

CS 641, Haik Sahakian

Mobile Web Development

The Accelerometer,
with DIVs and D3

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Creating a Test Page

- ❖ I'd like to create a web page that displays visual feedback when the user shakes a phone.
- ❖ A bar chart of motion in X, Y, and Z axes will be displayed. The faster the phone is shaken, the longer the bars will extend.
- ❖ Btw - in corporate speak, these are examples of "user stories" ...

UX Terms

- ❖ User Stories
- ❖ Personae
- ❖ Storyboards
- ❖ Style Guides
- ❖ User Journeys
- ❖ Wireframes
- ❖ Word Clouds

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- ❖ Btw - in corporate speak, these are examples of "user stories" ...

Steps for Building the Page

- ❖ Creating the HTML Container
- ❖ Listening for HTML Events
- ❖ Creating the UI for Event Display
- ❖ Connecting the UI to Event Listeners
- ❖ Testing on Mobile

Creating the HTML Container

- ❖ Adding the viewport tag

```
<!DOCTYPE html>
<html>
  <head>
    <title>Shake me</title>
    <style>
      body {
        background-color: #eee;
      }
    </style>
  </head>
  <body>
    </body>
</html>
```

Listening for HTML Events

- ❖ Using `addEventListener()`
- ❖ The Event object

```
window.addEventListener("devicemotion", handleMotionEvent, true);

function handleMotionEvent(event) {
    var x = event.accelerationIncludingGravity.x;
    var y = event.accelerationIncludingGravity.y;
    var z = event.accelerationIncludingGravity.z;
}
```

View the Phone Console on a Laptop

- ❖ Connect the two with a USB cable
- ❖ Enable remote debugging on each device
- ❖ Reload the page
- ❖ On Android? Go to <https://developer.chrome.com/devtools/docs/remote-debugging>

Creating the UI for Event Display

- ❖ Creating DIVs for the bars
- ❖ Styling the DIVs
- ❖ Changing the DIVs when events are received

```
<div class="chart">  
  <div id="x" class="bar">X</div>  
  <div id="y" class="bar">Y</div>  
  <div id="z" class="bar">Z</div>  
</div>
```

```
<div class="chart">
  <div id="x" class="bar">X</div>
  <div id="y" class="bar">Y</div>
  <div id="z" class="bar">Z</div>
</div>
```

```
var maxBarLength = window.innerWidth * 0.8;
```

```
function setBarLength (theBarId, theLength) {
  document.getElementById(theBarId).style.width = theLength *
maxBarLength / 50;
}
```


Finished Code

```
<html>
<head>
  <meta name="viewport" content="width=device-width" />
  <style>
    .chart {
      border: 1px solid red;
    }
    .bar {
      background-color: red;
      margin: 5px;
    }
  </style>
</head>
<body>

  <div class="chart">
    <div id="x" class="bar">X</div>
    <div id="y" class="bar">Y</div>
    <div id="z" class="bar">Z</div>
  </div>

  <script>
    if (window.DeviceMotionEvent==undefined)
      console.log("Your browser does not support the DeviceMotionEvent");

    var maxBarLength = window.innerWidth * 0.8;
    window.addEventListener("devicemotion", handleMotionEvent, true);

    function handleMotionEvent(event) {
      var x = event.accelerationIncludingGravity.x;
      var y = event.accelerationIncludingGravity.y;
      var z = event.accelerationIncludingGravity.z;
      //console.log("handleMotionEvent: ", x, y, z);
      setBarLength('x', x);
      setBarLength('y', y);
      setBarLength('z', z);
    }

    function setBarLength (theBarId, theLength) {
      var roundedLength = (Math.round(theLength * 10) / 10);
      document.getElementById(theBarId).style.width = roundedLength * maxBarLength / 30;
    }

    function roundFloat(_float, _digits){
      var rounder = Math.pow(10, _digits);
      return (Math.round(_float * 10) / 10);
    }
  </script>

</body>
</html>
```

Switching to D3

D3 Summary

- ❖ Connecting data to markup
- ❖ Able to style and change content
- ❖ Utility features: selectors, chaining

Code Changes for D3

- ❖ Include library
- ❖ Remove DOM lookup code
- ❖ Simplified DOM update code

```
<script src="http://d3js.org/d3.v3.min.js"></script>
```

```
var aaa = [a.x, a.y, a.z];
```

```
d3.selectAll(".bar")
```

```
  .data(arr)
```

```
  .text(function(d) { return (d) ? d.toFixed(1) + " m/s" : "Try this on a phone"; })
```

```
  .style("width", function(d) { return (d * maxBarLength / 50) + "px"; });
```


Finished Code

```
<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <style>
      .chart {
        border: 1px solid blue;
      }
      .bar {
        background-color: blue;
        margin: 5px;
        white-space: nowrap;
      }
    </style>
    <script src="http://d3js.org/d3.v3.min.js"></script>
  </head>
  <body>

    <div class="chart">
      <div id="x" class="bar">X</div>
      <div id="y" class="bar">Y</div>
      <div id="z" class="bar">Z</div>
    </div>

    <script>
      var maxBarLength = window.innerWidth * 0.8;
      window.addEventListener("devicemotion", handleMotionEvent, true);

      function handleMotionEvent(event) {
        var a = event.accelerationIncludingGravity;
        var arr = [a.x, a.y, a.z];
        d3.selectAll(".bar")
          .data(arr)
          .text(function(d) { return (d) ? d.toFixed(1) + " m/s" : "Try this on a phone"; })
          .style("width", function(d) { return (d * maxBarLength / 50) + "px"; });
      }
    </script>

  </body>
</html>
```

Questions?

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