

GestPoint Maestro3D

A White Paper from GestureTek
The Inventor of 3D Video Gesture Control

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Executive Summary

GestureTek is the inventor, pioneer, and multi-patent holder for video gesture control, and 3D depth camera video gesture control. Over 25 years of product development and deployment in a vast array of real world environments has led to a robust and rich product suite. Strong international patents and technology has allowed GestureTek to license technologies and patents to major players like Microsoft for the XBOX, Sony for the PlayStation and Hasbro for toys.

GestPoint Maestro3D is GestureTek's patented computer vision software that works with 3D cameras to generate **instantaneous** tracking and gesture recognition. The Maestro3D SDK includes a depth camera, along with demos (including source code) that illustrate how the 3D position and gesture data generated by Maestro3D can be used to control applications in Flash and C++. Unlike other 3D computer vision software that requires an initialization process to map a skeletal frame onto the user, Maestro provides instantaneous tracking data that offers a real advantage when immediate responsiveness is required.

The 3D data is exposed through two different trackers that comprise the package. Maestro3D Hand tracks hands within a "volume of interest" (VOI), which allows the user to engage or disengage with the Tracker. The user places their hand within the VOI when tracking is required and removes it when they wish to use their hands for non-tracking purposes. Maestro3D Multi also uses a VOI, but it's generally set to be the same as the camera's field of view (FOV) to provide continuous tracking and gesture recognition, unless it is necessary to exclude elements within the FOV.

The Trackers

GestureTek's GestPoint Maestro3D SDK provides the tools necessary to create innovative, interactive, "Kinect™-like" experiences that enable users to control applications or other devices without a keyboard or mouse or the need to wear special equipment. Two trackers are provided:

