

Title: Human IoT Interaction Approach for Modeling Human Walking Patterns Using Two-Dimensional Levy Walk Distribution

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Abstract: This work presents a novel approach to modeling and analyzing human walking patterns using a two-dimensional Levy walk distribution and the Internet of Sensing Things. The study proposes the strategic placement of MPU6050 sensors within a garment worn on the human leg to capture motion data during walking activities that can model human walking patterns. Random samples are generated from the Levy distribution through numerical modeling, simulating normal human walking patterns. A real-world experiment involving five male participants wearing sensor-equipped garments during normal walking activities validates the proposed methodology. Statistical analysis, including the Kolmogorov-Smirnov test, confirms the agreement between simulated Levy distributions and observed step distance data, supporting the hypothesis that deviations indicate abnormal walking patterns. The study contributes to advancing sensor-based systems for human activity recognition and health monitoring, offering insights into the feasibility of using Levy walk distributions for gait analysis.

Keywords: Internet of Things (IoT); Wearable sensors; Human-Computer Interaction (HCI); 3-axis accelerometer gyroscope; Walking pattern; Levy walk distribution; Abnormal walk prediction

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