



Feature selection or penalised regression?

Are loops really ☠?

How do I get Hadley to follow me?

How fast can I run a marathon?

Building an API with Plumber & Docker

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Riegel's Formula

If distance d_1 took t_1 , then distance d_2 should take t_2 .

$$t_2 = t_1 \times \left(\frac{d_2}{d_1} \right)^\alpha$$

Slowing with distance characterised by α (normally $\alpha = 1.06$).

[1] Peter Riegel, "Time Predicting", Runner's World Magazine, 1977.

[2] Peter Riegel, "Athletic Records and Human Endurance", American Scientist. 1981.

Riegel's Function

```
riegel <- function(time) {  
  time * (42.2 / 5) ** 1.06  
}
```

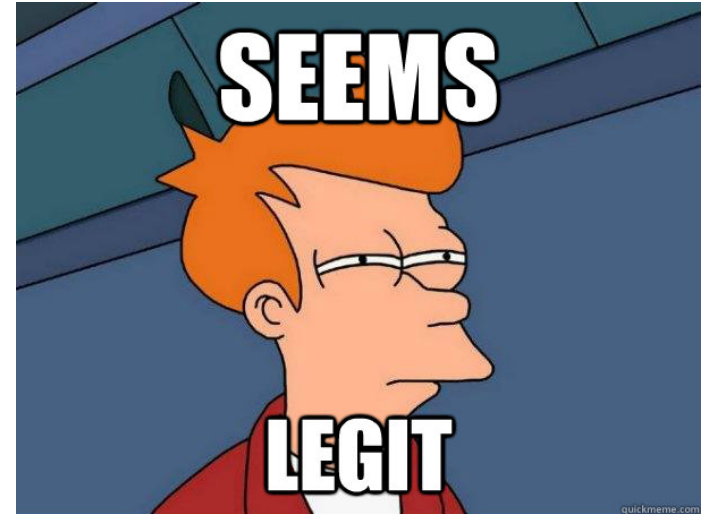
Test: Marathon time based on 25:00 for 5 km.

```
riegel(25)
```

```
[1] 239.8076
```

- Put this in a package? Nah!
- Just one function.
- Only accessible from R.

There must be a better way.



Plumber

Turn functions into API.

```
# From CRAN  
install.packages("plumber")  
  
# From GitHub  
devtools::install_github("trestletech/plumber")
```



Riegel's API

Decorate the function.

```
## @get /riegel  
function(time, exponent = 1.06) {  
  # API inputs are character.  
  time = as.numeric(time)  
  exponent = as.numeric(exponent)  
  # Fixed distances.  
  distance = 5  
  goal = 42.2  
  # Calculate time for goal distance.  
  time * (goal / distance) ** exponent  
}
```

Launch the API.

```
library(plumber)  
  
plumb("riegel-api.R")$run(port=8000)
```

API running on port 8000 on localhost.



"Have you heard about the Riegel API?"

Docker

Create a portable image (API + execution environment) which can be run from anywhere.

```
FROM rocker/r-ver:3.5.2

RUN apt-get update -qq && \
    apt-get install -y \
        pandoc \
        libssl-dev \
        libcurl4-gnutls-dev \
        libxml2-dev

RUN R -e "install.packages(c('plumber', 'dplyr', 'plotly'))"

COPY riegel-api.R riegel-api.R

EXPOSE 8000

ENTRYPOINT ["R", "-e", "library(plumber); plumb('riegel-api.R')$run(port=8000, host='0.0.0.0')"]
```

Notes on host:

- 127.0.0.1 — only accept connections from localhost (loopback device) and
- 0.0.0.0 — accept connections from anywhere.

Build the image.

