

visualisation

March 29, 2020

1 Data Visualisation of datasets in Group B

Data from experimental set-up. Data from battery 1 is used to train the model, while data from battery 2 is used to test the model on the ability to interpolate. Training: 1C, 2C, 3C; Testing: 1.5C, 2.5C

1.0.1 Import necessary libraries

```
[1]: import pandas as pd
import numpy as np
import copy
import matplotlib.pyplot as plot

import thermalModel_groupC as tm_gc
import importlib
importlib.reload(tm_gc)
```

Using TensorFlow backend.

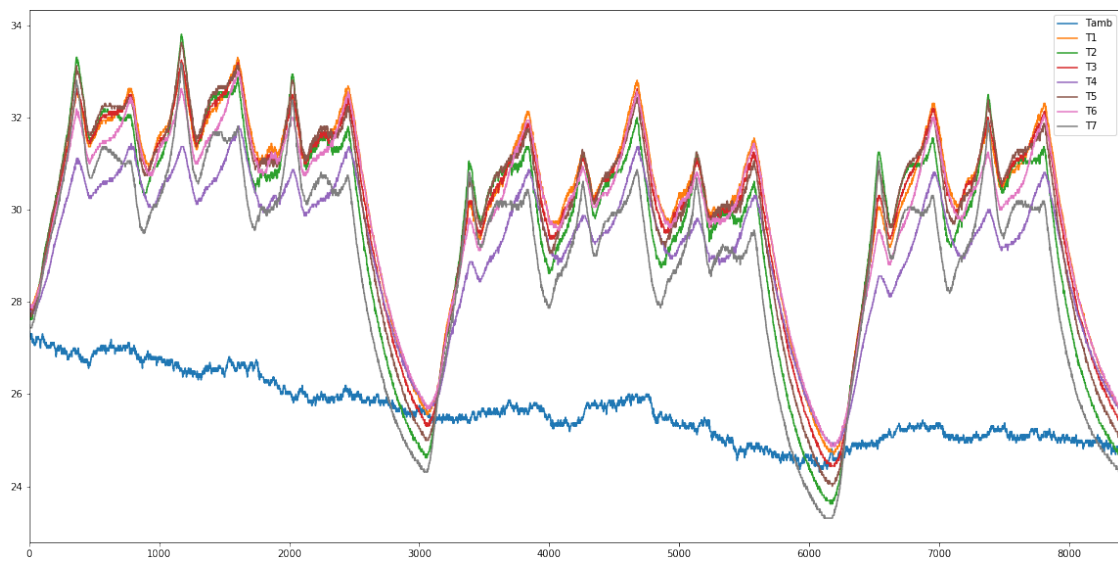
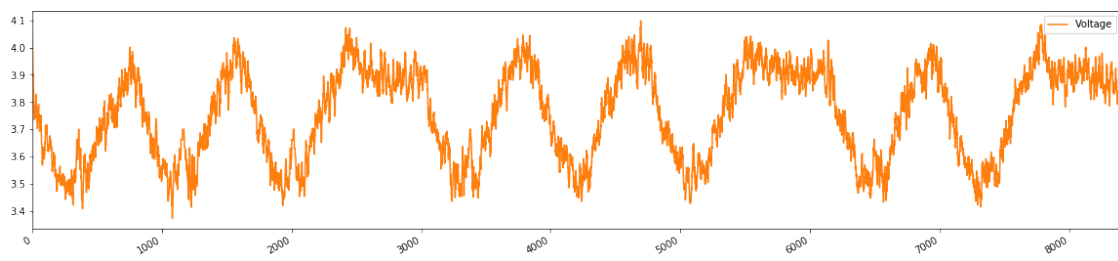
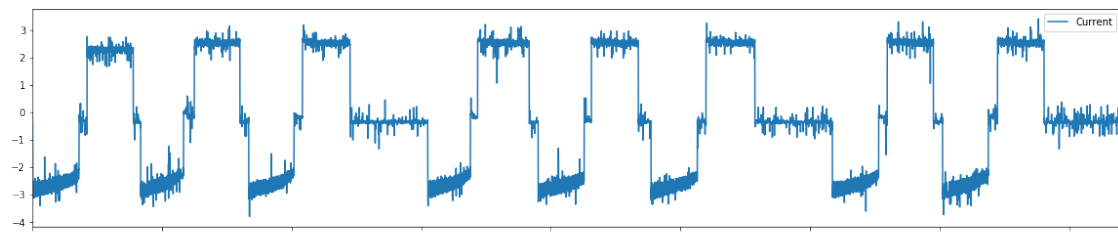
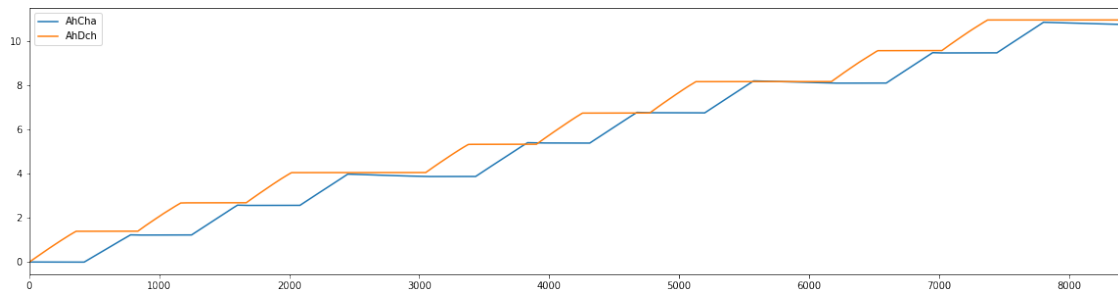
```
[1]: <module 'thermalModel_groupC' from
'C:\\Users\\user\\Anaconda3\\lib\\thermalModel_groupC.py'>
```