GestPoint Maestro3D Hand Tracker

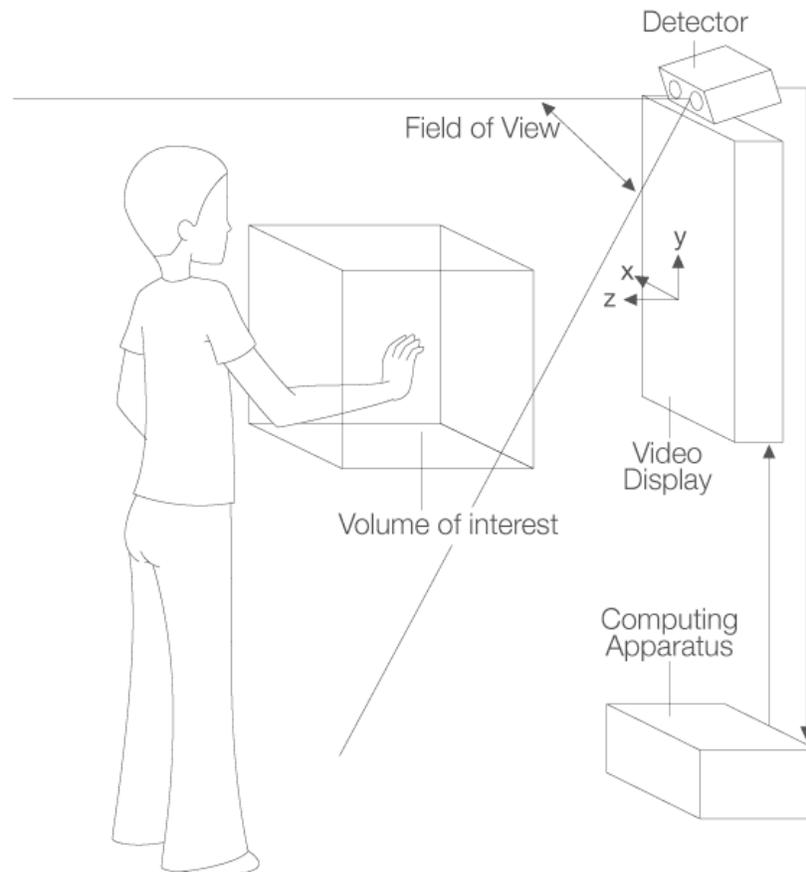


Figure 1. GestPoint Maestro3D Hand Tracker

The GestPoint Maestro3D Hand Tracker tracks hands within a “volume of interest” (VOI), which allows the user to engage or disengage the Tracker. The user places their hand within the VOI when tracking is required and removes it when they wish to use their hands for non-tracking purposes. By default the Hand Tracker provides mouse emulation for one hand, but tracking of up to ten hands is available through the API. The Tracker provides the 3D coordinates of hands within the camera's VOI with the camera's position as the origin. It also provides a unique ID for each hand tracked.

GestPoint Maestro3D Multi-Tracker

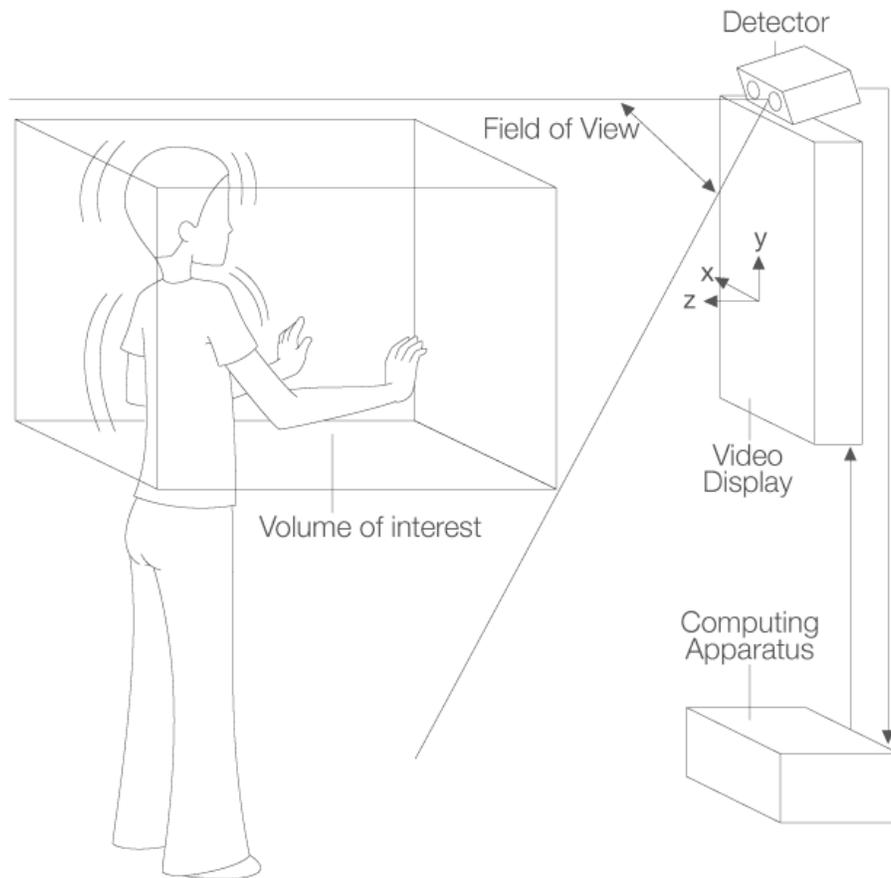


Figure 2. GestPoint Maestro3D Multi-Tracker

The GestPoint Maestro3D Multi-Tracker is a combination of five gestures and three trackers as described in the tables below.

Gestures

Gesture

How to Perform the Gesture

Circle Engagement

Move the hand in a continuous circular motion, either clockwise or counterclockwise, such that the circle begins and ends at approximately the same point. Once one complete circle has been detected, continuous control along the circumference of the circle is enabled.

Swipe

Move the hand (with the fingers together and palm to the side) horizontally from right to left or left to right.

Poke

Move the hand quickly forward towards the camera.

