

ABSTRAK

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Judul : **SISTEM DETEKSI DAN *AUTO-COUNTER* GERAKAN *PUSH-UP* BERBASIS *IMAGE-PROCESSING***

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Institusi Kepolisian Republik Indonesia menjaga kebugaran dan ketangkasan setiap anggotanya melalui tes kesamaptaaan secara berkala. Oleh karena pentingnya test kesamaptaaan ini, maka setiap Kepolisian Daerah berusaha meningkatkan performa layanan pelaksanaan test kesamaptaaan. Sekarang ini penyelenggara test kesamaptaaan masih dilakukan secara manual. Solusi teknologi untuk mengukur dan menghitung test kesamaptaaan sangat diperlukan. Kajian tentang monitoring dan pengukuran gerakan *push up* oleh peneliti sebelumnya lebih banyak menggunakan sensor yang menempel pada badan atlet, yang dapat mengganggu performa gerakan atlet. Oleh karena itu diperlukan sistem monitoring dan pengukuran gerakan *push up* yang tanpa mengganggu gerakan atlet. Alternatif sensor tanpa menempel pada badan atlet dalam gerakan *push up* adalah sensor kamera. Penelitian Tugas Akhir (TA) ini difokuskan pada pengembangan sistem deteksi dan *auto-counter* gerakan *push up* berbasis *image processing*. Sensor yang digunakan adalah kamera kinect XBOX 360 untuk mendeteksi objek dinamik gerakan *push up*. Kamera akan mendeteksi gerakan *push up*, selanjutnya aplikasi software berbentuk *Graphical User Interface* (GUI) mengolah data *skeleton tracking* gerakan *push up* melalui garis batas atas dan garis batas bawah. Titik *skeleton* yang dipindai berjumlah sepuluh titik. Pada aplikasi ini, gerakan *push up* dianggap valid sebanyak satu kali apabila saat gerakan badan ke bawah sampai menyentuh garis batas bawah dan saat badan naik sampai menyentuh garis batas atas ditandai dengan pemindaian titik-titik *skeleton* yang melewati garis batas bawah dan garis batas atas. Kinerja *tracking* gerakan *push up* ditampilkan nama dan nomer peserta, jumlah nilai *push up*, waktu dan video *real-time* gerakan *push up* peserta. Pengujian penghitungan dan pengukuran gerakan *push up* telah mencapai 100 % untuk semua gerakan yang dilakukan oleh peserta test. Penghitungan dan pengukuran gerakan *push up* juga dilakukan terhadap gerakan *push up* yang salah tidak sesuai standar.

Kata kunci : deteksi, gerakan *push up*, *image processing*, penghitungan, *skeleton*.

ABSTRACT

The Indonesian National Police maintains the fitness and agility of each member through periodic fitness tests. Because of the importance of this fitness test, each Regional Police tries to improve the performance of fitness test services. Currently, fitness test organizers still do it manually. A technique solution to measure and calculate fitness tests is necessary. Studies on monitoring and measuring push-up movements, by previous researchers have used more sensors attached to the athlete's body. Sensors attached to the athlete's body will interfere with and reduce the athlete's movement performance. Therefore, it is necessary a monitoring and measurement system for push-up movements that does not interfere with the athlete's movements. An alternative sensor without attaching to the athlete's body in monitoring and measuring push up is a camera sensor. This Final Project (TA) is focused on the development of a push up movement detection and auto-counter system based on image processing. The sensor used is the XBOX 360 Kinect camera to detect a dynamic object of push up movements. The camera will detect a push up movement, then the software application in the form of a Graphical User Interface (GUI) processes the skeleton tracking data of the push up movement through the upper and lower boundary lines. The scanned skeleton points consist the ten points. In this application, the push up movement is considered valid once if when the body moves down until it touches the lower boundary line and when the body goes up until it touches the upper boundary line is marked by scanning the skeleton points that pass through the lower and upper boundary lines. The performance of the push up movement tracking is displayed in real-time on the GUI including the name and number of the participant, the number of push up values, time and real-time video recording. Testing of push up movement calculation and measurement has reached 100% for all movements performed by test participants. Push up movement calculation and measurement are also performed on incorrect push up movements that do not meet standards.

Keywords: *detection, push up movement, image processing, calculation, skeleton.*