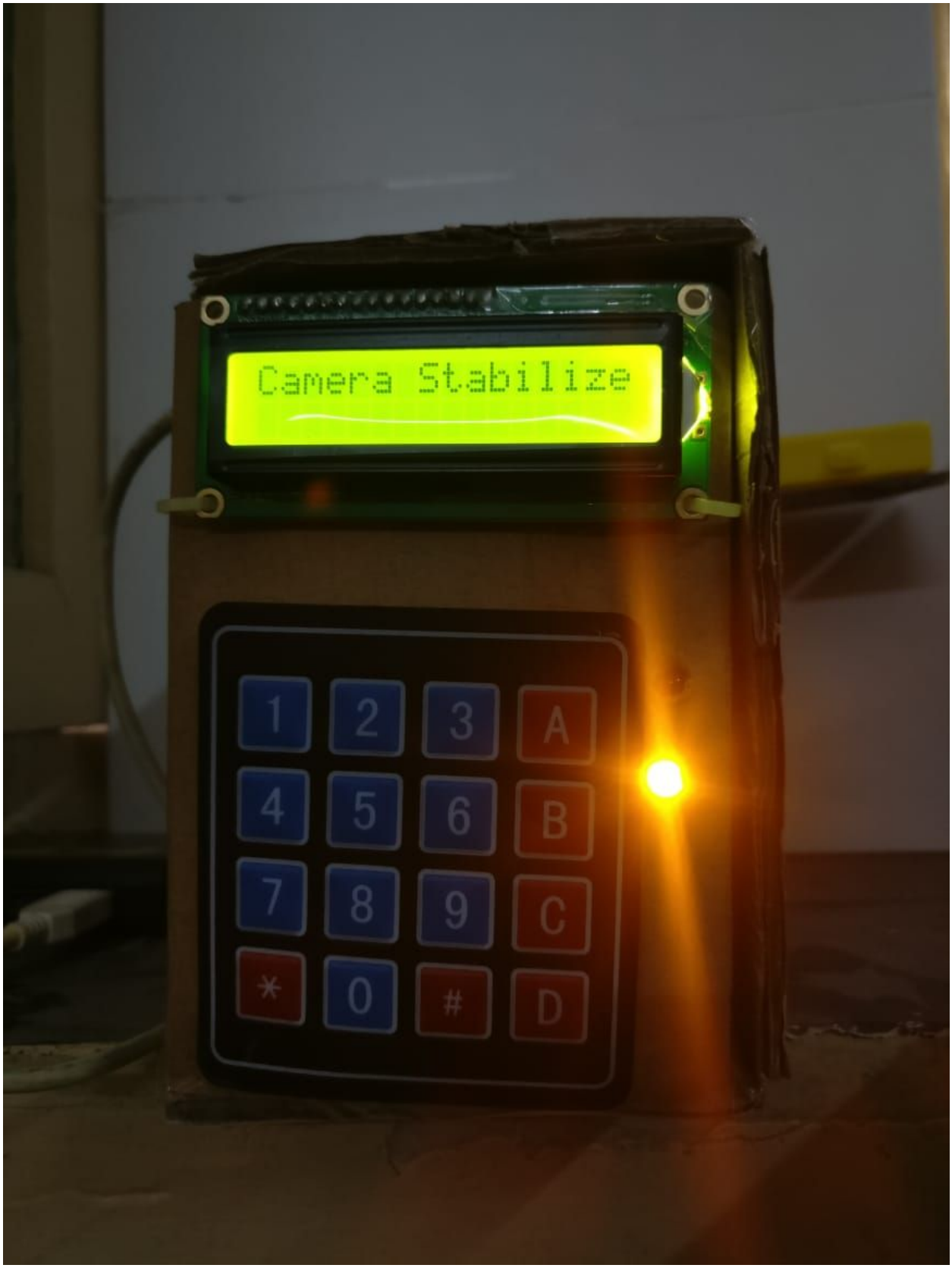
Images:




System Config...
Stay Stable
1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D


Enter Password
1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D


Camera Stabilize
1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D