Handheld Application Development

Lec 12: Multimedia III (Touch event)

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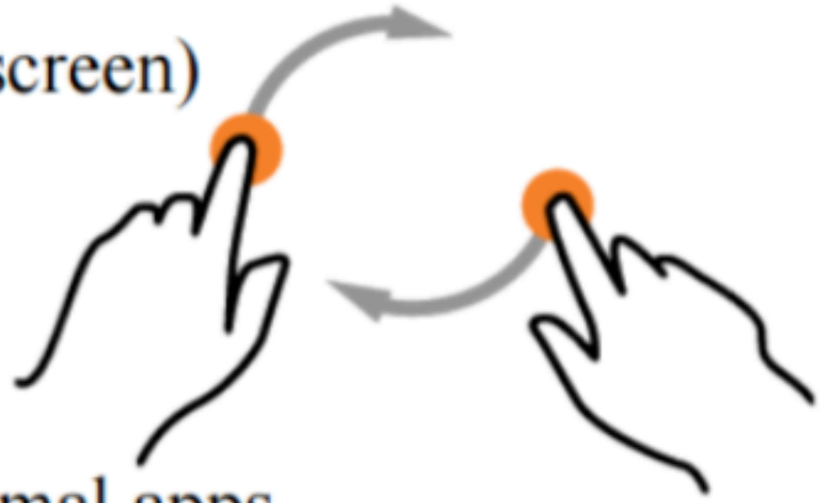
Mobile app controls

- (Multi) Touch Controls
  - Pointing, dragging
  - Clicking, selecting
  - More advanced gestures
- Accelerometer Support
  - Tilting
  - Rotating

Touch: Gestures

- Can also leverage device **gestures**
  - Manipulation strokes common to device
  - **Example**: Pinching for zoom
  - **Example**: Rotating (object, screen)
- Natural for camera control
- **Design Approach**:
  - Think about how used in normal apps
  - How do you leverage this in a game?



Basic touch mechanics

Tap

Double Tap

Tap and Hold

Flick

Pinch

Spread

Rotate

Drag (Scroll)

Multi-touch mechanics

Two Fingers

Tap

Tap/Press

Double Tap

Drag

Three Fingers

Tap

Double Tap

Swipe

Drag

Touch programming

GestureDetector

- Android class receives motion events
- Implement GestureListener interface, etc.
- E.g.,

Class

GestureDetector

implements

GestureDetector.OnGestureListener,
GestureDetector.OnDoubleTapListener

Touch programming

Methods in class

- onDown
- onSingleTapConfirmed
- onSingleTapUp
- onShowPress
- onDoubleTap
- onDoubleTapEvent
- onLongPress
- onScroll
- onFling