Scaling/Rotating

Hold two hands up and move the closer or farther apart (for scaling) or move them in a clockwise or counterclockwise motion (for rotation).

Steering

Hold two hands up in a typical 10:00 and 2:00 steering position and move them together either clockwise or counterclockwise.

Palm Open

Extend the hand towards the camera with the palm facing the camera and fingers spread apart.

Trackers

Tracker	Purpose
Depth Segmentation	Detects the body-sized object (torso) that is closest to the camera and provides the torso's depth position. A single crosshairs indicates that an object has been detected. When the detected object is lost, the crosshairs change color.
Two Hand Tracker	Detects and tracks hands when they are closer to the camera than the body, and the head and half of the torso are also visible. The hands must be at least 180 mm in front of the body to be detected.
Four Point Tracker	Tracks (head, torso, and hands). Hands are tracked in any position relative to the rest of the body. However, when they are directly in front of the body, they must be at least 180 mm from the body.

Applications

The success of Kinect has popularized device-free control. Gaming is an obvious application but there are plenty of other applications where the functionality of Maestro3D can be leveraged. Here are a few:

Home automation – Control devices around your home using gestures; for example, operating the television from the living room couch.

Clean room – Touch-free control of peripheral equipment in sterile environments such as clean rooms and surgical theatres

Digital signage – Touch-free, engaging interactive digital signage displays

Video conferencing – Control presentations and ensuing discussion during a conference call, using gestures.

Gaming – Avatar control and/or replacement of hardware control devices with simple hand / body gestures

Boardroom – Control presentations in the board room without devices.

PC desktop – Control your PC hands-free, such as answering Skype calls or controlling media playback.

In car control – Hands-free interaction with car controls such as navigation, communication, entertainment and internal environment.



Figure 3. Digital Signage

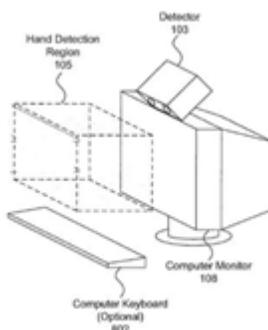


Figure 4. Near Screen Control



Figure 5. Surgery / Clean Room

Market

The instantaneous 3D tracking data provided by GestPoint Maestro3D makes it unique in the 3D computer vision market. It's suitable for integration with applications that require touch-free control, so it applies to numerous markets including digital signage, gaming, home/office/laboratory automation, automotive control and telecommunications.

Conclusion

GestPoint Maestro3D exposes two different trackers that offer 3D tracking and gesture recognition for numerous 3D cameras available in the market today. Unlike other 3D computer vision software that requires an initialization process to map a skeletal frame onto the user, Maestro provides instantaneous tracking data that offers a real advantage when immediate responsiveness is required. Maestro3D provides 2D mouse control "out-of-the-box" and offers an SDK that provides developers with access to 3D data and gestures that can be used to control applications written in Flash and C/C++.

About GestureTek

GestureTek®, founded in 1986, is the inventor, pioneer and world leader in gesture recognition technologies for presentation, information and entertainment systems. With patented single camera, multiple camera and 3D-vision solutions, GestureTek's video gesture control technology lets people use hand and body motions to control dynamic computer content on any screen, surface or camera-enabled device – with no need to wear, hold or touch anything. We also offer immersive and multi-touch interactive solutions. GestPoint Maestro3D is covered by one or more of the following US patents and their associated international filings:

US Patent 5,534,917	US Patent 7,389,591	US Patent 7,570,805	US Patent 7,848,542
US Patent 7,058,204	US Patent 7,421,093	US Patent 7,777,899	US Patent 7,898,522
US Patent 7,227,526	US Patent 7,430,312	US Patent 7,822,267	
US Patent 7,379,563	US Patent 7,574,020	US Patent 7,827,698	
US Patent 7,379,566	US Patent 7,555,142	US Patent 7,853,041	

GestureTek Contact Information

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