



University of
Zurich ^{UZH}

Geographic Information Visualization and Analysis
Department of Geography

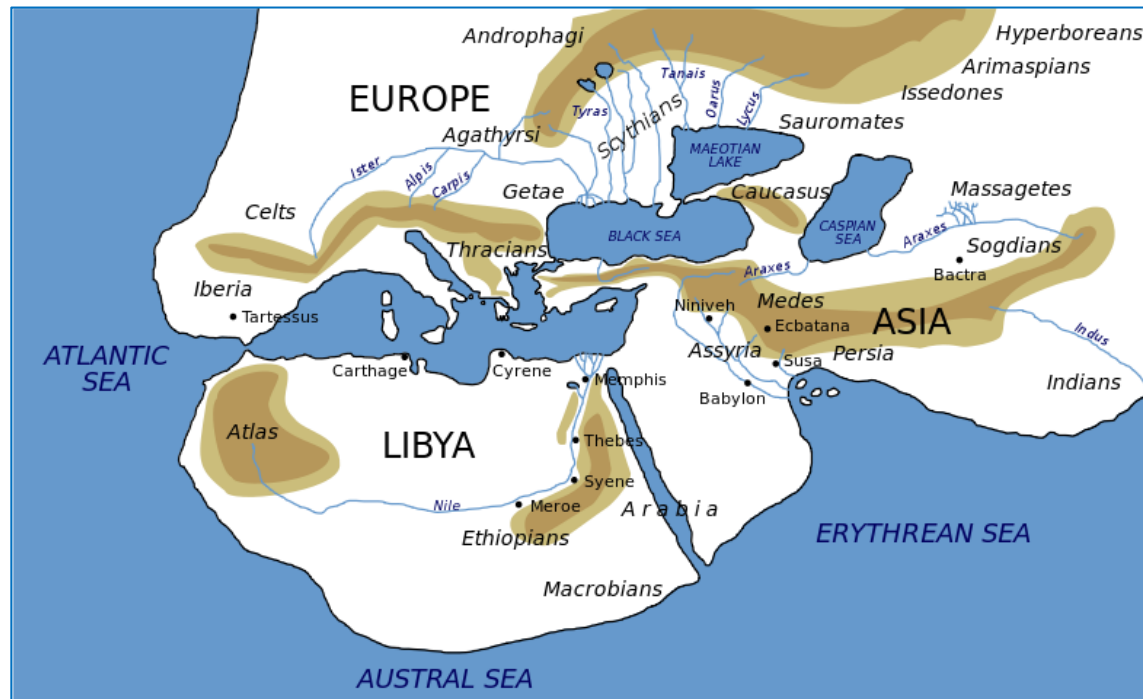
Area of Interest Based Interaction for GeoVisualization with WebGL

Kenan Bektaş
and
Arzu Çöltekin

the graphical web'12
13.09.12 Zürich



We first **look** at and then try to **understand**!

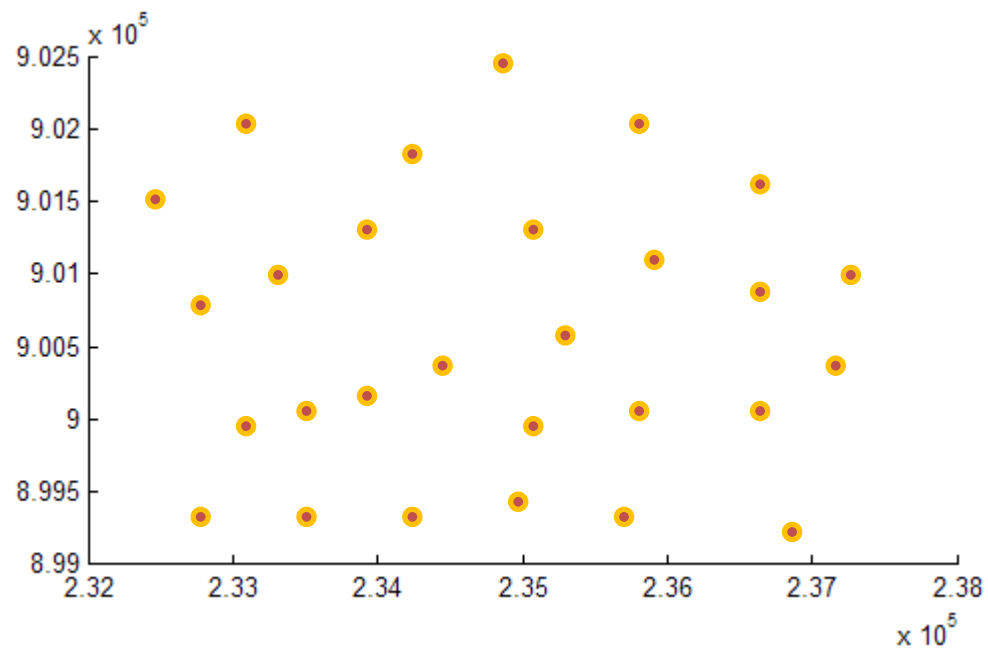


The world according to Herodotus, 440 BCE

Not enough information!