2 Visualise data from battery 1 (for training)

2.0.1 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 1 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 1 C-rate (from first round of experiments)

```
[2]: b1c_1 = tm_gc.load_preprocess_csv(filename = 'battery_1_1C.csv', to_plot = True)
```

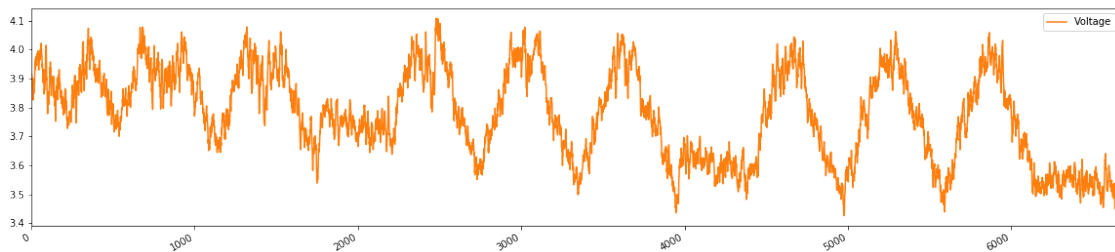
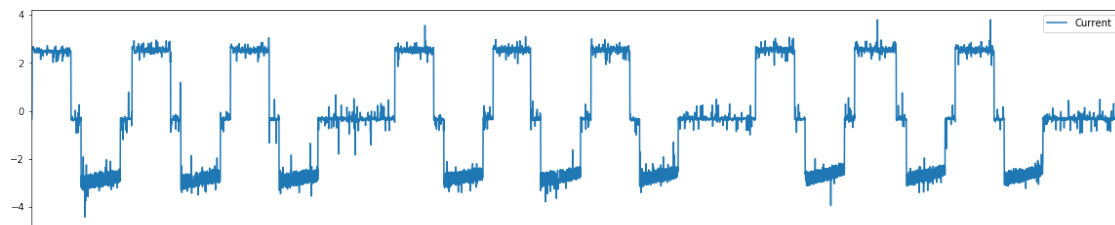
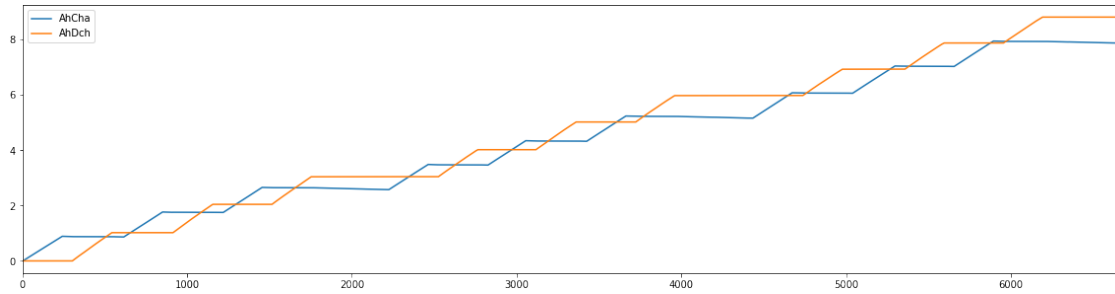
Data loaded!

