AUTOMATED ROBOTIC ARM FOR OBJECT SORTING *HANDWRITING UNG STM32*

INTRODUCTION

Automation through emeded systems improves precision and reduces human labor in industrial and scedemic domains, This project presents a 4-4-DOF-robotic arm powered by an STM32 microcontroller to pick, place, and write characters using servo coordination servo.

PROBLEM STATEMENT

Manual sorting and handling are slow and erroir prone.

Existing robotic arms are costly and complex.

OBJECTIVES

- Develop a 4-DOF-roobotic arm using servo motors.
- Implement automated grip control for picking and placing
- Program the arm to write basic alphabets and shapes using trajectory planning
- Oplimize servo control for precision and repestability

RESEARCH QUESTION

How can an affordable STM32 based robotic arm achieve precise sbject nia-hipulation at and handwriting autom-

Servo motors

PWM

Servo motors

Base

SYSTEM DESIGN OVERVIEW

Convapiain compere

Progranhee
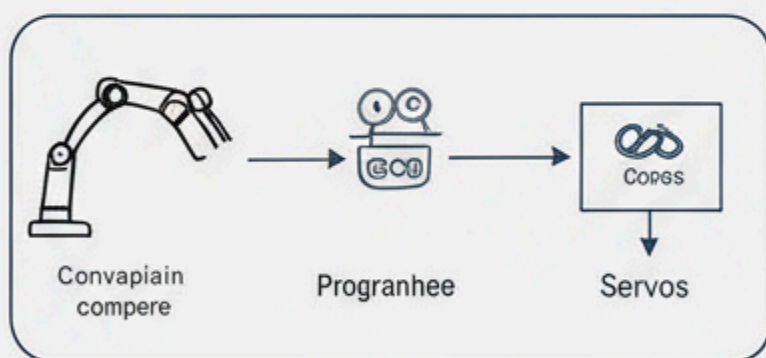
Servos

KEY FEATURES

- Automated motion sequencing (C code)
- Real-time servo control with calibrated angles.
- Cost-effective and modular hardware
- Future-ready design supports vision and sensor integration

OUTCOME

Performs accurate pick and-blace operations.

Demonstrates handwriting automation (c.g." A

Achieves high precision, low latency, repestable control

Validated as an educational and prototype-scele

CONCLUSION

The STM32 based robotic arm successfully compines atfordability, reltuabi-lity, and accuracy.

Estabiishes a firdlistion for future enttancements such as At bssed vision, gecturc control, and dynamic motion pianning