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Pick and Place Robot Arm

Conceptual Design Report

Discussion Group C
Group 8

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EN2160 - Electronic Design Realization

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Contents

1 Robot Arm Concepts

1.1 Multi Axis Robot Arm

A multi-axial robot arm is an advanced robotic design characterized by its ability to move in multiple directions or axes, offering increased degrees of freedom (DOFs) compared to traditional robotic arms. This enhanced flexibility enables the robot to perform complex and intricate tasks with precision and adaptability.

1.1.1 Multi Axial Robot Arm Concept Design

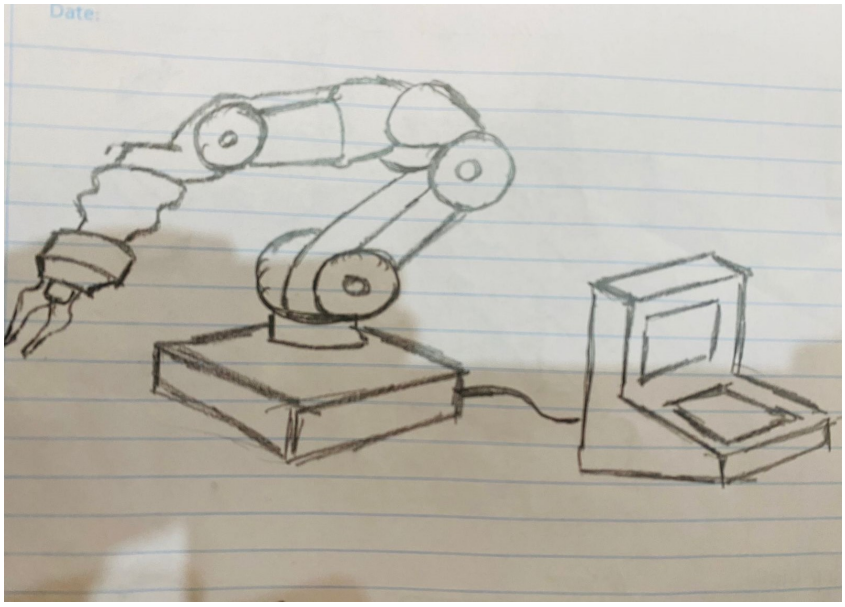

Figure 1: Multi Axial Robot Arm Concept Design

1.1.2 Multi Axial Robot Arm Block Diagram

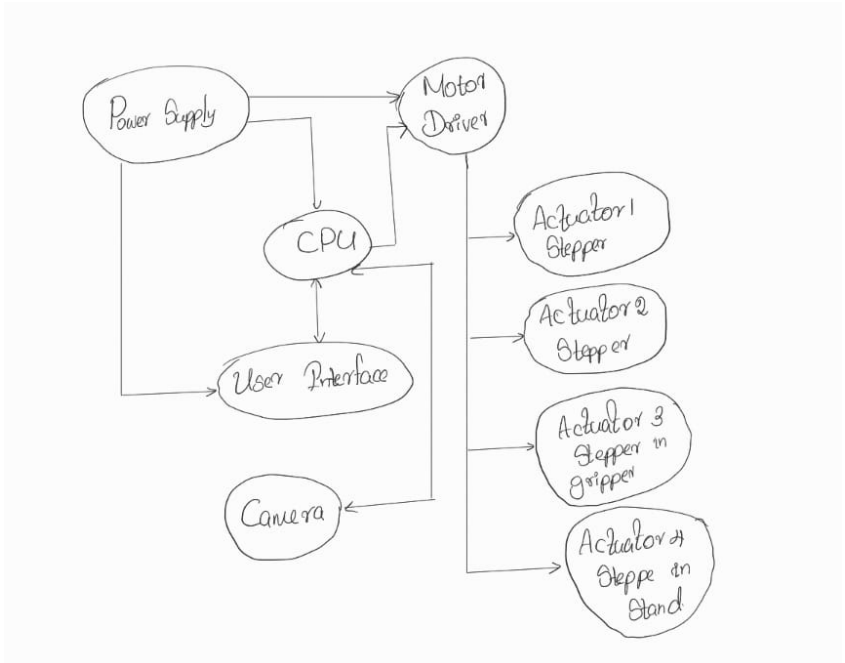

Figure 2: Multi Axial Robot Arm Block Diagram

1.2 Screw-Rod Based Robot Arm

A Screw-Rod Based Robot Arm is a specialized robotic design that utilizes a screw or rod mechanism for its motion, enabling it to move vertically and horizontally with precision. This type of robot arm design is particularly effective in applications where linear motion along specific axes is crucial.

