

Iteration-1

Dated 11th April 2024

Patiala

3D model

The model was printed and assembled with the guidance of **Mr. Faheem** and **Dr. Vineet Srivastava**, under the supervision and mentorship of **Dr. Sumit Kumar** and **Dr. Sachin Kansal**. We used thrust ball bearings and axial ball bearings along with epoxy, to assemble the model. Next, with the permission of **Dr. Shalini Batra**, Head CSED and **Dr. R K Duvedi**, Associate Dean ELC, under the guidance of **Mr. Manoj** and with help from **Mr. Rohit**, the model was successfully installed with stepper motors(28-BYJ-48) that ensured vertical and horizontal changes in motor angles.

The model was designed with help from Dr. Rohit, MED, and Dr. Devender, MED. It was designed in Autodesk Fusion 360 and was exported to *.stl files. These have been attached for reference.

Post this the members responsible for Computer Vision and ML processing, suggested to use the YOLOv8-POSE detection model, and which was run on YOLOv8n, due to environment restrictions.

For this Iteration, **Nvidia Boards were NOT used for processing any data**. The model was run on a Dell Inspiron 7573 laptop, with i7-8th gen and no dedicated graphics processor. The connection was done via USB cables to the Arduino Mega and Camera, and the algorithm for actuating the required movement was a crude one, the explanation for which is given later. The Arduino Code and Python code are in the root folder of this document, along with the required weights file.

The instructions for operating the model at this phase are attached in Tutorial PDF file. The overall system is a simple closed-loop program.

Problems with current Iteration:

1. Camera might track something out of hardware limits.
2. Processing is slow, response time is bad.
3. Nvidia board was not implemented.
4. Lack of appreciable GUI for end-users.

Model for Actuation of movement

