Where to Park

Technology Review

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Background and Use Cases

- Application: tool that allows users to find parking options surrounding the destination they are interested in visiting
- Use case: Closest Parking
  - User inputs name of destination/address of destination
  - Tool returns list of parking areas sorted by distance, along with an interactive map
- Use case: Lowest Occupancy Parking
  - Tool displays an interactive map
  - User is able to drag and zoom to a particular area
  - Tool displays nearby parking facilities, along with respective occupancy rates
- Python Library: Mapping
  - Use to create an interactive map for users
  - Provide a base map of Seattle
  - Overlay parking and destination locations

Python Package Choices: Mapping

- ArcGIS
  - Author: Esri (Geographic Information System Software Company)
  - Purpose: Perform GIS visualization and analysis, spatial data management, GIS system administration tasks
    - arcgis.geocoding: find point locations of addresses and businesses
    - arcgis.mapping: mapping layers for 2D and 3D mapping
- Bokeh
  - Author: NumFOCUS (Nonprofit focused on open-source software for scientific computing)
  - Purpose: Create interactive map-based visualizations and work with geographical data
    - bokeh.tile_providers: pre-configured tile sources
    - bokeh.plotting: plot glyphs over a Google map using function gmap()

Package Comparison

Bokeh

Pros:

- Free and open-source
- Has built-in function gmap() to plot over Google Map API
- Has a variety of tools for interactivity, such as panning, zooming, and selecting data points

Cons:

- Limited to two-dimensional maps
- Lacks some of the more advanced features of ArcGIS such as routing and geocoding

ArcGIS

Pros:

- Offers a wide range of mapping and geospatial analysis tools, including 3D visualization, geocoding, and routing
- Provides a rich set of pre-built basemaps and layers, as well as the ability to use custom data layers
- Offers integration with ArcMap and ArcGIS Online

Cons:

- Expensive compared to Bokeh, it requires a subscription or license to use
- Requires some learning curve to become proficient in using it

Our Choice

- 2-D mapping offered by bokeh is sufficient enough for the purpose of our project
- gmap() function offers interactive map that is essential to our project
- ArcGIS requires steeper learning curves

Drawbacks

- Bokeh is based on Python framework, therefore if we want to work under frameworks other than Python, e.g. JavaScript, in the future, it would be difficult to translating into the frameworks.
- The interactivity of the library is limited. Especially when working on the map, the moving and the shifting could lag.

Demo of Package