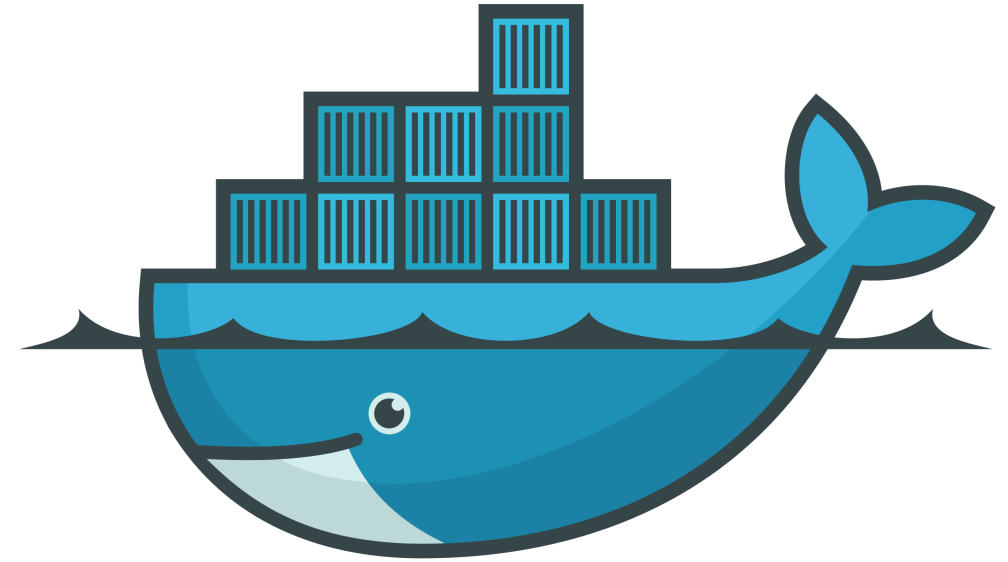
```
$ docker build -t riegel-api .
```

Create a container.

```
$ docker run --rm -p 8000:8000 riegel-api
```

Container port 8000 mapped to host port 8000.

- **Run locally or on AWS or Azure.**
- **Runs on any platform that supports Docker**
 - **Windows**
 - **Mac**
 - **Linux**
- **No other installs required.**
- **No version conflicts.**



docker

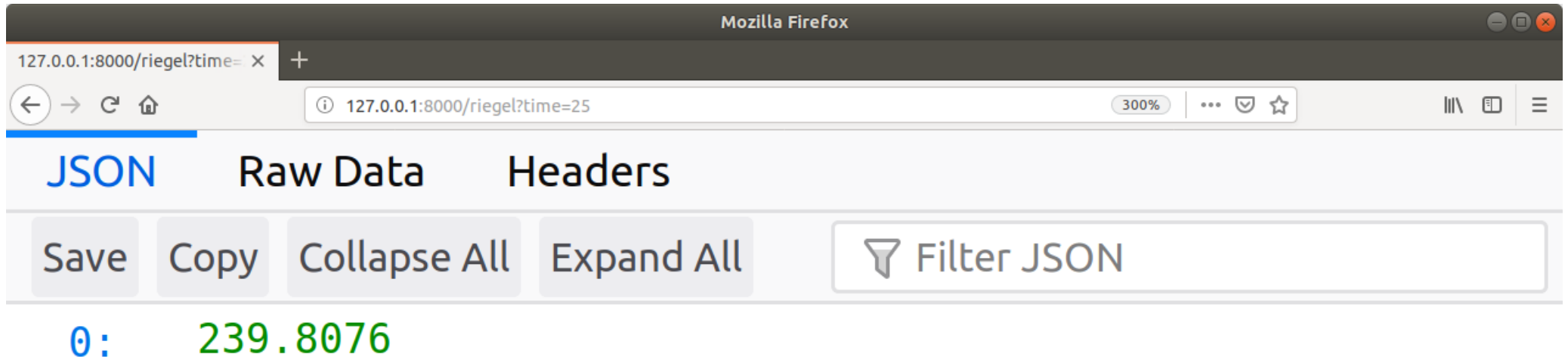
Access Programmatically from Anywhere!

```
# BASH
$ curl http://3.84.115.105:8000/riegel?time=25
[239.8076]
```

```
# R
> library(httr)
> response = GET("http://3.84.115.105:8000/riegel?time=25")
> response
Response [http://52.23.233.245:8000/load-shedding]
Date: 2019-04-01 07:55
Status: 200
Content-Type: application/json
Size: 7 B
> content(response, as = "parsed")
[[1]]
[1] 239.8076
```

