Turn Any Computer Screen into a Gesture-Assisted Touch Screen Using a Leap Motion Controller

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**Background**
- Enhance Human-Computer Interaction (HCI)
- Introduce new and innovative way to interact with computers
- Enable touch screen setup anywhere and anytime

**Objectives**
- LEAP SENSE
  - 2D
  - 3D
  - Touch Screen Mode
  - Gesture Mode
  - Scroll Mode
  - OS Navigation
  - Specific Application
  - Media Player
  - Browsers

**Design**
- LEAP SENSE

**Implementation in 2D Space**

**Screen Recognizer**
By pinpointing 5 determined points on the screen, Screen Recognizer function in Leap Sense will be able to recognize the screen width, screen height, and also its coordinate in Leap Motion Controller coordinate system. With all of these information, Leap Sense will be able to model the screen with plane equation and build a virtual touch screen.

\[
\begin{align*}
\alpha(x_2-x_3) &+ \beta(y_2-y_3) + \gamma(z_2-z_3) = 0 \\
\end{align*}
\]

**Implementation in 3D Space**

**Gesture Mode**
Identified by this cursor’s shape:
- Controlled using five-finger gestures
  - To show desktop (pictures above)
  - To close applications
  - To open Windows menu
  - To minimize window
  - To navigate between running applications, etc.

**Specific Application**
- Controlled using one-finger gestures
  - To change tabs
  - To go to next page
  - To go to previous page, etc.

**Browser**
- To increase/decrease volume

**Scroll Mode**
Allow user to scroll up and down mimicking the usage of mouse wheel. Scroll Mode is identified with the following cursor’s shape:

**Conclusion**
This project takes the challenge of combining both touch screen and motion detection technology to enhance human computer interaction by creating Leap Sense, an application that has the ability to turn any computer screen into gesture-assisted touch screen.