Practical Guide for Building a 3D Web App from 2D Data

Kristian Ekenes
Raluca Nicola
Kristian Ekenes

- Product Engineer JS API
- Data visualization, Smart Mapping, Arcade
- Redlands, California

Ralucica Nicola

- Product Engineer JS API
- Data visualization, 3D
- Zurich, Switzerland
You will learn
This hike has remarkable views from Munt Basfolia and around 23 glader lakes (also called the Macun lakes). Hikers can admire rare flora like the pygmy buttercup (only occurrence in Switzerland).
when all you have is this
how to create a 3D analysis app

with 2D data
and some other examples
Hiking trails – Swiss National Park

Airspace encroachment analysis

Other visualizations

20 min

20 min

10 min
Hiking trails

Swiss National Park
Goals

View and filter trails

Show details about each path: description, elevation profile, images
Resources

- Hiking trails - 2D line data
- Bus stops – 2D points
- Mountain peaks – 2D points
- Village names – 2D points
- Basemaps & satellite imagery
- Elevation service
- Image REST API

ArcGIS API for JavaScript (& AMCharts)
**Filtering**

definitionExpression – an SQL clause used for client side feature filtering

```java
layer.definitionExpression = "RouteId = 10 OR RouteId = 20";
```
elevationLayer.queryElevation – queries the elevation layer for elevation values for the given geometry

```javascript
// call the queryElevation method on the ground
// with 2D geometry (multipoint, point, line)
elevationLayer.queryElevation(feat.geometry, {
  demResolution: "finest-contiguous"
  noData: 1500
})
.then((response) => {
  // prints geometry with z values obtained
  // by querying the underlying elevation service value
  console.log(response.geometry);
});
```
elevationInfo

```javascript
var feature = new FeatureLayer({
  // other properties...
  elevationInfo: {
    mode: "relative-to-ground"
  }
});
```

- **relative to ground**
- **relative to scene**
- **absolute height**

**on the ground**

**relative to ground**
Line labeling

Labels with callouts on lines

Hiking trail 1

```js
new FeatureLayer({
  // set properties like url and renderer here
  labelsVisible: true,
  labelingInfo: [new LabelClass({
    symbol: new LabelSymbol3D({
      symbolLayers: [new TextSymbol3DLayer({})],
      verticalOffset: {
        screenLength: 80,
        maxWorldLength: 3000,
        minWorldLength: 200
      },
      callout: {
        type: "line",
        size: 1,
        color: "white"
      }
    }),
    labelExpressionInfo: { expression: `${feature.name}` }
  })]
});
```
Set images in the scene

IconSymbolLayer works with any image

on click add it to the DOM and transition it to full screen

```javascript
const billboard = new PointSymbol3D({
symbolLayers: [new IconSymbol3DLayer({
  size: 50,
  resource: {
    href: `https://url.com/image.jpg`
  }
}),
},
verticalOffset: {
  screenLength: 50,
  maxWorldLength: 3000
},
callout: {
  type: "line",
  size: 1,
  color: "white"
}
});
```
Airspace Encroachment Analysis

Military Training Routes
Real world size

Using data attributes to size features based on real world size.
Elevation offsets
Realistic symbols

aka Web Styles…
Realistic symbols

Web Styles published from ArcGIS Pro

```javascript
const turbineRenderer = {
  type: "simple",
  symbol: {
    type: "web-style",
    styleUrl: "https://www.arcgis.com/sharing/rest/..."
  },
  visualVariables: [{
    type: "size",
    field: "total_ht",
    axis: "height",
    valueUnit: "feet"
  }]
};
```
Underground visualization
Documentation samples
Terrain visualization
Using contour lines
Resources

ArcGIS API for JavaScript SDK samples:


Hiking app – https://github.com/RalucaNicola/hiking-app

Airspace encroachment analysis app –