boston.tif: Image by **GeoEye** (2 MP)

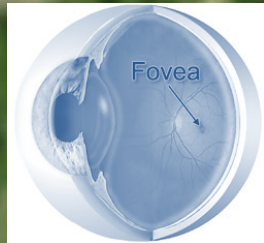




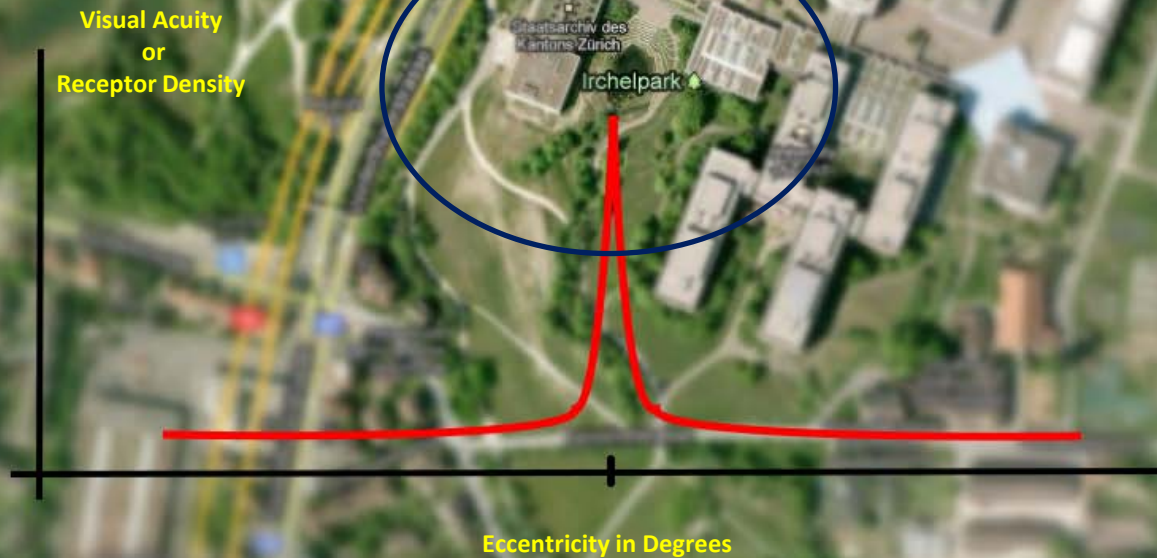
Google Maps



Google Maps



Peripheral vision: Lower resolution information over a wider range (Context)
Foveal vision: High quality visual information on a limited range (Focus)

