Ferrari Dashboard

April 4, 2025

```
[3]: #import libraries
     from urllib.request import urlopen
     import json
     import pandas as pd
     import seaborn as sns
     import matplotlib.pyplot as plt
     from ipywidgets import interact
```

```
[6]: #use openf1 api to get datasets from most recent session
     response = urlopen('https://api.openf1.org/v1/car_data?
      ↪driver_number=44&session_key=latest')
     data = json.loads(response.read().decode('utf-8'))
     HamiltonDf = pd.DataFrame(data)

     response = urlopen('https://api.openf1.org/v1/car_data?
      ↪driver_number=16&session_key=latest')
     data = json.loads(response.read().decode('utf-8'))
     LeClercDf = pd.DataFrame(data)

     response = urlopen('https://api.openf1.org/v1/sessions?session_key=latest')
     data = json.loads(response.read().decode('utf-8'))
     RaceData = pd.DataFrame(data)

     response = urlopen('https://api.openf1.org/v1/location?
      ↪driver_number=44&session_key=latest')
     data = json.loads(response.read().decode('utf-8'))
     HamiltonLOC = pd.DataFrame(data)

     response = urlopen('https://api.openf1.org/v1/location?
      ↪driver_number=16&session_key=latest')
     data = json.loads(response.read().decode('utf-8'))
     LeClercLOC = pd.DataFrame(data)
```

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[7]: #perform simple transformations to make dataset more usable
     HamiltonDf['date'] = pd.to_datetime(HamiltonDf['date'], format='mixed')
     LeClercDf['date'] = pd.to_datetime(LeClercDf['date'])
     HamiltonLOC['date'] = pd.to_datetime(HamiltonLOC['date'], format='mixed')
```

```
LeClercLOC['date'] = pd.to_datetime(LeClercLOC['date'])
```

[12]:

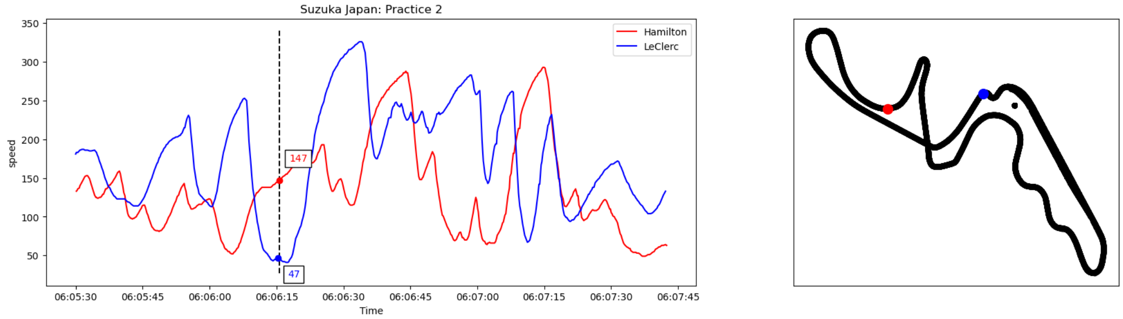
```
#static verison of plot for pdf view

mid = 3711
stat = 'speed'
time = -76

fig, (ax1,ax2) = plt.subplots(nrows=1, ncols=2, figsize=(20,5),␣
 ↪width_ratios=[2,1])

sns.lineplot(HamiltonDf[(HamiltonDf.index >= (mid-250)) & (HamiltonDf.index <=␣
 ↪(mid+250))], x='date', y=stat, color='r' ,ax=ax1, label='Hamilton')
sns.lineplot(LeClercDf[(LeClercDf.index >= (mid-250)) & (LeClercDf.index <=␣
 ↪(mid+250))], x='date', y=stat, color='b' ,ax=ax1, label='LeClerc')
ymin, ymax = ax1.get_ylim()
ax1.vlines(x=HamiltonDf['date'].iloc[mid+time], ymin=ymin, ymax=ymax,␣
 ↪color='#000000', linestyles='dashed')
ax1.plot(HamiltonDf['date'].iloc[mid+time], HamiltonDf[stat].iloc[mid+time],␣
 ↪'ro')
ax1.annotate(text= str(HamiltonDf[stat].iloc[mid+time]), xy=␣
 ↪(HamiltonDf['date'].iloc[mid+time], HamiltonDf[stat].iloc[mid+time]), c='r',␣
 ↪bbox = {'ec' :'#000000', 'fc' : '#FFFFFF'}, xytext=(10,20),␣
 ↪textcoords='offset points')
ax1.plot(LeClercDf['date'].iloc[mid+time], LeClercDf[stat].iloc[mid+time], 'bo')
ax1.annotate(text= str(LeClercDf[stat].iloc[mid+time]), xy= (LeClercDf['date'].
 ↪iloc[mid+time], LeClercDf[stat].iloc[mid+time]), c='b', bbox = {'ec' :
 ↪'#000000', 'fc' : '#FFFFFF'}, xytext=(10,-20), textcoords='offset points')


