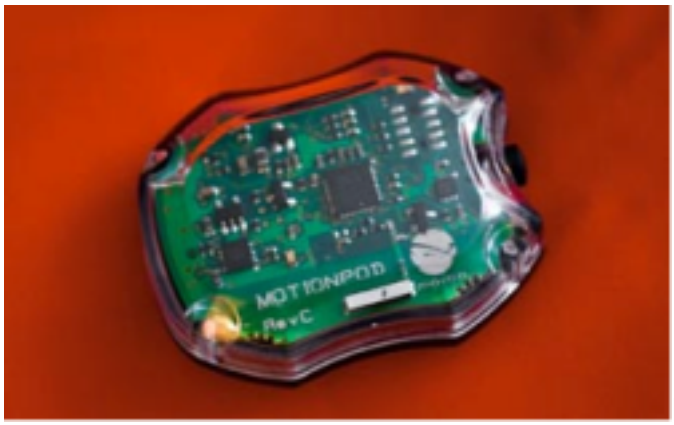
Full Body Motion Capture and Gesture Recognition System With 9 Axis IMU Body Area Network



Movea, a world leader in motion technology, now enables full body gesture recognition with its recently launched MEMS-based MotionPod solution for low cost, full body motion capture. The solution can be used to enable more realistic avatar motion for gaming or highly accurate biomechanical analysis for sports applications and is now available for B2B customers in the sports and entertainment markets.

Together with its jointly run research partner, the Motion Lab, Movea has developed a MEMS sensor-based, full body motion capture system, enabling a computerized avatar to reproduce a person’s body movements in real-time, with an accuracy that matches the efficiency of more expensive video systems.

“By attaching 9 MotionPods on a person’s body limbs, our system can track any movement in 3D to a fine degree of accuracy. We have developed a biomechanical model taking into account human constraints such as the fact that a knee can only bend forward,” explained Bruno Flament, Movea CTO. “This model therefore can reproduce human body motion realistically and accurately.”

In addition to tracking motion in real time, Movea has developed expertise in live gesture recognition. Movea has been pioneering gesture recognition for use in remote controls and computer mice. Gesture recognition allows consumers to control televisions and personal computers through simple hand gestures and the ability to create user-specific sign-on gestures. These techniques are now being used for the first time for full body gesture recognition. The full body positional information and motion is compared in real-time against a library of full body gestures. For example, in the case of a yoga or martial arts application, it can help guide the user into the correct position. For an avatar in a game, Movea’s technology speeds up the game action such as taking an arrow out of a quiver and firing it from a bow as the early detection feature recognizes the start of a gesture without having to wait for it to be completed, triggering the game action early and ensure a continuous user experience.

“Our new approach offers many advantages,” explained David Rothenberg, World Wide Marketing Manager for Movea. “It is an incredibly simple to use, extremely accurate, and low cost solution that does not come with the expense or operational constraints of more complex video-based systems. We have packaged all our expertise in motion technology into an off the shelf, ready to use solution.”

Traditional full body motion capture typically uses dots or balls attached to a suit worn by actors with cameras capturing their movement. This efficient but costly system requires a fully equipped motion capture room, experienced users and sophisticated programs to convert this into usable information controlling computer avatars. The optical-based systems approach, whether it is for movie animation, sports or gaming, limits the field of action as the actor or player needs to remain in a defined Motion Capture Volume without obstacles that would obstruct camera’s vision.

Movea’s solution uses up to 5 MotionPods, which each allow 6 Degrees-of-Freedom (DOF) for full 3D motion capture, and are fitted to key parts of the body to form a Body Area Network (BAN) that enables detailed full body motion to be captured in real time with dynamic accuracy of one degree. These Inertial Measurement Units (IMUs) transmits highly accurate movement information through a 2.4GHz wireless link to a MotionController™ central receiver unit, plugged into a computer via a USB port.

MotionPod
The MotionPod is a patented hardware solution for motion sensing that incorporates a 3-axis accelerometer, a 3-axis gyroscope and a 3-axis magnetometer in fully integrated package complete with software and wireless interface. The MotionPod measures 33x22x15mm (1.3”x0.8”x0.6”) and weighs 14g (0.5 oz). It is designed to clip onto a bracelet or strap for easy attachment to the body. Each MotionPod has a built-in, 2.4GHz wireless transmitter that uses Movea’s proprietary wireless technology to deliver a range of up to 30m (100 ft) with very low power consumption to maximise battery life, providing up to 8 hours of usage.

Further information about Movea can be found at www.movea.com [1].

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Links:
[1] http://www.movea.com