ABSTRACT

Febrian Saputra, 2025. ***Design and Implementation of a Hand Gesture-Based Robotic Arm Using Arduino Nano and MPU6050 Sensor*.** Final Project, Informatics Study Program (Bachelor), IndonesianInformatics & Computer Science. Supervisor: Dr. Evy Poerbaningtyas

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The advancement of robotics technology has driven innovation across various sectors, including the development of robotic arms to support human activities, particularly for individuals with disabilities.

This study aims to design and implement a robotic arm that can be controlled in real time through hand gestures using the MPU6050 sensor and Arduino Uno microcontroller. The main problem addressed is how to create an intuitive and effective control system capable of accurately representing hand movements. This is an applied research project that begins with the design of a 4DOF robotic arm mechanism, followed by hardware integration, Arduino programming, and performance testing. Hand movement data is collected through an IMU (MPU6050) sensor mounted on a glove, which is calibrated to detect the user's hand motions. The analysis focuses on the accuracy and stability of the system's response in mimicking basic human arm movements. The results indicate that the system can perform its control functions well, despite challenges related to sensor accuracy and the limited processing power of the Arduino Nano. This research is expected to contribute to the development of affordable and user-friendly assistive technologies that are accessible to the broader public.