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(54) **GESTURE-CONTROLLED INTERFACES FOR SELF-SERVICE MACHINES AND OTHER APPLICATIONS**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.**[7] **G06K 9/00**

(52) **U.S. Cl.** **382/103**; 382/209; 701/45; 345/473; 345/474

(58) **Field of Search** 382/103, 107, 382/168, 153, 154, 117, 118, 170, 181, 190, 209, 219, 276; 701/45; 348/169, 170, 171, 172

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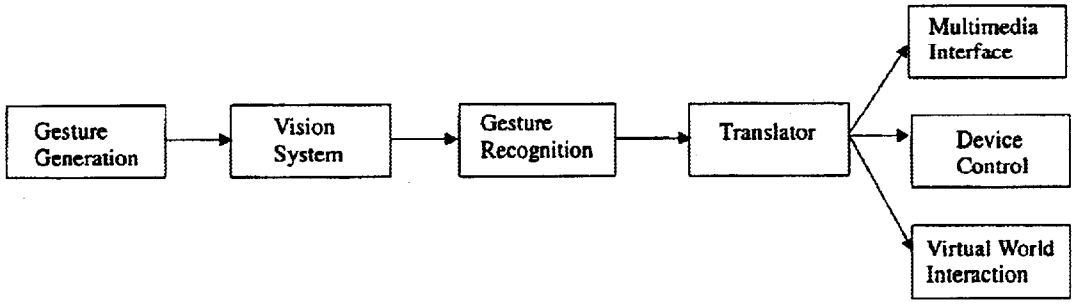
(57) **ABSTRACT**

A gesture recognition interface for use in controlling self-service machines and other devices is disclosed. A gesture is defined as motions and kinematic poses generated by humans, animals, or machines. Specific body features are tracked, and static and motion gestures are interpreted. Motion gestures are defined as a family of parametrically delimited oscillatory motions, modeled as a linear-in-parameters dynamic system with added geometric constraints to allow for real-time recognition using a small amount of memory and processing time. A linear least squares method is preferably used to determine the parameters which represent each gesture. Feature position measure is used in conjunction with a bank of predictor bins seeded with the gesture parameters, and the system determines which bin best fits the observed motion. Recognizing static pose gestures is preferably performed by localizing the body/object from the rest of the image, describing that object, and identifying that description. The disclosure details methods for gesture recognition, as well as the overall architecture for using gesture recognition to control of devices, including self-service machines.

17 Claims, 19 Drawing Sheets



Gesture Recognition System Flow Chart.

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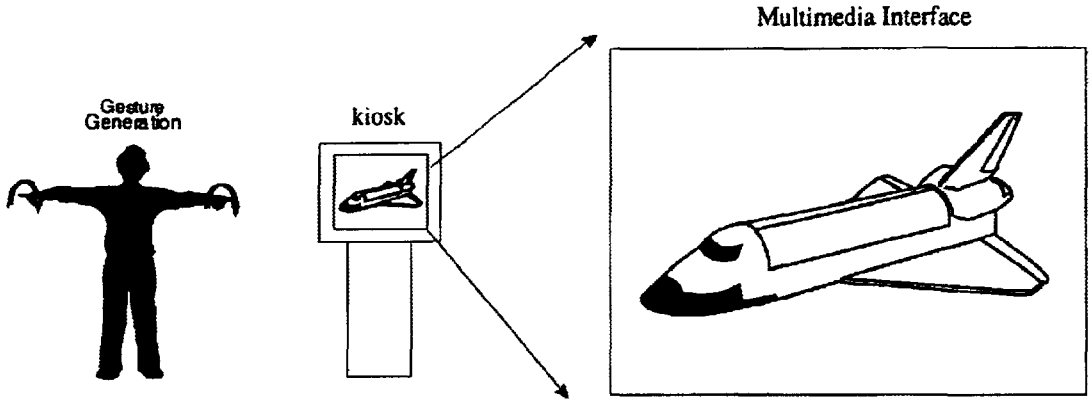

Figure 1: Gesture Recognition System.

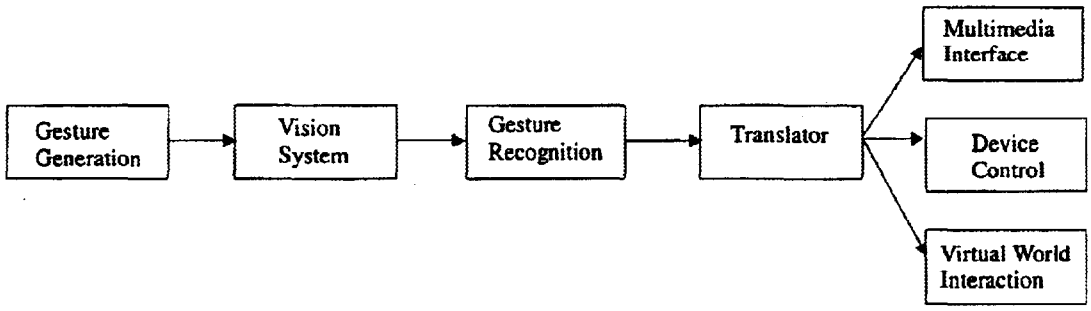

Figure 2: Gesture Recognition System Flow Chart.