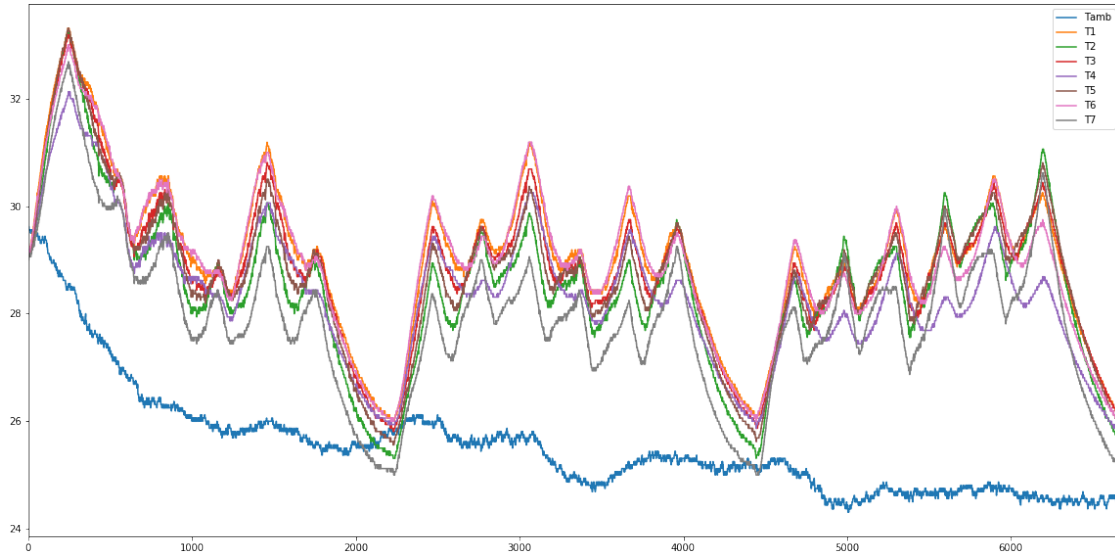


2.0.2 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 1 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 1 C-rate (from second round of experiments)

```
[3]: b1c_2 = tm_gc.load_preprocess_csv(filename = 'battery_1_1C_day2.csv', to_plot = True)
```

Data loaded!