ax1.set_title(f'{RaceData['location'].iloc[0]} {RaceData['country_name'].
 ↪iloc[0]}: {RaceData['session_name'].iloc[0]}')
ax1.set_xlabel('Time')
ax1.legend()
sns.scatterplot(HamiltonLOC, x='x', y='y', ax=ax2, c='#000000',␣
 ↪edgecolors='none')
hamLoc = HamiltonLOC[['x','y']].iloc[(HamiltonLOC['date'] - HamiltonDf['date'].
 ↪iloc[mid+time]).abs().idxmin()]
ax2.plot(hamLoc['x'],hamLoc['y'],'ro', markersize=10)
lecLoc = LeClercLOC[['x','y']].iloc[(LeClercLOC['date'] - LeClercDf['date'].
 ↪iloc[mid+time]).abs().idxmin()]
ax2.plot(lecLoc['x'],lecLoc['y'],'bo', markersize=10)
ax2.get_xaxis().set_visible(False)
ax2.get_yaxis().set_visible(False)
```



[ ]:

```python
#Make interactive plot of data of two ferrari drivers (must run notebook to view)
@interact(mid=(HamiltonDf.index.min() + 250,HamiltonDf.index.max() - 250),stat=HamiltonDf.select_dtypes(include='number').drop(labels=['meeting_key','session_key','driver_number','drs'], axis=1).columns, time=(-250,250))
def ThrottlePlotter(mid=(HamiltonDf.index.max()//2), stat = 'speed', time=0):
    fig, (ax1,ax2) = plt.subplots(nrows=1, ncols=2, figsize=(20,5), width_ratios=[2,1])

    sns.lineplot(HamiltonDf[(HamiltonDf.index >= (mid-250)) & (HamiltonDf.index <= (mid+250))], x='date', y=stat, color='r' ,ax=ax1, label='Hamilton')
    sns.lineplot(LeClercDf[(LeClercDf.index >= (mid-250)) & (LeClercDf.index <= (mid+250))], x='date', y=stat, color='b' ,ax=ax1, label='LeClerc')

    ymin, ymax = ax1.get_ylim()
    ax1.vlines(x=HamiltonDf['date'].iloc[mid+time], ymin=ymin, ymax=ymax, color='#000000', linestyles='dashed')

    ax1.plot(HamiltonDf['date'].iloc[mid+time], HamiltonDf[stat].iloc[mid+time], 'ro')
    ax1.annotate(text= str(HamiltonDf[stat].iloc[mid+time]), xy= (HamiltonDf['date'].iloc[mid+time], HamiltonDf[stat].iloc[mid+time]), c='r', bbox = {'ec' :'#000000', 'fc' : '#FFFFFF'}, xytext=(10,20), textcoords='offset points')

    ax1.plot(LeClercDf['date'].iloc[mid+time], LeClercDf[stat].iloc[mid+time], 'bo')
    ax1.annotate(text= str(LeClercDf[stat].iloc[mid+time]), xy= (LeClercDf['date'].iloc[mid+time], LeClercDf[stat].iloc[mid+time]), c='b', bbox = {'ec' :'#000000', 'fc' : '#FFFFFF'}, xytext=(10,-20), textcoords='offset points')
    ax1.set_title(f'{RaceData['location'].iloc[0]} {RaceData['country_name'].iloc[0]}: {RaceData['session_name'].iloc[0]}')
    ax1.set_xlabel('Time')
    ax1.legend()

    sns.scatterplot(HamiltonLOC, x='x', y='y', ax=ax2, c='#000000', edgecolors='none')

    hamLoc = HamiltonLOC[['x','y']].iloc[(HamiltonLOC['date'] - HamiltonDf['date'].iloc[mid+time]).abs().idxmin()]
    ax2.plot(hamLoc['x'],hamLoc['y'],'ro', markersize=10)

    lecLoc = LeClercLOC[['x','y']].iloc[(LeClercLOC['date'] - LeClercDf['date'].iloc[mid+time]).abs().idxmin()]
    ax2.plot(lecLoc['x'],lecLoc['y'],'bo', markersize=10)

    ax2.get_xaxis().set_visible(False)
    ax2.get_yaxis().set_visible(False)
```

```
interactive(children=(IntSlider(value=8140, description='mid', max=16030, min=250), Dropdown(description='stat…
```