ABSTRACT

Motion capture system is a term used to describe the process of recording movement and translating the movement to be a digital model. Motion capture system is used in animation, medical, augmented reality, sports, entertainment, gait analysis, etc. There are many input methods used in motion capture techniques, they are electromechanical, acoustic, electromagnetic, and optic. The most popular method is the optical method, because it is more resistant to disruption and the movement of the subject is easier than other methods. Optical methods are widely applied using high-resolution cameras with special configuration to capture motion. In this study we designed the special purpose motion capture system using input optical method for bipedal robot trajectory planning using a low cost general purpose camera. Red marker was used as a marker that is placed on a six-movement position of right sagittal plane, they are placed on part of the body namely body, hip, knee, ankle, heel and toe. The color image was captured by normalized and filtered to produce a binary image. The values of three joint angles in sagittal plane were determined and based on the detected marker position using geometrical description. Each value of measured joint angle was calibrated using manual geometric and the error measurement of angle was 1.6%. Walking cycle was captured by camera for 1.25 ms and the angles data of hip, knee and ankle were used to plan a bipedal robot trajectory of walking movement. Three subject were used in this experiment, and walking for one walking cycle ten times. After thirty time experiments there were two error happened because only 5 marker that detected. Missing marker was happened at knee joint angle when the high speed walking. This method is expected to be expand in measuring joint movement in different plane (frontal and transversal).

Keyword: motion capture, image processing, trajectory planning