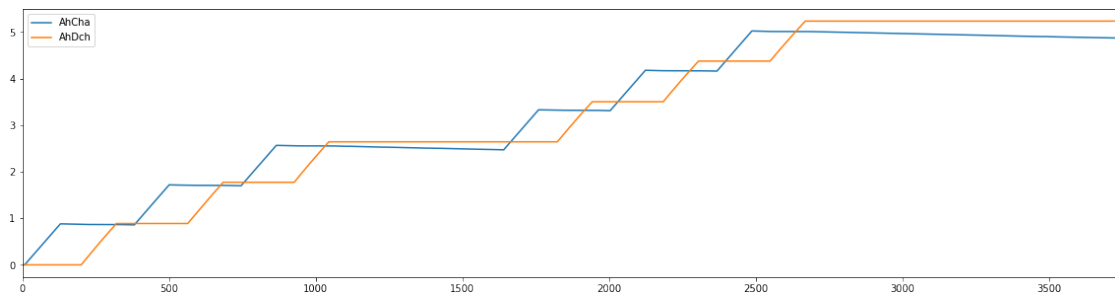


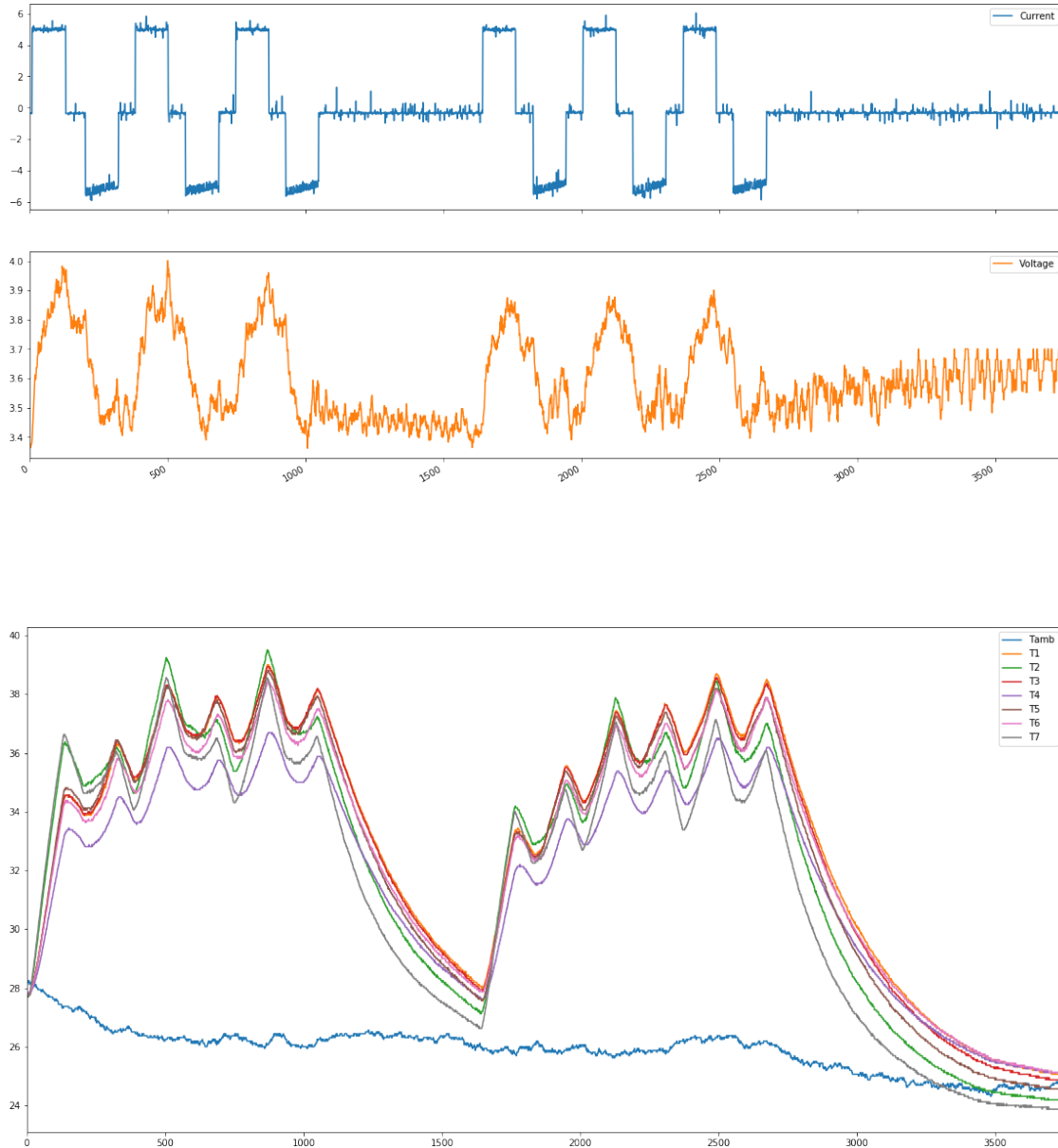


2.0.3 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 2 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 2 C-rate (from first round of experiments)

```
[4]: b2c_1 = tm_gc.load_preprocess_csv(filename = 'battery_1_2C.csv', to_plot = True)
```

Data loaded!

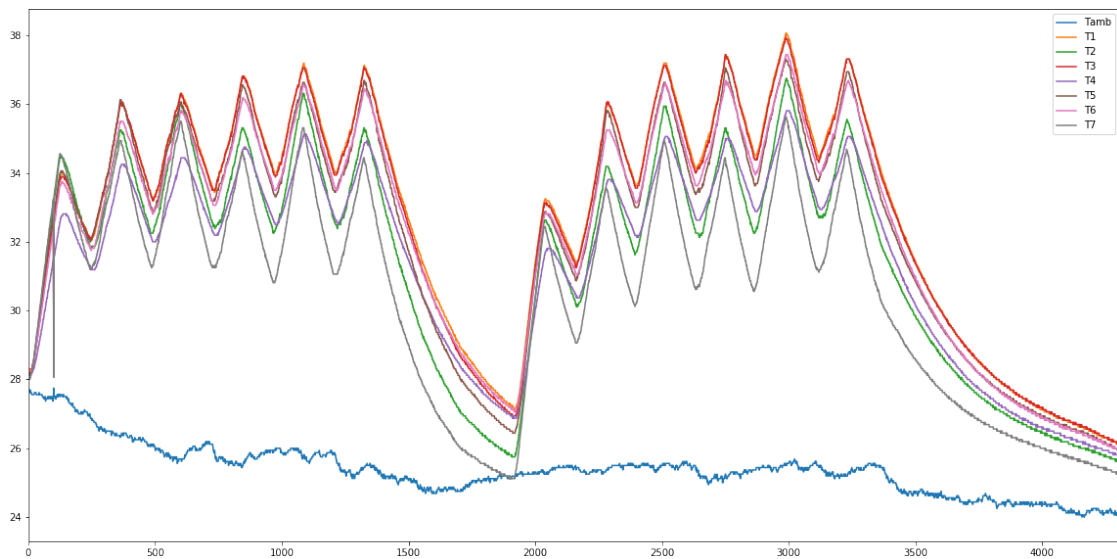
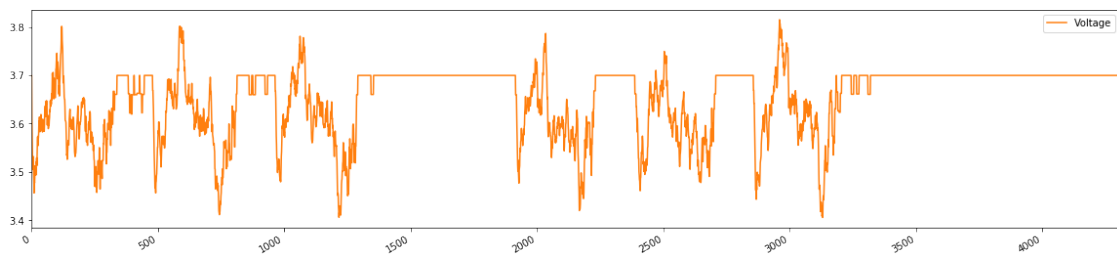
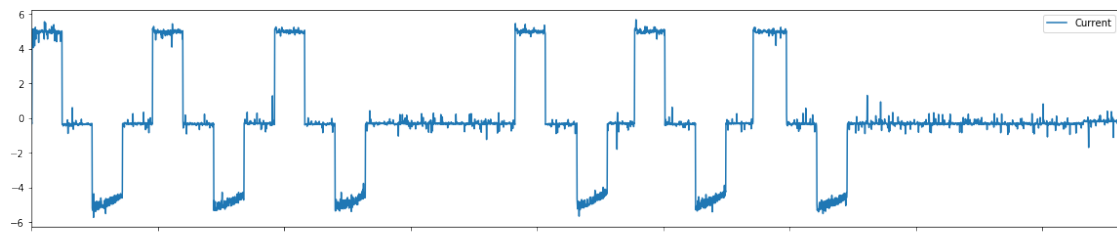
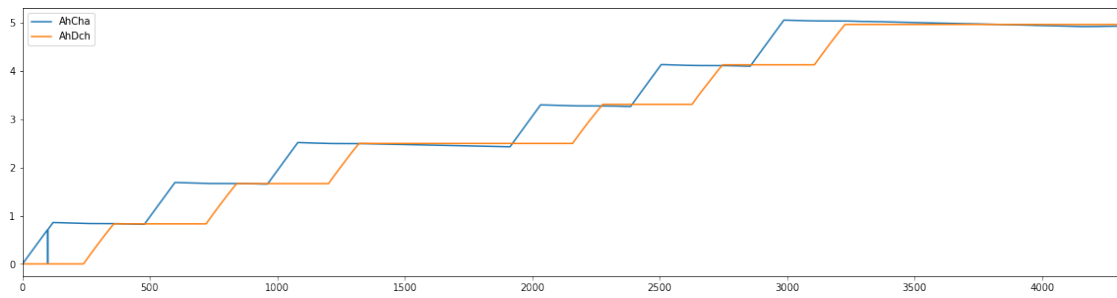




