SurfacePad

Gesture Recognition on Ubiquitous Surfaces
with a Single Mobile Device

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Goal

- SurfacePad
  - Gesture Recognition on Ubiquitous Surfaces with a Single Mobile Device

Motivation

- There are situations where it is difficult to touch the screen
- To operate a smartphone without touching the screen, a new App is required

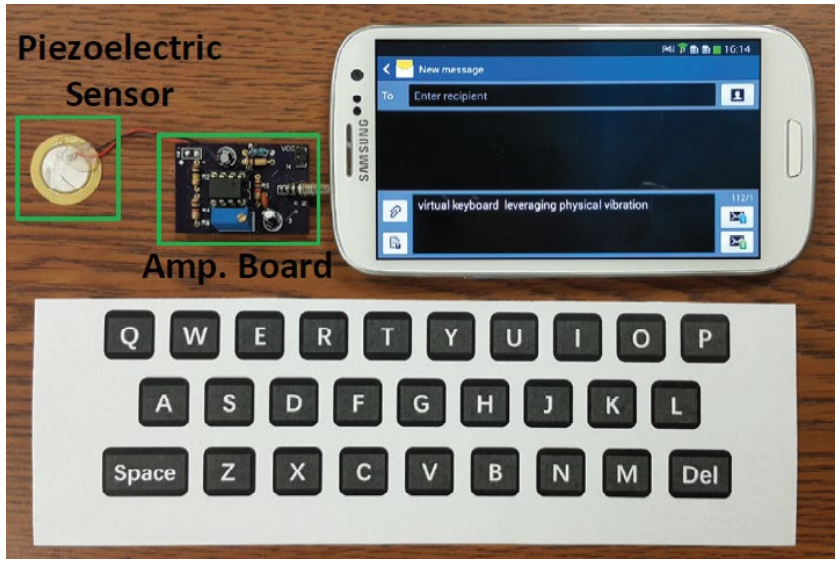
Examples of situation



Related Works

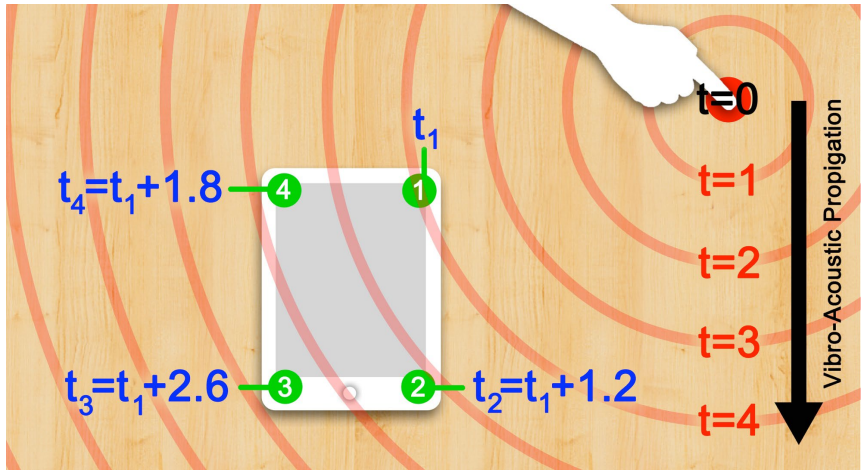
- ViType
  - Body vibration
  - Piezoelectric vibration sensor

- VibKeyboard
  - Easily connected to mobile device
  - Piezoelectric vibration sensor & Amp

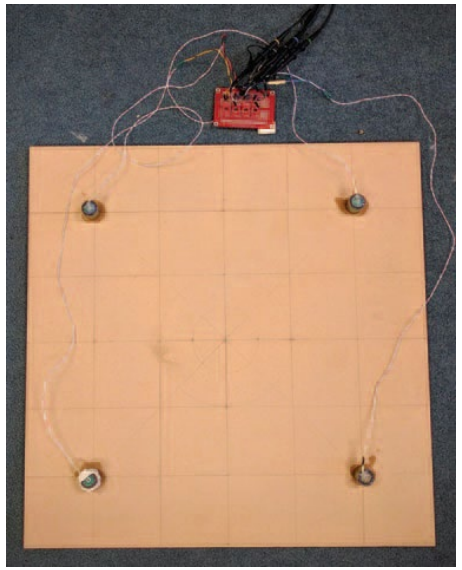


Related Works

- Toffee
  - 4 vibro-acoustic sensor
  - Time Difference of Arrival(TDoA)

