ABSTRAK

Stroke yang menyerang tubuh bagian bawah (*lower limb*) merupakan salah satu penyebab kecacatan jangka panjang yang berdampak dalam mobilitas kehidupan seseorang. Dengan berkembangnya teknologi robot rehabilitasi dan peran terapis, memungkinkan pasien menerima manfaat maksimal dari rehabilitasi *lower limb* melalui terapi yang lebih cepat, penilaian objektif, dan pengulangan latihan yang terkontrol. Namun, dalam penerapan robot rehabilitasi diperlukan satu atau lebih sensor untuk melakukan klasifikasi pola berjalan (*walking gait*) pada pasien. Klasifikasi gait berjalan berdasarkan posisi dan kecepatan sudut engkel menggunakan pendekatan *machine learning*. *Motion Capture* digunakan untuk mengambil titik koordinat (x,y,z) sendi lutut, engkel dan ujung jari kaki dari video berjalan orang normal. Titik koordinat tersebut akan dihitung besar sudut engkel dan kecepatan sudut engkel menggunakan perhitungan vektor posisi. Kemudian data yang sudah didapat dibagi fase gaitnya dan diklasifikasikan dengan pendekatan *machine learning Supervised Learning* (*Support Vector Machine*s (SVM)). Data dibandingkan nilai varian, standard deviasi dan tingkat akurasi klasifikasi SVMnya. Didapatkan variansi data posisi 15,6 , variansi data kecepatan sudut engkel 2330,4 dan variansi data fase gait 0,13. Posisi dan kecepatan sudut engkel dapat digunakan sebagai sebagai fitur klasifikasi, ditunjukkan dengan angka korelasi tertinggi 0,664 dan rata rata 0,261. Algoritma supervised *machine learning* SVM dapat mengklasifikasikan data *walking gait* dengan akurasi tertinggi adalah 91,80%, akurasi terendah 26,83% dan rata rata akurasi 62,82%.

Kata Kunci: *Motion Capture, Machine Learning,* Robot Rehabilitasi, *Stroke, Support Vector Machine.*

ABSTRACT

A stroke that attacks the lower limb is one of the causes of long-term disability that has an impact on a person's mobility of life. With the development of rehabilitation robot technology and the role of the therapist, it is possible for patients to receive the maximum benefits of lower limb rehabilitation through faster therapy, objective assessment, and controlled repetition of exercises. However, in the application of rehabilitation robots, one or more sensors are needed to classify walking patterns in patients. In this study, the classification of gait walking is carried out based on the position and speed of the ankle angle using a machine learning approach. Motion Capture was used to take the coordinate points (x,y,z) of the knee joint, ankle and toe tips from a normal person's walking video. The coordinate point will be calculated by the size of the ankle angle and the speed of the ankle angle using the position vector calculation. Then the data that has been obtained is divided into the gait phase and classified by the machine learning Supervised Learning approach (Support Vector Machines (SVM)). The data were compared with the value of the variant, the standard deviation and the accuracy level of the SVM classification. The variance of position data was 15,6, the variation of ankle angular velocity data was 2330,4 and the variation of gait phase data was 0.13. The position and velocity of the ankle angle can be used as a classification feature, indicated by the highest correlation number of 0.664 and the average of 0.261. SVM's supervised machine learning algorithm can classify walking data with the highest accuracy of 91.80%, the lowest accuracy of 26.83% and the average accuracy of 62.82%.

Kata Kunci: *Motion Capture, Machine Learning, Rehabilitation Robot, Stroke, Support Vector Machine.*