2.0.4 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 2 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 2 C-rate (from second round of experiments)

```
[5]: b2c_2 = tm_gc.load_preprocess_csv(filename = 'battery_1_2C_day2.csv', to_plot = _
→True)
```

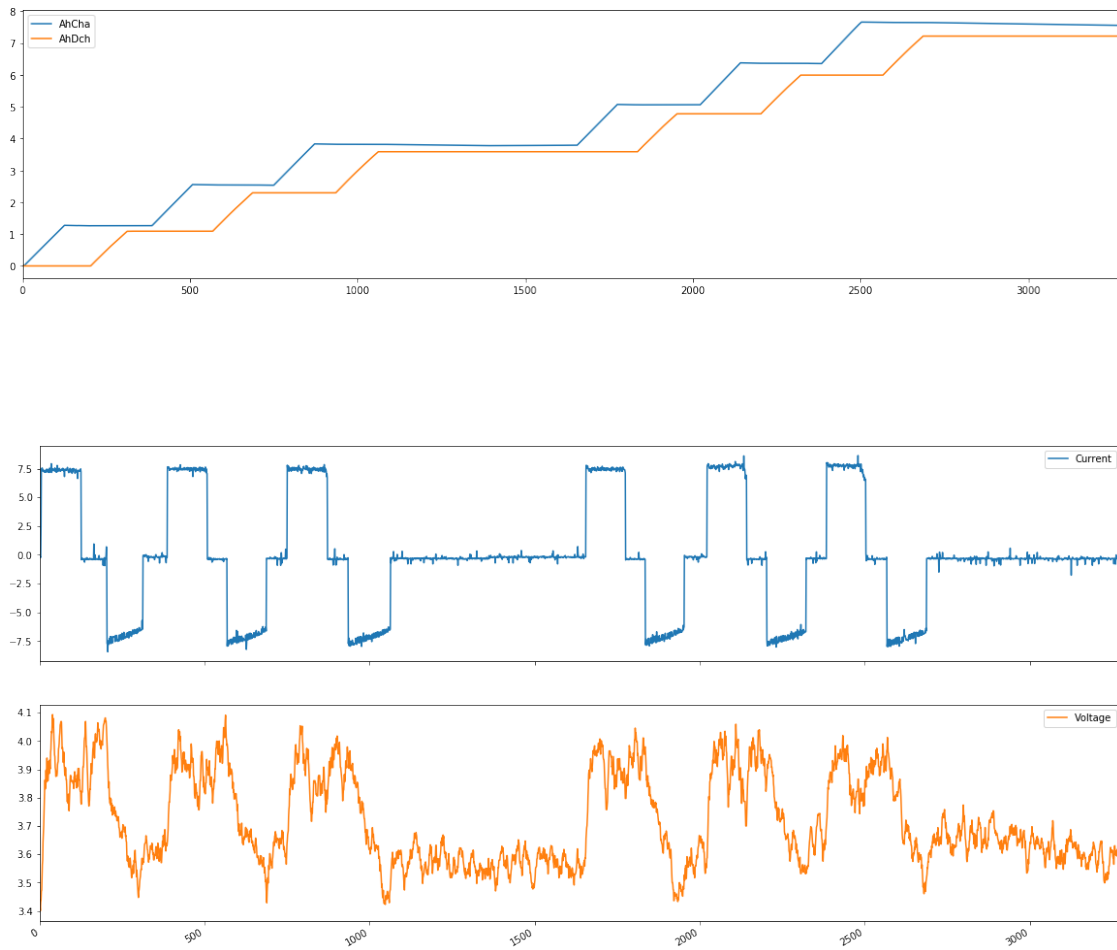
Data loaded!