1.2.1 Screw-Rod Based Robot Arm Concept Design

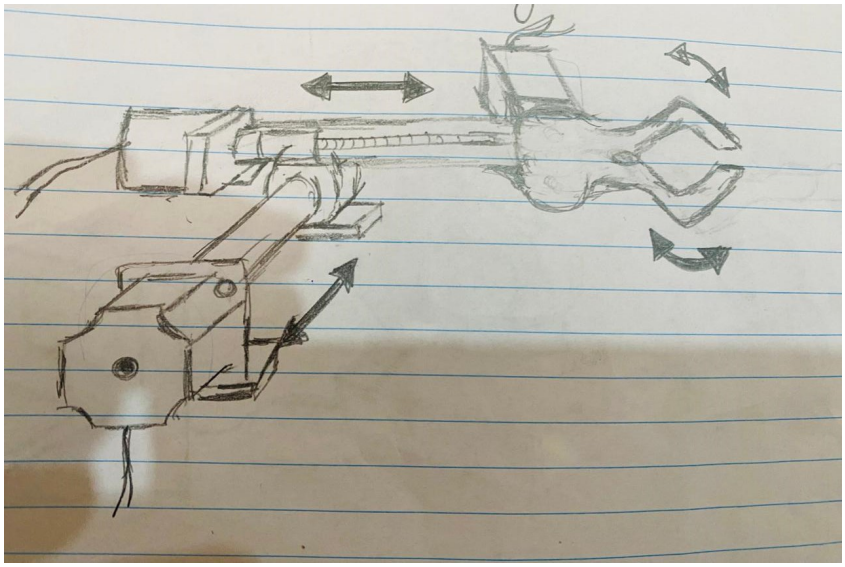

Figure 3: Screw-Rod Based Robot Arm Concept Design

1.2.2 Screw-Rod Based Robot Arm Block Diagram

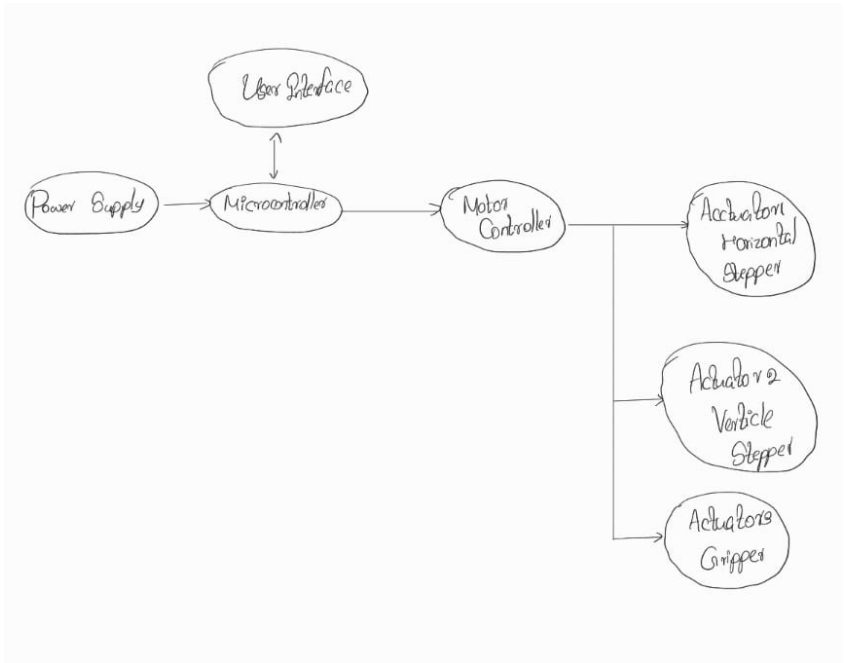

Figure 4: Screw-Rod Based Robot Arm Block Diagram

1.3 Feeder Assembler System

A Feeder Assembler System is a sophisticated automation solution designed to efficiently gather components from multiple conveyors and assemble them at a centralized point. This system is widely used in manufacturing and assembly lines to streamline production processes and enhance overall efficiency.

