

# Capital Bikeshare Predictions

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**Mission : Data**

# Who Am I?

I am a Senior at the George Washington University, majoring in Computer Science.

This past summer, I was a software development intern at Mission Data.

# The Question

Can we use machine learning to predict the chance a bikeshare station will have a bike available, or a rack to check in a bike, at a future point in time?

# Machine Learning Techniques

We used the [random forest](#) algorithm, after testing a number of options (including logistic regression, AdaBoost, and even some simple neural networks).

The features the algorithm learned from were:

- Time of Day
- Day of Week
- Month
- Temperature
- Amount of Precipitation

# API

```
{  
  "datetime": string (date and time),  
  "location": string[,  
  "station_count": integer]  
}
```

# API

- Station List
  - Name
  - Distance
  - Prediction
    - Chance Empty
    - Chance Full
- Forecast
  - Condition
  - Temperature (Celsius and Fahrenheit)
- Address, Date, Time

# Data (and Sources)

Historical Bike Data - [Capital Bikeshare Tracker](#)

Current Bike Rack Status - [Official Capital Bikeshare Station Status Feed](#)

Historical Weather Data - [NOAA](#)

Weather Forecasts - [Weather Underground API](#)

[Google Maps Geolocation API](#)

# Tech Stack

Machine Learning in Python 3, with [Pandas](#) and [scikit-learn](#)

API in Python 3 using [Falcon](#)

Web interface in [Angular 2 with TypeScript](#), running on a [Sinatra](#) in Ruby



# Results

Our predictions worked. On most bike stations, we were able to reach accuracy above 95%.

Cyclists don't like getting wet. Adding weather data improved results dramatically.

# Interfaces

A public web application.

A conversational Slackbot using [wit.ai](https://wit.ai).

The screenshot shows the 'Capital Bikeshare Predictions' web application. At the top, the title 'Capital Bikeshare Predictions' is displayed in a teal font. Below the title is a teal banner with a 'New Prediction' button. The main content area shows the location '2221 S Clark St, Arlington, VA 22202, USA' and the text 'Bikes near:'. Below this, a weather and date bar indicates 'Thursday November 03, 2016', '07:00 PM', and '69 F, Overcast'. The bottom section displays a grid of six location predictions, each with its name and the probability of being empty or full.

Location	Chance Empty	Chance Full
23rd & Crystal Dr	3.0%	0.0%
23rd & Eads St	0.0%	0.0%
20th & Crystal Dr	0.0%	0.0%
Crystal City Metro / 18th & Bell St	0.0%	0.0%
26th & S Clark St	4.0%	0.0%

# Links

Mission Data Lab Notes: [Machine Learning Part 1](#), [Part 2](#), [Slackbot](#)

[Source \(on Github\)](#)

[Mission Data](#)

**Thank You!**

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