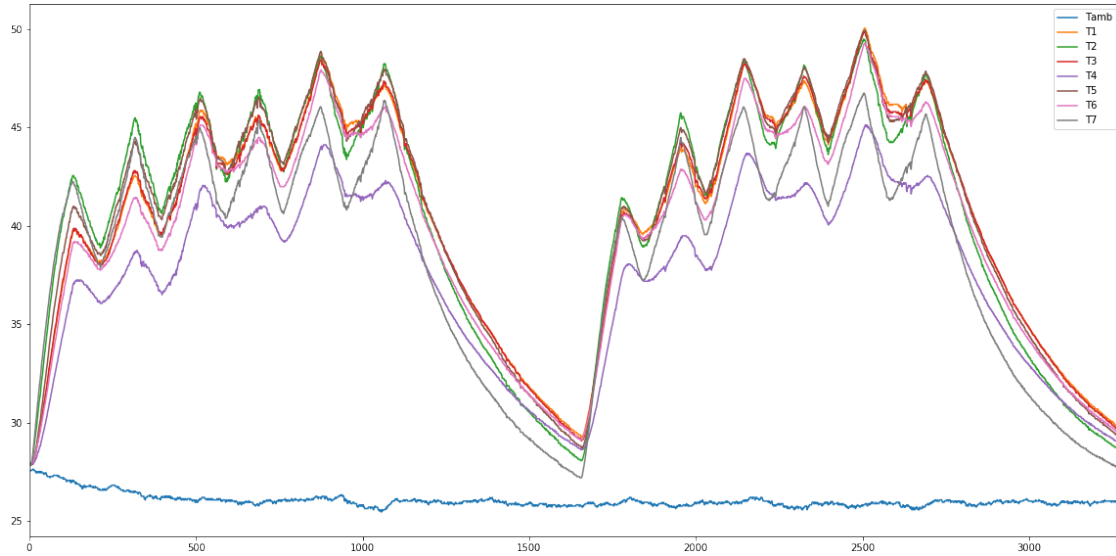


2.0.5 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 3 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 3 C-rate (from first round of experiments)

```
[6]: b3c_1 = tm_gc.load_preprocess_csv(filename = 'battery_1_3C.csv', to_plot = True)
```

Data loaded!