1.3.1 Feeder Assembler System Concept Diagram

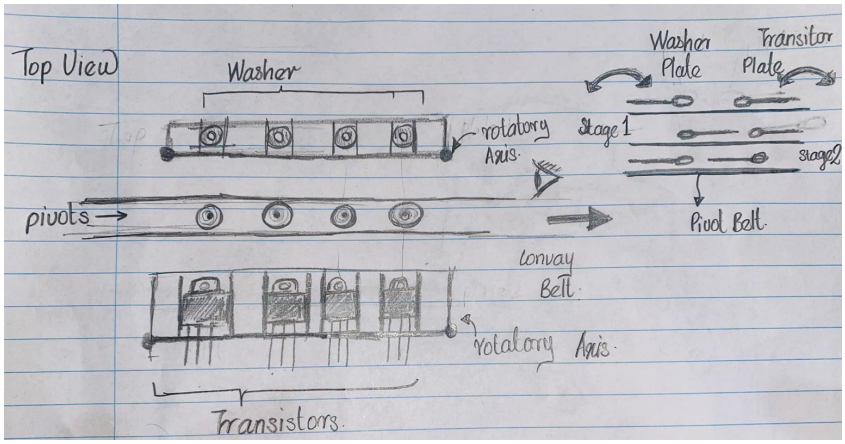

Figure 5: Feeder Assembler System Concept Diagram

1.3.2 Feeder Assembler System Block Diagrams

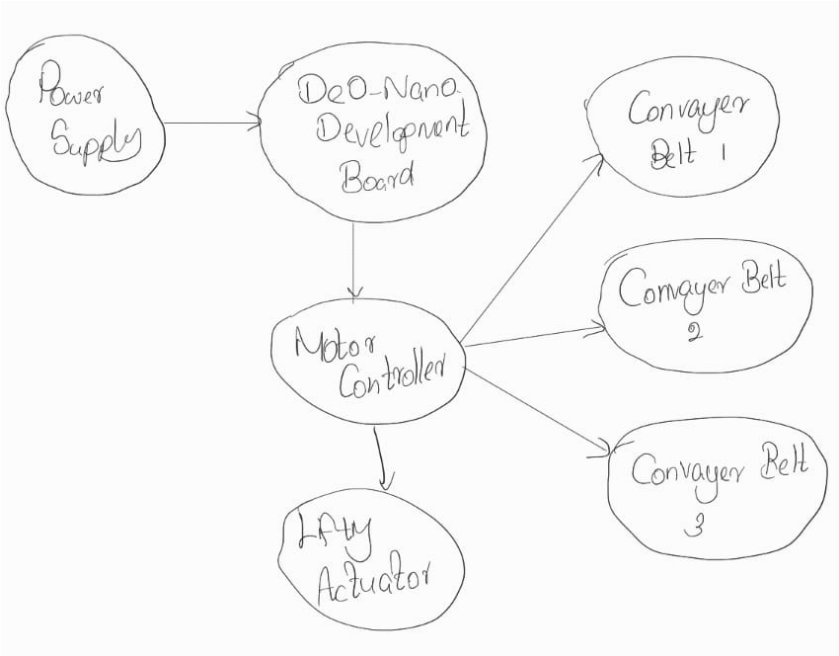

Figure 6: Feeder Assembler System Block Diagram

2 Gripper

2.1 Mechanical Gripper

This is a concept of the gripper that uses stepper motor and mechanical system for gripping