Touch programming

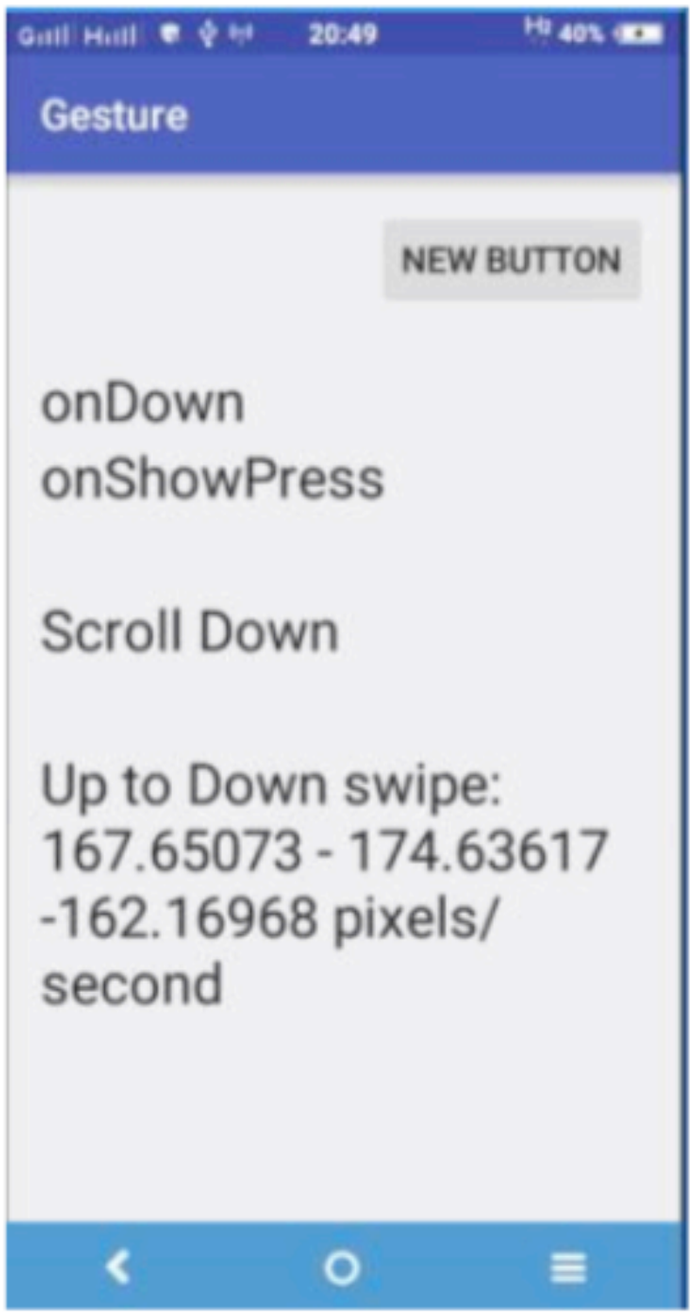
```
public boolean onScroll
(MotionEvent e1, MotionEvent e2, float distanceX, float distanceY)
{
    Log.d("Gesture ", " onScroll");

      if (e1.getY() < e2.getY())
      {
           Log.d("Gesture ", " Scroll Down");
      }

      if(e1.getY() > e2.getY())
      {
           Log.d("Gesture ", " Scroll Up");
      }
       return true;
}
```

Touch programming

```
public boolean onFling(MotionEvent e1, MotionEvent e2, float velocityX, float velocityY)
{
    if (e1.getX() < e2.getX())
    {
        Log.d("Gesture ", "Left to Right swipe: "+ e1.getX() + " - " + e2.getX());
        Log.d("Speed ", String.valueOf(velocityX) + " pixels/second");
    }

    if (e1.getX() > e2.getX())
    {
        Log.d("Gesture ", "Right to Left swipe: "+ e1.getX() + " - " + e2.getX());
        Log.d("Speed ", String.valueOf(velocityX) + " pixels/second");
    }

    if (e1.getY() < e2.getY())
    {
        Log.d("Gesture ", "Up to Down swipe: " + e1.getX() + " - " + e2.getX());
        Log.d("Speed ", String.valueOf(velocityY) + " pixels/second");
    }

    if (e1.getY() > e2.getY())
    {
        Log.d("Gesture ", "Down to Up swipe: " + e1.getX() + " - " + e2.getX());
        Log.d("Speed ", String.valueOf(velocityY) + " pixels/second"); } return true;
    }
    return true;
}
```

Touch programming

Example1



Touch programming

Pinch (คีบ) gesture

- To scale UI element
- Use ScaleGestureDetector class

Touch programming

```
public boolean onScale(ScaleGestureDetector detector)
{
    return true;
}
```

```
public boolean onScaleBegin(ScaleGestureDetector detector)
{
    return true;
}

public void onScaleEnd(ScaleGestureDetector detector)
{
    super.onScaleEnd(detector);
}
```

Touch programming

Example2

Motion Event

```
To detect the touch of three fingers
   getPointerCount();

ACTION_DOWN
    For the first pointer that touches the screen. New touch started.

ACTION_MOVE
    A change has happened in the touch gesture. Finger is moving.

ACTION_UP
    The last pointer leaves the screen.

ACTION_POINTER_DOWN
    For extra pointers that enter the screen beyond the first. (multi-touch)

ACTION_POINTER_UP
    Sent when a non-primary pointer goes up. Pointer up (multi-touch)

ACTION_CANCEL
    The touch event has been canceled, something else took control of the event.
```

Motion Event

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To detect the touch of three fingers
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Motion Event

Example3