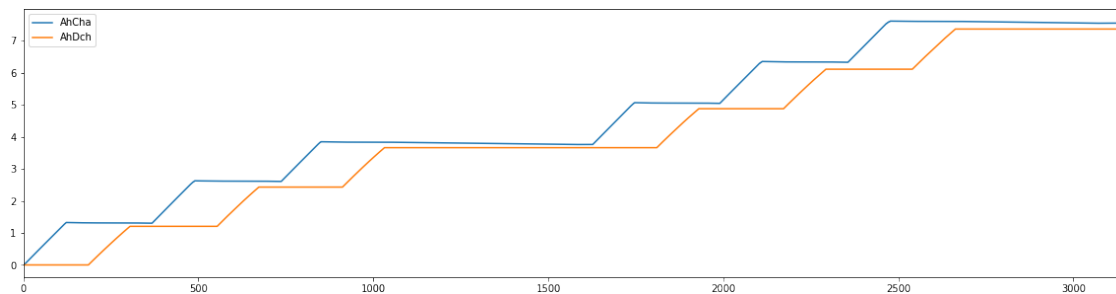


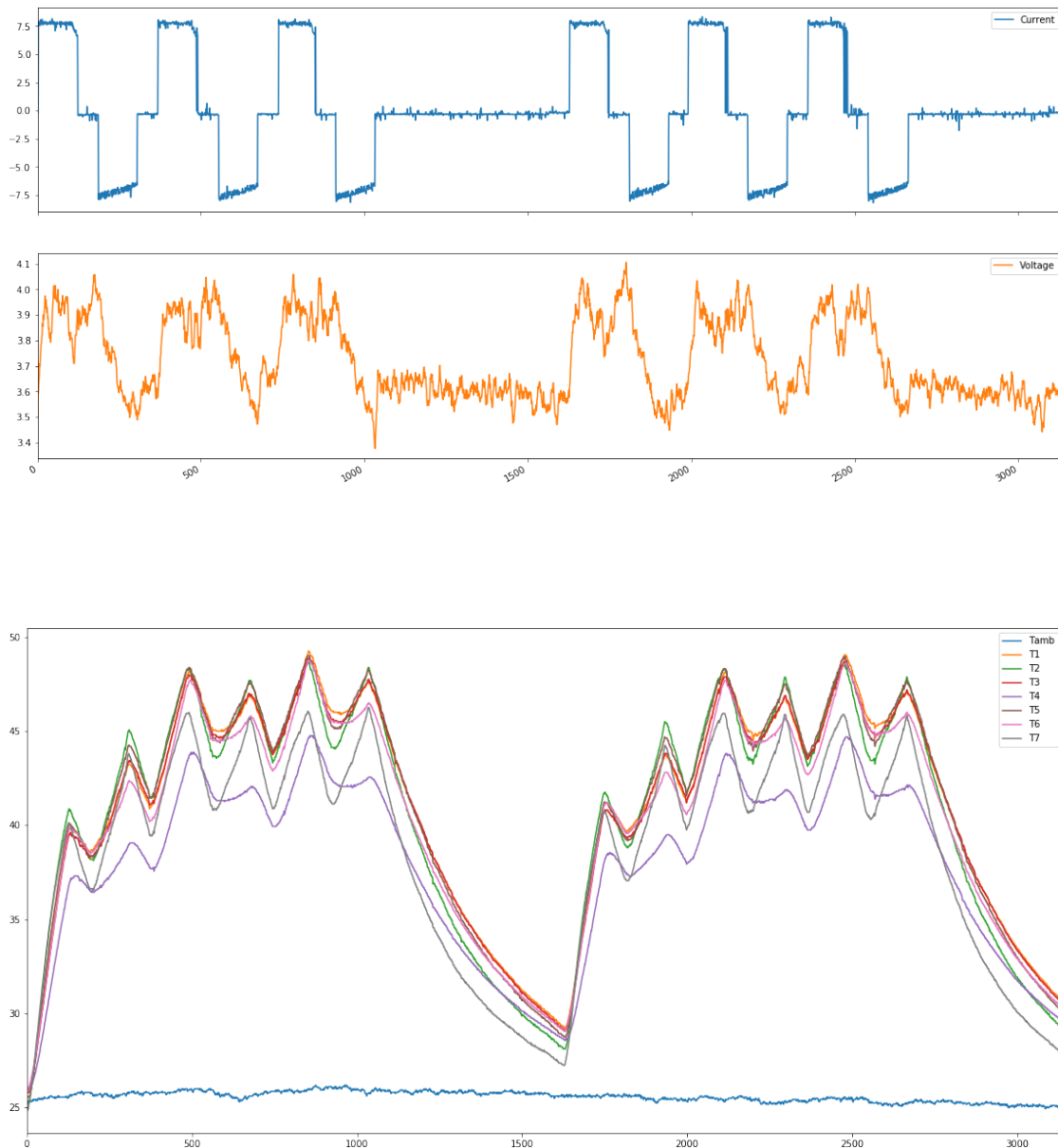


2.0.6 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 3 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 3 C-rate (from second round of experiments)

```
[7]: b3c_2 = tm_gc.load_preprocess_csv(filename = 'battery_1_3C_test2.csv', to_plot_
    ↪ = True)
```

Data loaded!