2.1.1 Mechanical Gripper Concept

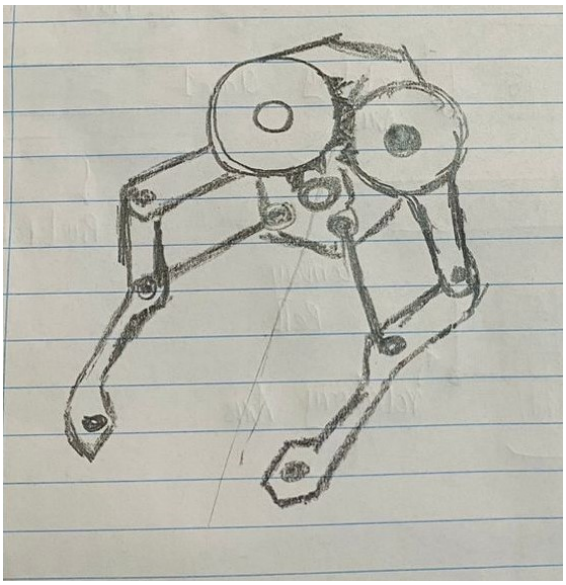

Figure 7: Mechanical Gripper Concept

2.1.2 Mechanical Gripper Block Diagram

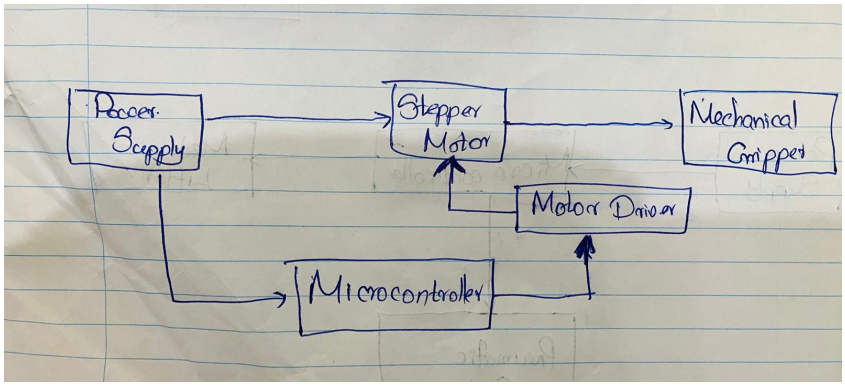

Figure 8: Mechanical Gripper Block Diagram

2.2 Suction Gripper

This is a concept of the gripper that uses pneumatic vacuum concepts to suck the components and grip them.

2.2.1 Suction Gripper Concept Diagram

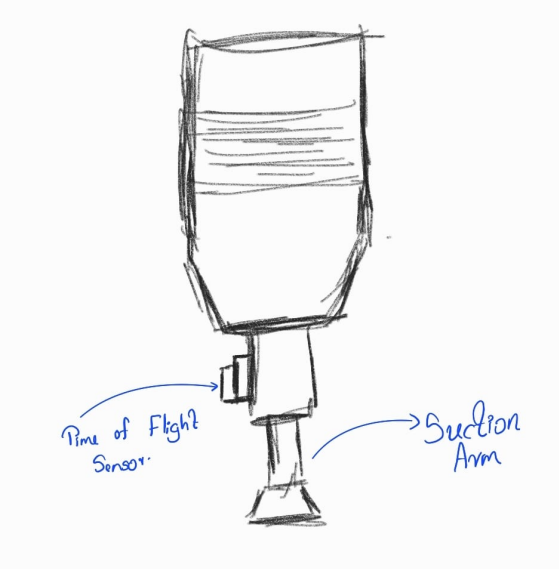

Figure 9: Pneumatic Suction Gripper Concept Diagram

2.2.2 Pneumatic Gripper Block Diagram

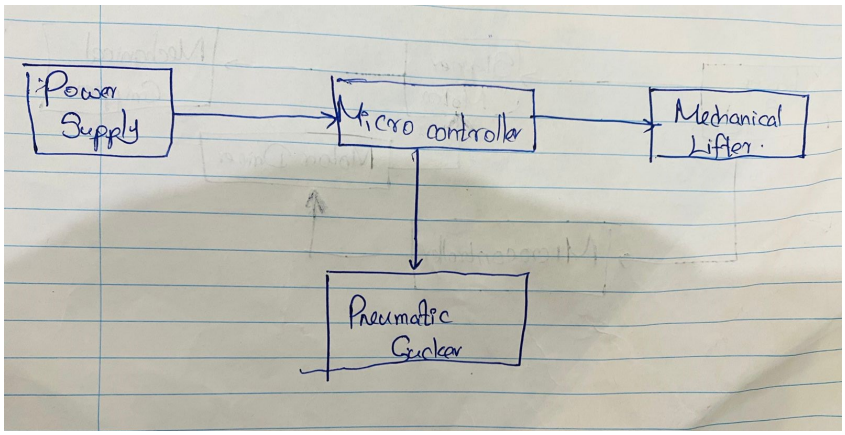

Figure 10: Pneumatic Suction Gripper Block Diagram