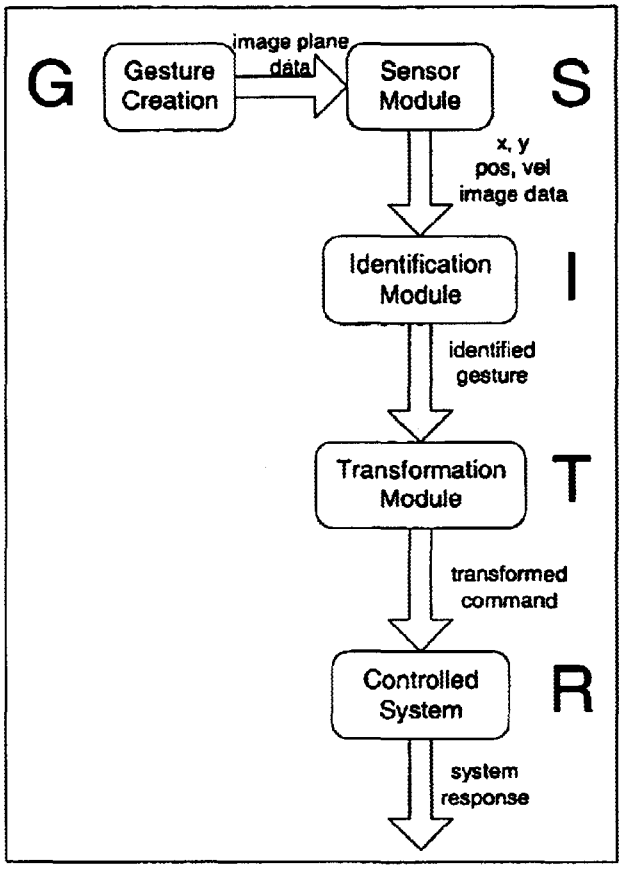

Figure 3: Signal Flow Diagram of the Gesture Recognition System.

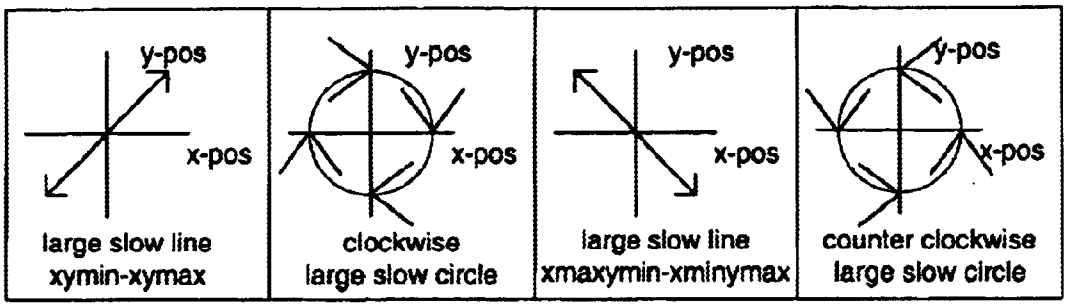

Figure 4: Example gestures, showed in two dimensions.

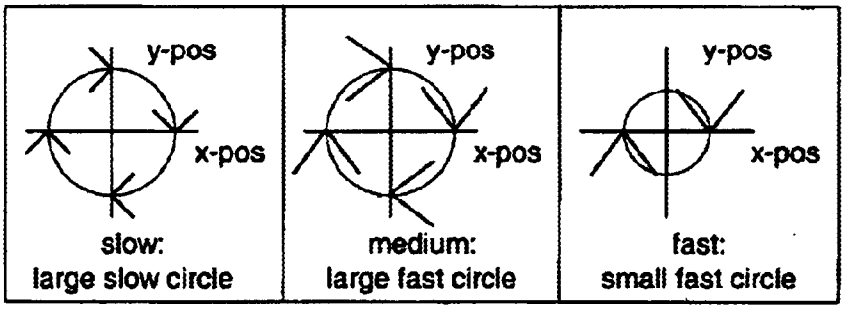

Figure 5: Three Example Gestures.

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