

ABSTRACT

Members of the Indonesian Army and Polri often have to carry out tasks that require excellent physical condition. The Chin-up and Pull-up tests are physical evaluations used to measure the strength, endurance and physical abilities of prospective members. Currently, physical test measurements are still carried out manually, which takes longer and is prone to human error. The main problem in this research is developing a system that is able to increase accuracy in the physical selection process for prospective members of the Indonesian Army and Polri, especially in calculating repetitions of Chin-ups and Pull-ups.

The solution offered is the development of a sensor-based Chin-up and Pull-up counter system that uses an MPU6050 sensor and an ESP32 microcontroller connected via Bluetooth. This system is designed to detect and count the number of Chin-ups and Pull-ups performed by the user automatically. Apart from that, this system is also equipped with a website that allows real-time monitoring and recording of results.

Tests were carried out with eight respondents involving three movement scenarios for chin-ups and pull-ups, each with different frequencies and time intervals. The movements carried out are measurements of correct and incorrect movements. In the chin-up and pull-up tests, there is a graph that shows the angular waves of the hands and feet produced in movements with free time intervals that are more varied compared to movements using time intervals of 2 seconds, 4 seconds and 6 seconds. Additionally, movements with longer intervals tend to produce less movement, but with greater stability. In some graphs there is also a large vibration at the beginning of the test caused by noise when adjusting the respondent's initial position, but in this adjustment phase, the movement pattern becomes more consistent. Test results show that this system is able to provide accurate results in calculating the number of repetitions of chin-ups and pull-ups. Quantitative data shows high measurement accuracy with minimal error. Thus, this system can improve the physical selection process for prospective TNI AD and Polri members, ensuring prospective members meet the required physical standards.

Keywords: *Chin-up, Pull-up, Sensor, MPU6050, ESP32*