

Live motion capture



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The method that records a live motion event, which then is being translated into usable mathematical conditions by tracking a number of key points that are being combined in space over time to get a single three-dimensional representation performance is called Motion Capture. To simplify the meaning of this technology, it enables the use of real performance to a digital one. Everything that exist in our world and has actual motion could be then captured; each moving part of that subject has its key points that provide the motion. When that technology is being used on a human as an instance, key points are the actual joints and they work as pivot points and connections for the bones. Usually when that is being done, all of the sensors, potentiometers or markers identify the points and that transmits the data to the main device. The performance that is being used to get a character to life is called performance animation, and motion capture is related to the actual technology that collects the motion. To conduct that, motion capture needs to be done and then that is being transmitted to the 3D character. That being said, mocap obtains all of the information that represents motion, while the performance animation on the other hand, is the final deliverable of a character created by the performer. Menache, A. (2011). Understanding motion capture for computer animation. Burlington, MA, Morgan Kaufmann.

Motion Capture is known as Motion tracking and in most cases as `Mocap`, in any case it is actually 3D Animation. The process in which recordings of human movement are translated into digital form by recording every pivot point on the actor/actresses body. After this footage is filmed it is then translated onto a 3D model. Since the 1970`s that technology has improved

drastically and Performance Capture is a term referred to when Motion Capture animates small human features such as fingers, expressions and facial features. That process is actually very time consuming. For instance, the performance capture in 2009 20th Century Fox award winning film “Avatar”, took over 15 years to create and the reason for that is that the amount of sensors that were used to portray these expressions was immense. The concept of animation dates back to more than a thousand years ago when Chinese zoetrope-type device was built to produce the illusion of motion from a burst succession of static images. To present, everyone is familiarized with the different types of animation, from traditional hand-drawn image frames, to the Claymation or technology of Stop Motion. Until the arrival of the Computer Graphics that has not shifted for all that time. The most known categories of character animation to date are three. The first category consists of algorithmic and model-driven approaches. An example is the dynamic physics-based model, like reverse pendulum. The second category is the digital key-framing and hand driven, a workflow alike the original animation creation but with the assist of 3D creation tools. Motion Capture is the last category, it was first developed in the late 1970`s but it hasn`t been recognized as a revolutionary animation technique until the mid 1980`s when it was used for entertainment purposes. Inspired by “ Rotoscoping”, an old time consuming animation technique that was being used in the early 1900`s, in which the animation would track movement frame to frame. In the field of entertainment Motion Capture is considered as the descendant of that same technique, which is still being used by some traditional animation studios to duplicate realistic motion from movie footage over to a cartoon characters. For centuries some

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of the motion capture technologies have been used in different ways, most known for its medical and military purposes. Originally it was examined by the Military to track head rotations of pilots by electromagnetic motion capture. Capturing motion could be done in few different ways. A lot of them use camera systems that produce digitized views of the performance, which afterwards is used to combine the location of the key points represented by one or more markers. Other way of capturing motion is being made by using electromagnetic fields or ultrasound to track a group of sensors. Also available is the mechanical system, which is based on the linked structures or the armatures that use potentiometers to identify the rotation of every link. Menache, A. (2011). Understanding motion capture for computer animation. Burlington, MA, Morgan Kaufmann

Motion Capture input systems

Prosthetic That is probably one of the first methods that have been used for capturing motion from various parts of the human anatomy. These methods include simple switching type of motion detection systems as well as complex tracking systems. If it wasn't for the complex mechanical needs and the performance inhibiting qualities which are generally associated with such designs the latter type of prosthetic motion capture could be an ideal approach. Nonetheless, this method uses armatures which have to be attached all over the performers body. Afterwards they are being connected to each other by using a series of rotational and linear encoders. Once that process is complete all the encoders are connected to an interface that simultaneously reads all the encoders and prevents data loss. In the end through a set of trigonometry functions the actual performer's motion is being analyzed. (http://www.siggraph.org/education/materials/HyperGraph/animation/character_animation/motion_

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capture/motion_optical. htm)AcousticThis is a complex method that involves the use of audio receivers. Large amount of audio transmitters are strapped to performers body. Each receiver calculates the time that it takes for the sound to travel from each transmitter. In the 3D space the distance of the receivers is being measured to provide a point in the dimension. Normally the optical systems are occupied by occlusion problems which in that case is none existent and is considered as an advantage. ([http://www. siggraph. org/education/materials/HyperGraph/animation/character_animation/motion_ capture/motion_optical. htm](http://www.siggraph.org/education/materials/HyperGraph/animation/character_animation/motion_capture/motion_optical. htm))MagneticThis is one of the most used methods for performance capture. In that case it is used a centrally located transmitter, as well as large amount of receiver that are strapped on to various parts of the performers body. Once that is complete the receivers measure their spatial relationship to the transmitter. Every receiver is linked to an interface that can sync to prevent data skew. Each receiver then obtains the data stream which consists of 3D positions and orientations for each other. That data is usually applied to an inverse kinematics systems to an animated skeleton. The magnetic method shares the same advantage as the audio method, it lacks occlusion problems. ([http://www. siggraph. org/education/materials/HyperGraph/animation/character_animation/motion_ capture/motion_optical. htm](http://www.siggraph.org/education/materials/HyperGraph/animation/character_animation/motion_ capture/motion_optical. htm))Electromagnetic Motion Capture is one of the more technical type of Motion Capture relying on transmitters and receivers to track movement. OpticalOptical Motion Capture is another type of motion capture, it requires the actor or actresses to wear reflective sensors over a tight “ Mocap Suit”. They would then proceed with their act and at that time several cameras will be tracking the reflective pads. Recently, that type of motion capture has become quite popular. The advantage of that method is <https://assignbuster.com/live-motion-capture/>

that it doesn't require any sort of cables and the actor can perform freely. That system requires over three cameras, each of which is equipped with its own light so that it can illuminate the field of view for the specific camera. A frame buffer is being used that is connected and synchronized with each camera. The computer receives view from each camera in order to measure a 3D position of each marker. (http://www.siggraph.org/education/materials/HyperGraph/animation/character_animation/motion_capture/motion_optical.htm)