Integrating Natural Gestures in touch Interfaces

Fahim Imaduddin Dalvi {fid,msakr}@qatar.cmu.edu
Ameer Abdulsalam ameer@cmu.edu
Advisor : Dr. Majd F. Sakr
Computer Science - **Carnegie Mellon Qatar**

The Problem

- **Traditional Human-Computer interaction methods are not very intuitive and natural to the average user.**
- Advent of touch screen technology has enabled more rapid and efficient interaction, especially on public information kiosks.
- This work aims to explore the design and implementation of effective touch screen user interfaces, in particular, touch gestures that cater to users of varying lingual and cultural backgrounds.

Related Work

- The leading technologies today use multi-touch on portable devices, which enables more complex gestures like pinch zoom.
- Single touch devices are primarily available in two types, surface capacitive, which is generally cheap and infrared touch screens, which are more accurate, but not very common.

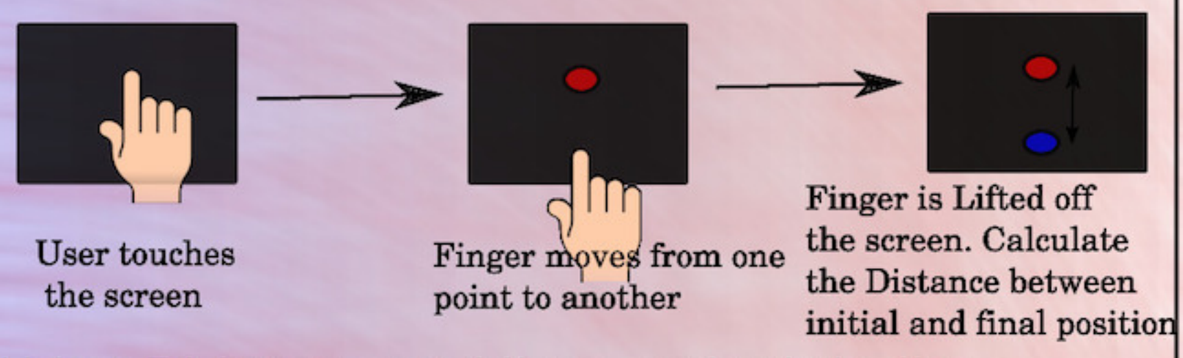
Specifications and Constraints

- Large screen size - Poses a challenge in implementing the gestures used in touch devices today, as it is difficult to perform the same gestures on a large screen.
- Single touch screen - Limits the possible gestures that can be implemented.
- Limited the interface to the English and Arabic knowledge, as these are the most popular languages in the region.
- Implement an up/down scrolling gesture.

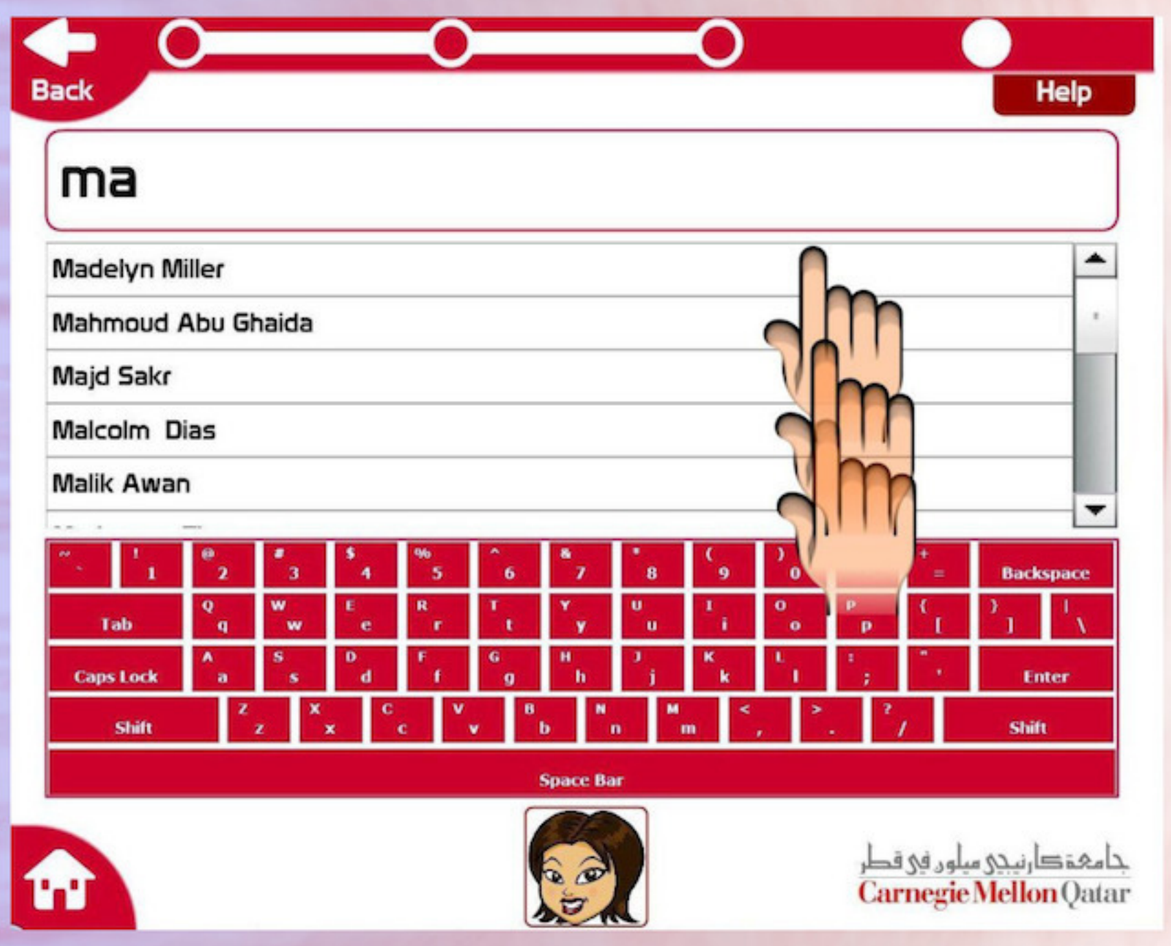
Design

- Adobe Flash and ActionScript 3.
- Object-oriented aspect of ActionScript 3 helped simplify the process a lot.
- The Gesture: Initial touch position on the screen and the direction of movement from initial position were recorded.
- Scrolling: Used timers to derive the speed at which the list should move.

Implementation



Using Distance and time, calculate the speed of the finger, and scroll accordingly. Therefore, If one flicks his finger faster, the list scrolls much faster.



Results

- Successful implementation of scrolling gesture on large touch screen.
- Initial feedback is positive, gestures serves as a better alternative to the unnatural scroll bar interface.
- Due to the inaccuracy of the touch sensor on the touch screen, it results in some unpredictable behavior.

Future Work

- Implement right/left swiping gesture.
- Explore the potential of using multi-touch for large UIs as in information kiosks.
- Measure error and improve gesture recognition algorithm.