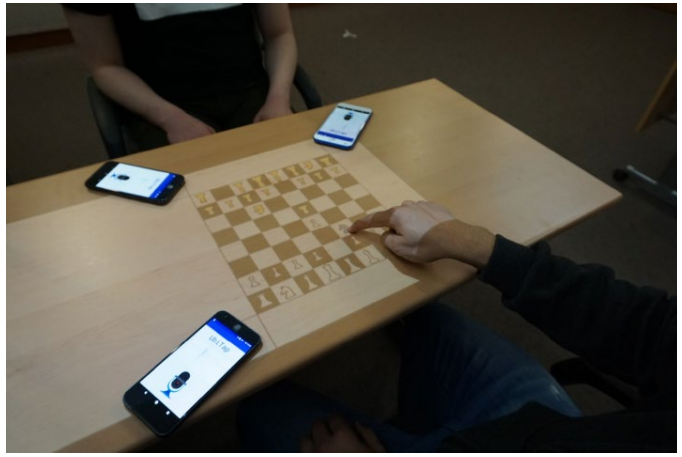


- SurfaceVibe
  - 4 vibration sensors
  - Time Difference of Arrival
  - Tap & Swipe Tracking

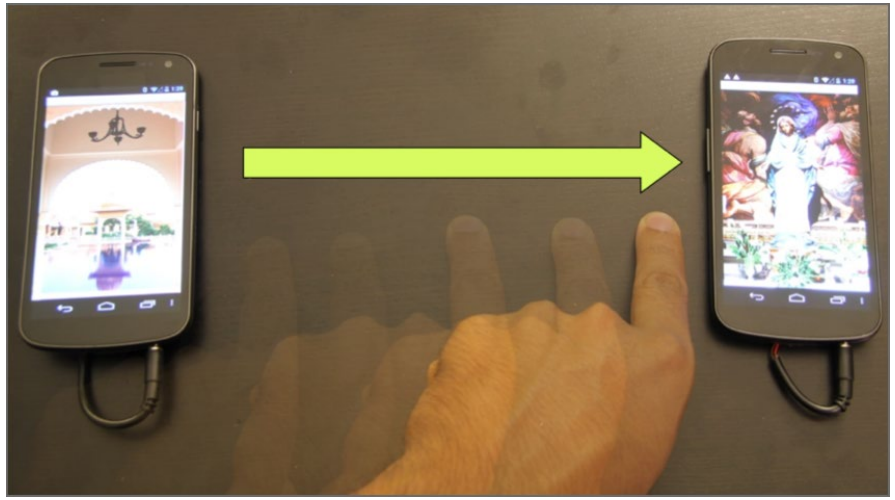


Related Works

- UbiTap
  - Smartphone MIC
  - Acoustic dispersion



- SurfaceLink
  - Inertial & Acoustic sensing
  - Gesture class, length, shape, mode



Cross-domain Impact

- **Drawing Tablet:** A drawing tablet helps people for comfortable drawing, but it has a different texture from paper and it's LCD is high-cost. With this technology, application will be able to recognize how pictures are being drawn on paper and render it in device.

- **Manufacturing Industry:** Technology and material costs for touch screens will be reduced, which will reduce the cost for smartphone manufacturing.

Approach

- **Stereo MIC**
  - Through the time difference that the sound reaches each microphone(Time Difference of Arrival, TDoA), application will be able to identify the source of sound.
- **Accelerometer**
  - Since different types of vibration will occur depending on the type of gesture, the accelerometer can read the information to distinguish the type of gesture.
- **Sound Decibel**
  - Since it will be difficult to measure the distance from the location of the gesture with only the accelerometer, the sound decibel information will correct the distance information.
- **Bixby**
  - Bixby can run applications installed on smartphones with only voice recognition.

Plan

	~4/4	~4/11	~4/18	~4/25	~5/2	~5/9	~5/16	~5/23	~5/30
Related works									
Sensor analysis									
Gesture recognition model									
App design									
S/W development									
User study									