

 Windows Phone

Using the Accelerometer



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Rob Miles & Andy Wigley

Windows Phone 7 Jump Start

Microsoft Corporation

Agenda

What the accelerometer gives you

Obtaining accelerometer values

Creating a "tipping" XNA game

Faking the Accelerometer object

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The Windows Phone Accelerometer

The Accelerometer

- The Accelerometer can measure acceleration in X, Y and Z
- You can use just the X and Y values to turn it into a replacement for a gamepad
- The values that are returned are in the same range
 - -1 to +1 in each axis
- When the value is 0 this means the device is flat on that axis

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XNA 4.0 Accelerometer

- Unlike other XNA input devices the accelerometer in XNA 4.0 is event driven
 - The XNA keyboard, mouse and touchpad devices all expose a GetState method
- The accelerometer generates events when new readings are available
- You must bind a method to the event
- The method can store the settings for later use

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Zune HD accelerometer

- The Zune HD exposes its accelerometer in a different way from the Windows Phone
- It provides a GetState method which is called on an Accelerometer instance
 - This is just how all the other devices work
- However, this is not the way that the Windows Phone works
- Fortunately converting between them is easy

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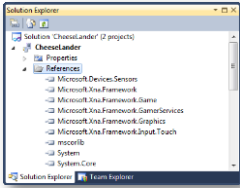


Obtaining Accelerometer Values

XNA and Silverlight

- The reason why the accelerometer is event driven is that XNA actually uses the same sensor interface as Silverlight
- This means that you need to include the appropriate sensor library into your program to obtain accelerometer readings

Adding the Sensors library



- You need to add Microsoft.Devices.Sensors to your solution to bring in the library

Adding the Namespace

```
using Microsoft.Devices.Sensors;
```

- Once you have added the library you can use the Sensors objects
- Adding the namespace to your program makes the code a bit cleaner
- Note that you only have to do this for the accelerometer

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Creating an Accelerometer

```
1. Accelerometer acc = new Accelerometer();
2. acc.ReadingChanged +=
3.     new EventHandler<AccelerometerReadingEventArgs>
4.         (acc_ReadingChanged);
5. acc.Start();
```

- The above code runs in the Initialise method to set up the accelerometer
- It creates a new Accelerometer, binds an event handler to it and then starts it running

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Accelerometer Events

```
1. Vector3 accelState = Vector3.Zero;
2. void acc_ReadingChanged
3.     (object sender, AccelerometerReadingEventArgs e)
4. {
5.     accelState.X = (float) e.X;
6.     accelState.Y = (float) e.Y;
7.     accelState.Z = (float) e.Z;
8. }
```

- This method runs when a new reading is available from the accelerometer
- It copies the readings into a vector

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Using the reading

```
1. if (accelState != null)
2. {
3.     // Update the X and Y positions
4.     float dx = (float) (cheeseMaxAccell * accelState.X);
5.     float dy = (float) (cheeseMaxAccell * accelState.Y);
6.     cheeseXSpeed += dx;
7.     cheeseYSpeed += dy;
8.     accelVector = new Vector2(dx,dy);
9. }
```

- I use the acceleration to control the speed of my cheese



Creating a "tipping" game

"Tipping" games

- The accelerometer makes it very easy to create "tipping" games, which simulate gravity moving items around the screen
- The further you tip the device the greater the force acting on the object
- This leads to a very simple physics model, which is actually very effective

Cheese Lander


Demo

Demo 1: Creating a “tipping” game



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Faking the Accelerometer

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Fake Accelerometer Fun

- It is possible to create fake accelerometer readings quite easily
- I have created a fake accelerometer that uses an Xbox 360 gamepad as the input device
- It runs a local web host that the XNA game hits against when it runs
- See my blog for details

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Review

The Accelerometer only provides X and Y acceleration

The Accelerometer generates an event for each new reading

The Accelerometer is part of the sensors namespace

Both Silverlight and XNA use the accelerometer in the same way

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Coming Up Next...

Using the touchscreen in an XNA game

Advanced XNA sound playback

Using the Guide for text input

Controlling media playback with XNA

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