plotVR - Walk Through Your Data

Dr. Philipp Thomann
About me

- Vita
  - PhD in Probability Theory
  - PostDoc in ML
  - Senior Consultant with D ONE Solutions
- Projects in DataScience, ML, AI, Infrastructure, Visualisation, Coaching
- (Co-)Creator of
  - liquidSVM - A fast and versatile SVM implementation
  - Nabu - vocabulary drilling tool
  - NLPeasy - Easy Peasy Language Squeezy
- ...and introducing:
  - PlotVR - walk through your data
About D ONE Solutions

- Consultancy based in Zurich
- ~ 40 Consultants, a third with PhD
- Consulting in all aspects of data driven value creation
  - Setup DWHs (DataVault 2.0, HELT)
  - Visualisation / Dashboards (Tableau, PowerBI, Qlik, D3, ...)
  - AI/ML/Data Science Projects (Python, R, Microsoft Cognitive Services, ...)
  - Data Science Infrastructure (Jupyter, RStudio Server, Docker, ...)
  - Strategic Consulting
- Investment in StartUps (WinJi, Skunk)
- Supporting Society / Industry with Talks, Education, Interest Groups, ...
- Projects mostly in Switzerland, some also abroad

Interested? We’re hiring! [www.d-one.ai](http://www.d-one.ai)
What is plotVR about?
Data Scientists love to visualise...

Now and then go 3D

Not the "real" thing, so

Expensive, meanwhile...
But there are some issues to solve here...

- How do we bring the data from the workstation to the mobile device?
- Can we do both VR and AR?
- Can we do it in HTML or do we need an app for that?
- How do we navigate when we are in VR?
- Does it need to cost something?
- Can I create all that in my own free time?
## Features Matrix

<table>
<thead>
<tr>
<th></th>
<th>VR</th>
<th>AR</th>
<th>3D</th>
<th>Technology</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTML</td>
<td>✓</td>
<td>✕</td>
<td>✓</td>
<td>three.js</td>
<td>GitHub</td>
</tr>
<tr>
<td></td>
<td>(ugly on iOS)</td>
<td>(no nice lib?)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iOS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>SceneKit, ARKit, GVR</td>
<td>GitHub</td>
</tr>
<tr>
<td>Android</td>
<td>✓</td>
<td>planned</td>
<td>planned</td>
<td>OpenGL, ARCore, GVR</td>
<td>GitHub</td>
</tr>
</tbody>
</table>
Demo
If Demo-Gods are not willing...

```python
import plotvr
plotvr.start_server_process()


from sklearn import datasets
iris = datasets.load_iris()

plotvr.plotvr(iris.data, iris.target)

plotvr.controller()
```

move
down (q) forward (w) up (e)
left (a) back (s) right (d)

look
up (up)
left (left) down (down) right (right)

other
reload (r) toggle flying mode (space)

Devices 2, Controllers 5, having focus: 1
http://localhost:2908/index.html Copy
Architecture

**Server (Tornado)**
listen on 10.0.0.1:2908

**Jupyter**
plotvr to 10.0.0.1:2908

**Controller (HTML)**
10.0.0.1:2908/keyboard.html

**plotVR (Java)**
http://10.0.0.1:2908

**plotAR (Swift)**
http://10.0.0.1:2908

**Browser (three.js)**
http://10.0.0.1:2908

**R**
plotvr to 10.0.0.1:2908

**Warning:** All data is transmitted unencrypted and everybody can connect!
Can I haz plotVR?

- **Python:**
  - pip install "git+https://github.com/thomann/plotVR#egg=plotvr&subdirectory=plotVR-py"

- **R:**
  - devtools::install_github('thomann/plotVR', subdir='plotVR-R')

- **iOS-App**
  - [https://github.com/thomann/PlotAR-ios](https://github.com/thomann/PlotAR-ios) (needs XCode and a free personal team)
  - To have you as an early tester: philipp.thomann@d-one.ai
  - Soon via AppStore TestFlight with a shared public link?

- **Android-App:**
  - [https://github.com/thomann/plotVR-android](https://github.com/thomann/plotVR-android)
  - [https://github.com/thomann/plotVR-android/releases](https://github.com/thomann/plotVR-android/releases)
Outlook / Vision

- Add text, lines, surfaces to 3D plots
- Make scenery nicer
- PyPI, CRAN, AppStore, GooglePlay
- Solidify protocol

Ideas:

- HTTPS / Authentication / Authorisation
- User Jupyter-Tornado as server?
- Interface to plotly, ggplot?
- Namespaces on server → central plotVR server, e.g. on cloud/premise
Thanks

- All the giants' shoulders this project stands on: Cardboard, GVR, ARKit, Jupyter, Tornado, requests, pyqrcode, three.js, …
- D ONE for being a really cool employer to send me here
- EuroPython for giving me the opportunity to work more on this!
- And all the future contributors to these projects ;-)}
LET’S MAKE SENSE

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