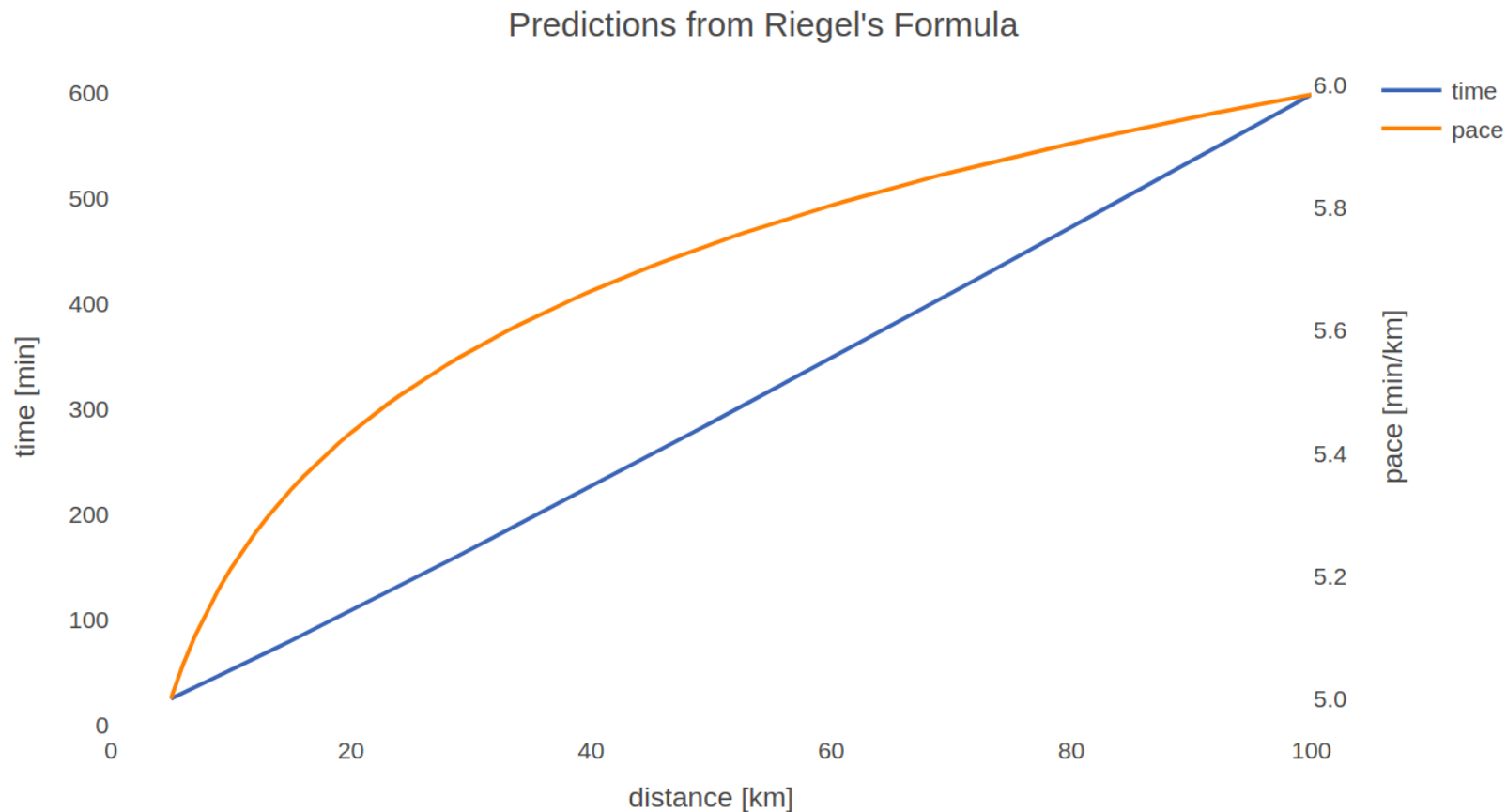
```
# Python
>>> import json, requests
>>> response = requests.get("http://3.84.115.105:8000/riegel?time=25")
>>> response.status_code
200
>>> json.loads(response.content.decode('utf-8'))
[239.8076]
```

Even your Browser



Other Serialisers

API can return more than just JSON: variety of results from PDF to interactive graphics.



Give these tools a try!

Try these:

- **Plumber** and
- **Docker**.

Deploying your own API will make you feel like a 🧑.

Slides and code available from <http://bit.ly/satrdaysatjoburg-api>.



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