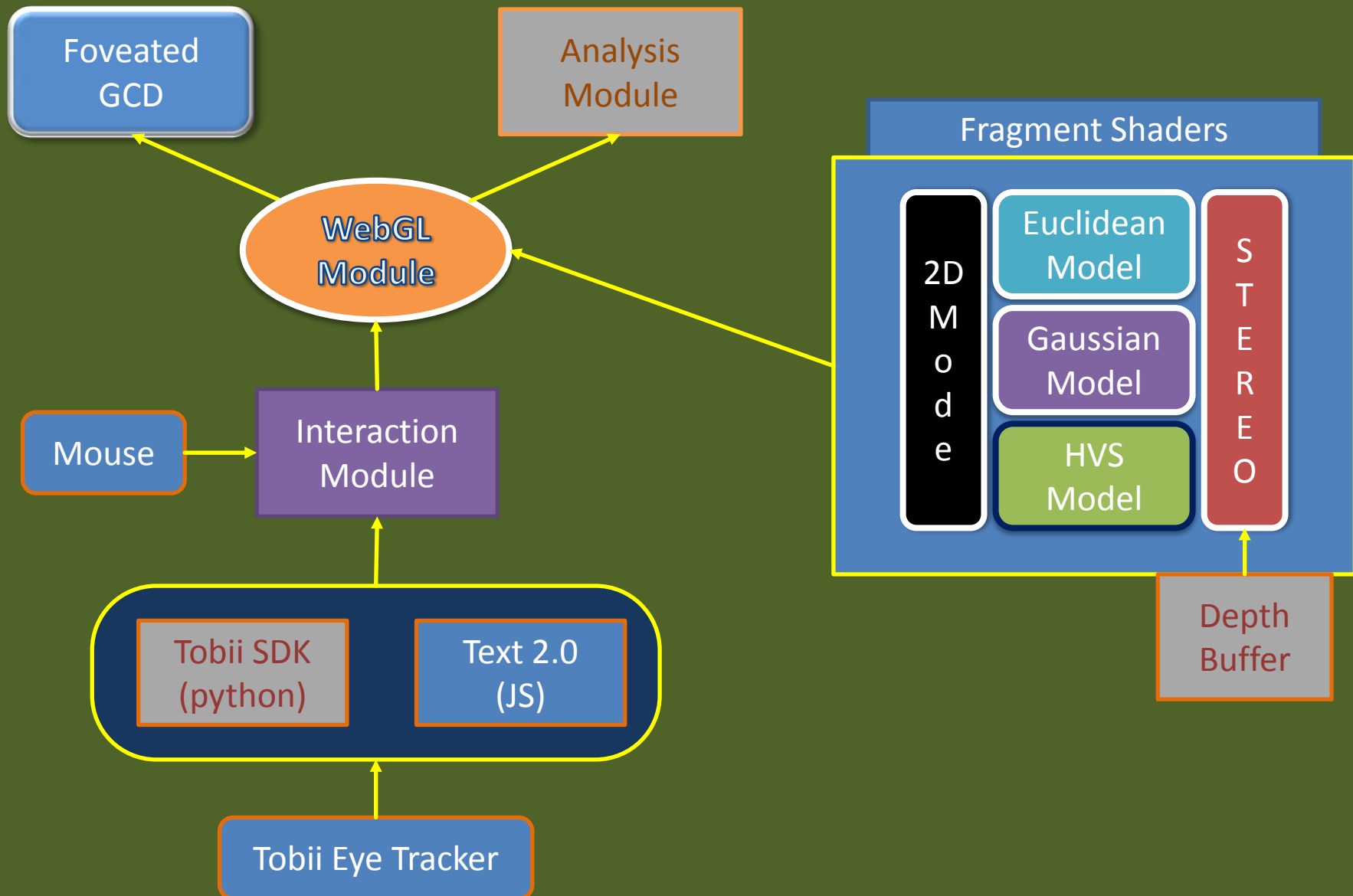


Google Maps

Motivation

- Mass amount of graphics media/data
 - Remove perceptually irrelevant detail
- Human visual system
 - Foveation
- Where do people look?
 - Eye tracking
- How to foveate on browser in real-time?
 - WebGL

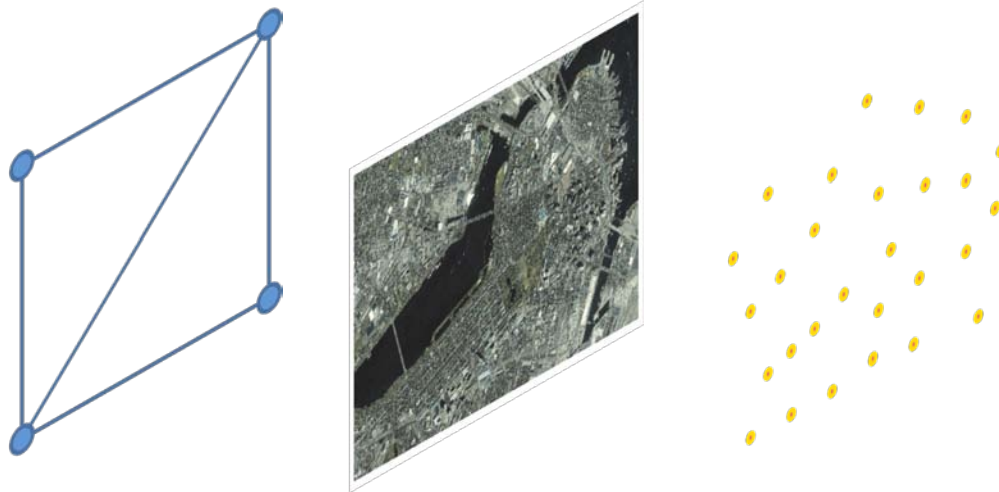
Test Bed Modules



Foveated GCD



WebGL



...

```
varying vec2 v_texCoord;
```

```
uniform sampler2D u_image; // texture1: Background
```

```
uniform sampler2D u_image_lr; // texture2: Foreground
```

...

Fragment Shader

```
<script id='fshader' type='x-shader'>
    precision mediump float;
    varying vec2 v_texCoord;
    uniform sampler2D u_image; // texture1: Background
    uniform sampler2D u_image_lr; // texture2: Foreground
    uniform vec2 center;
    void main() {
        float dist = (distance(v_texCoord, center) * (1.0));
        vec4 color = texture2D(u_image, v_texCoord, dist) +
            texture2D(u_image_lr, v_texCoord, dist);
        gl_FragColor = color;
    }
</script>
```




Select Convolution Method: Original

516, 355

Conclusion

Perceptually adapted geovisualization according to the user's POI.

Done

- Two layers (1024 X 1024)
- Mipmapping
- Reduced resolution
- Real-time rendering
- Mouse and eyetracker
- Firefox 15.0

To-Do

- Additional layers
- FBO
- Color and geometry
- NPOT
- Other browsers

Thank you for your interest

We appreciate your questions and
suggestions 😊

{Kenan.Bektas | Arzu.Coltekin} (at) geo.uzh.ch

This work is funded by Swiss National Science Foundation (SNF)