

Intra-Sense

[Demo Abstract]

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ABSTRACT

We propose to show a multimedia demo which highlights a number of advances we have made in low cost, high level human movement analysis. This will be demonstrated in our portable motion interaction structure we have developed to provide mobile presentation and performance opportunities.

Using inexpensive motion capture technology, we have developed a completely autonomous algorithm for the real-time creation of a moving subject's kinematic model from optical motion capture data and with no a priori information. Our approach solves marker tracking, the building of the kinematic model, and the tracking of the body simultaneously. The novelty lies in doing so through a unifying Markov random field framework, which allows the kinematic model to be built incrementally and in real-time.

We have also developed our own techniques for extracting a wide array of movement features. The system can recognize gestures from a single training example and give measures of similarity in time and performance.

The system also has an understanding of how 2 people are 'relating' based on social cues of personal space and imitation. We began this process by looking at different types of nonverbal behavior research regarding interpersonal communication. Some of the basic features look at interpersonal space, body orientation, synchronous/mirroring movement, and matching/call-and-response movement. Using this, we can construct collaborative environments that feel natural to users and utilize familiar relationships.

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An individual is also free to move without a pre-defined set of movements - as the system also seeks to understand the movement as it relates to spatial and durational coordinates.

Applications for this system can be found in diverse fields of rehabilitation, kinesiology, sports training, animation, education, data exploration and interactive arts.

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