Methodologies for Analyzing Motion Data in Humans ELIZA-BETH SIZEMORE, Department of Physics, University of Dallas, CLAIRE SEXTON, CAREY DAVIES, ANNE ALMEDA, S.R. SLAUGHTER, Department of Biology, University of Dallas — Inertial measurement units (IMUs) are used to acquire acceleration, rotation, and magnetic field data in three dimensions. When attached to individual body segments these devices can wirelessly stream this data to computer workstations for analysis. The patterns seen can then be used to evaluate relative movements. In this study, rotation at the knee was analyzed by devices worn on the leg and thigh. Gait was studied over dissimilar surfaces, including flat, railroad ballast, and stairs. Image density, neural network, and fractal analysis techniques were employed to evaluate acquired data. Imaging software contributed to the quantification of rotation data in the X and Z axes. Error propagation neural networks create heuristic problem solvers that excel at analyzing non-linear relationships and capturing associations within a set. Fractal analysis gives us terms to express the degree of self similarity, which was applied to the different surface data. Determinations from these techniques will be presented.

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