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OCCUPATIONAL WRIST POSTURAL ASSESSMENT AND MONITORING SYSTEM: DEVELOPMENT AND INITIAL VALIDATION

By: [Umar, RZR](#) (Umar, Radin Zaid Radin)^[1]; [Ling, CF](#) (Ling, Chai Fong)^[1]; [Abdullasim, N](#) (Abdullasim, Nazreen)^[2]; [Ahmad, N](#) (Ahmad, Nadiah)^[1]; [Halim, I](#) (Halim, Isa)^[1]; [Hamid, M](#) (Hamid, Malek)^[3]

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Abstract

Identification and quantification of poor wrist postures at the occupational setting are generally challenging due to rapid changes in wrist movement. A system prototype was developed to capture and assess wrist postural behaviour at the workplace. This manuscript describes the development and initial validation process of the system prototype. The system prototype utilizes wearable glove attached with Inertia Measurement Unit (IMU) sensors to capture wrist postural behaviours. The postural angle data from sensors were extracted and processed through a customized programming software for visualization purpose. The real-time wrist postural angle data at work is benchmarked and normalized to personal maximum wrist Range of Motion (ROM) data. Preliminary validation compared the wrist postural angle readings between system prototype and traditional goniometer, at 30. for ulnar, radial, flexion, and extension wrist positions. Overall, the results from one sample t-test across 31 subjects indicate statistically no significant differences between the system prototype and goniometer readings at alpha level 0.05 (p-value > 0.05). The results from this preliminary validation activity demonstrate a degree of accuracy in terms of capturing wrist postural angle when being compared to goniometer.

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Author Information

Reprint Address: Umar, RZR (reprint author)

+ Univ Teknikal Malaysia Melaka, Fac Mfg Engn, Durian Tunggal 76100, Melaka, Malaysia.

Addresses:

- + [1] Univ Teknikal Malaysia Melaka, Fac Mfg Engn, Durian Tunggal 76100, Melaka, Malaysia
- + [2] Univ Tekn Malaysia Melaka, Fac Informat & Commun Technol, Durian Tunggal 76100, Melaka, Malaysia
- + [3] Int Islamic Univ Malaysia, Fac Engn, POB 10, Kuala Lumpur 50728, Malaysia

E-mail Addresses: radinzaid@utem.edu.my

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