Validating the Location and Tracking of a Human’s Center of Mass Using a Statically Equivalent Serial Chain

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Validating the Location and Tracking of a Human’s Center of Mass Using a Statically Equivalent Serial Chain
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**Definition of SESC:** The statically equivalent serial chain is comprised of 13 parameters. These parameters are determined by capturing poses and using the body segment length and position information, as well as the center of pressure reading, acquired from different poses. Given these 13 parameters, the SESC points directly at a person’s CoM.

### Objectives
- Investigate accuracy and repeatability of calculating a human’s CoM using low cost equipment
- Determine if the S-Vector components converge
- Determine the optimal standard deviation/frame rate allowed when capturing poses
- Determine individual importance of S-Vector components and decide if any components can be eliminated

### Methods

**Force Plate Calibration**
- 9 weight placements
- Locate WBB relative to the Kinect
- Matlab code aligns axes of Kinect and WBB

**Node Based Statically Equivalent Serial Chain**

### S-Vector Convergence
- Determine number of captured poses required for the SESC values to converge, thus creating a reliable SESC

### Standard Deviation Variation
- Determine the optimal number of frames, CoP standard deviation, and node location standard deviation for collecting accurate pose data.

### Elimination of S-Vector Components
- Determine if individual or multiple S-Vector components can be eliminated from the model

### Future Work
- Test more individuals of varying body types
- Investigate further the validity/practicality of the SESC method

### References