Abstract

Gait analysis is an essential aspect of biomechanics and medical rehabilitation, used to detect movement disorders, evaluate therapy effectiveness, and understand human walking patterns. In Indonesia, gait research is still limited, with most available data originating from foreign populations, which may not accurately represent local characteristics. In this study, gait data was collected using Vicon cameras that track marker movements on the subject's body and convert them into kinematic data in spatial coordinates, which were then stored in Excel format.

To support clinical applications, an efficient system is needed to manage gait data and present analysis results interactively. Therefore, a gait data management system was developed using MongoDB, chosen for its flexibility in handling unstructured data and its scalability. The system was designed to preprocess gait data and display the results through an interactive dashboard built with Streamlit.

The analysis involved calculating gait angle parameters, which were visualized in gait cycle angle graphs and statistically analyzed using mean and standard error values to improve interpretation accuracy. System testing showed that it could store data in an average time of 1.52 seconds, retrieve data in 3.598 seconds, and render visualizations in 0.192 seconds, with high accuracy and no degree error between input and output data.

This system effectively addresses the challenge of managing local gait data and supports comprehensive biomechanical analysis, enabling healthcare professionals to make informed rehabilitation decisions based on deviations from the normal range of gait angles.

Keywords**:** *Biomechanics, Database, Data Visualization, Dashboard, Gait, MongoDB, Non-relational Database, Streamlit.*