

## MOTION SENSOR CHARACTER GENERATION FOR MOBILE DEVICE

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to portable mobile communications devices and systems, and more particularly to a portable mobile communications device, system and method that can create and recognize characters based on the motion of the mobile device.

[0002] A number of mobile devices are equipped with motion sensing capabilities in the form of accelerometers and/or gyroscopes. Typical reasons for their inclusion include support for gaming applications, enhanced menu navigation/selection, or sports/fitness applications (e.g. pedometer), etc.. Another potential and novel use for an embedded motion sensor within a mobile device is to render motion tracked as a graphical image. The mobile device can be thought of as a writing instrument using the motion sensors to trace a character or image. However, one obstacle to overcome is the ability to determine intentional motion from unintentional motion.

[0003] What is needed is a means for rendering an image on the mobile device display based on tracking the intended motion of the mobile device.

### BRIEF SUMMARY OF THE INVENTION

[0004] According to one embodiment of the invention there is disclosed is a mobile device for detecting, tracking, and translating motion into an image that can be rendered on a mobile device display. A motion sensor contained within the mobile device and coupled with a processor can detect and track motion in a two-dimensional plane. A motion selector button is disposed on the housing of the mobile device and coupled with the processor. The motion selector button actuates and de-actuates the motion sensor such that motion is only detected and motion data forwarded to the processor while the motion selector button is actuated. The mobile device further includes a display for rendering an image corresponding to the detected motion. The processor translates the captured motion data into a scaled two-dimensional image that is completely rendered on the mobile device display.

[0005] Images can also be applied to a character recognition process to aid in textual input for a variety of other applications. The mobile device further includes a stored set of reference characters and character recognition means executable by the processor for determining whether the scaled two-dimensional image substantially matches a character contained in the stored set of reference characters.

[0006] The images rendered on the mobile device display are two-dimensional. The processor determines the two-dimensional plane of motion tracked by the motion sensor to be parallel to the face of the mobile device. The processor continuously re-determines the two-dimensional plane of motion tracked by the motion sensor to adjust for unintended subtle changes in the orientation of the mobile device. Motion having a component in a third-dimension perpendicular to the plane parallel to the face of the mobile device is ignored when translating the captured motion data into a scaled two-dimensional display image that is completely rendered on the mobile device display.

[0007] However, motion having a component in a third-dimension perpendicular to the plane parallel to the face of the mobile device can be representative of non-character input including a space, a carriage return, or an end of character delineation. Detected rapid changes in the orientation of the face of the mobile device caused by a sudden twisting motion can be used to manipulate the scaled two-dimensional image. A sudden twisting motion can manipulate the scaled two-dimensional image by changing the default width of a line stroke thereby making the image bolder.

[0008] The motion sensor can be an accelerometer or a gyroscopic device.

[0009] According to another embodiment of the invention there is disclosed is an accessory for a mobile device that can detect, track, and translate motion into an image that can be transmitted to and rendered on a mobile device display. A motion sensor contained within the accessory and coupled with a processor can detect and track motion in a two-dimensional plane. A motion selector button is disposed on the housing of the accessory and coupled with the processor. The motion selector button actuates and de-actuates the motion sensor such that motion is only detected and motion data forwarded to the processor while the motion selector button is actuated. The processor can translate the captured motion data into a scaled two-dimensional image that is transmitted to and rendered on a mobile device display.

[0010] Images can also be applied to a character recognition process to aid in textual input for a variety of other applications. The accessory can further include a stored set of reference characters and character recognition means executable by the processor for determining whether the scaled two-dimensional image substantially matches a character contained in the stored set of reference characters.

[0011] The processor determines the two-dimensional plane of motion tracked by the motion sensor to be perpendicular to the longitudinal axis of the accessory. The processor continuously re-determines the two-dimensional plane of motion tracked by the motion sensor to adjust for unintended subtle changes in the orientation of the accessory. Motion having a component in a third-dimension along the longitudinal axis of the accessory is ignored when translating the captured motion data into a scaled two-dimensional image.

[0012] However, motion having a component along the longitudinal axis of the accessory can be representative of non-character input including a space, a carriage return, or an end of character delineation. Detected rapid changes in the orientation of the face of the mobile device caused by a sudden tilting motion can be used to manipulate the scaled two-dimensional image. A sudden tilting motion can manipulate the scaled two-dimensional image by changing the default width of a line stroke thereby making the image bolder.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a block diagram of an exemplary portable mobile communications device according to an embodiment of the present invention.

[0014] FIG. 2 is a flowchart describing the motion capture process for creating graphical images.