

ABSTRACT

Feet are an important part of limbs for someone to move. It can be noted that foot posture can become abnormal due to wrong habits in daily activities. Abnormal foot posture will have an impact on foot movement, risk of injury, and stunted growth. Therefore, it is important to identify the abnormality of the posture of the feet. In addition, a medical expert assesses foot posture using palpation and other assessment aids, having impacts to the assessment process for hundreds of patients. Assessing the type of foot posture can be carried out by two methods, namely the uni-planar method and multi-planar method. Uni-planar methods include the examination of Rear Foot Arch, Medial-Longitudinal Arch Angle, Navicular Position Test, Arch Height Index, and CT-Scan. While the multi-planar methods can be used for Foot Posture Index-6 (FPI-6) and Foot Posture Index-8, FPI-6 is considered to have better efficiency, standardized for screening, and has higher reliability in leg posture validation. In previous studies using FPI-6 and image processing, there were issues when analyzing criteria 1 and criteria 4 that required 3D image morphology. 3D image morphology in this research was carried out using a photogrammetry technique that was carried out using feature extraction in providing the assessment index.

This research proposes the use of the FPI-6 method based on photogrammetry and feature extraction is developed. For user convenience, a Graphical User Interface (GUI) was created using the Python program for system operation. The output of this study is a system that can identify the type of foot posture with a maximum error of 30% using 6 criteria in FPI-6. The data used are obtained from 40 children aged 3 to 5 years old, involving 30 reference data and 10 test data.

The results of research is a mechatronics system capable of assessing foot posture index with an error of assessment between 0% - 26.7% for 30 data. On the other hand, 10 test data have an error of 10% - 30%. Mechatronics platform was made for data acquisition with a camera distanced around 55 cm from the subject, with a camera height of 10 cm, a fixed video shooting angle on the y-axis of 20°

and the rotating x-axis of 360° with a camera rotation speed of approximately 0.0483 m/s.

Keywords: *Photogrammetry, Extraction Features, Foot Posture Index-6 (FPI-6).*