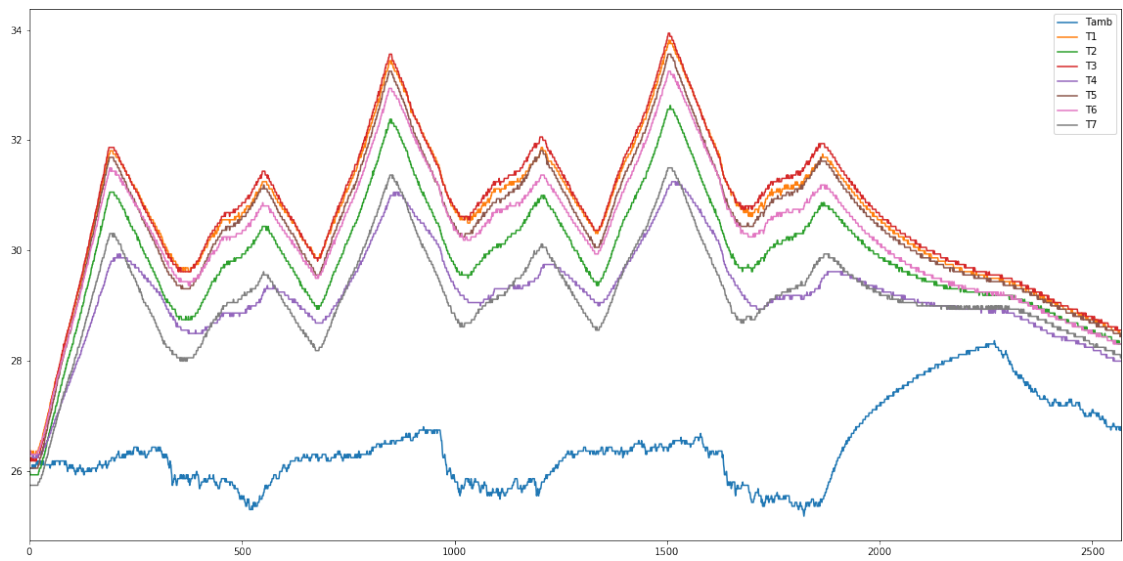
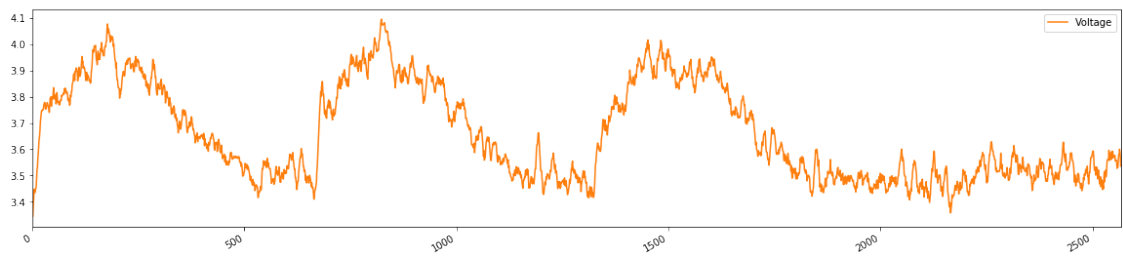
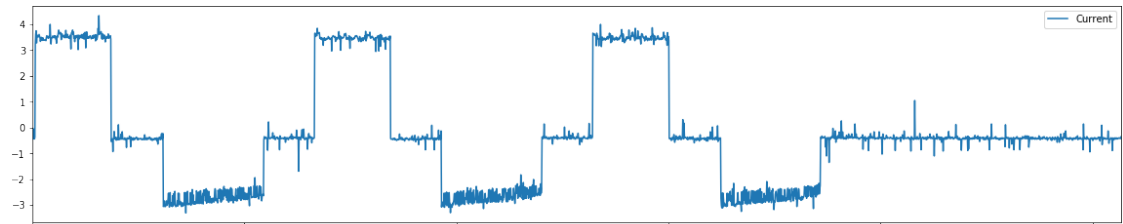
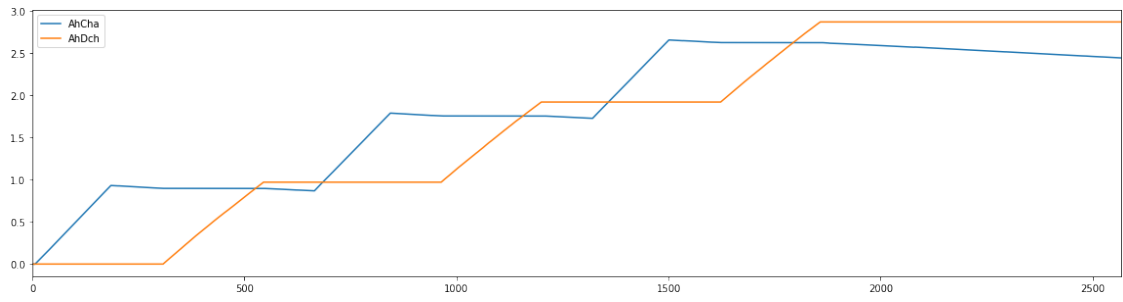


3 Visualise data from battery 2 (for testing)

3.0.1 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 1.5 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 1.5 C-rate

```
[8]: b1p5c_1 = tm_gc.load_preprocess_csv(filename = 'battery_2_1point5_C.csv',
    ↳to_plot = True)
```

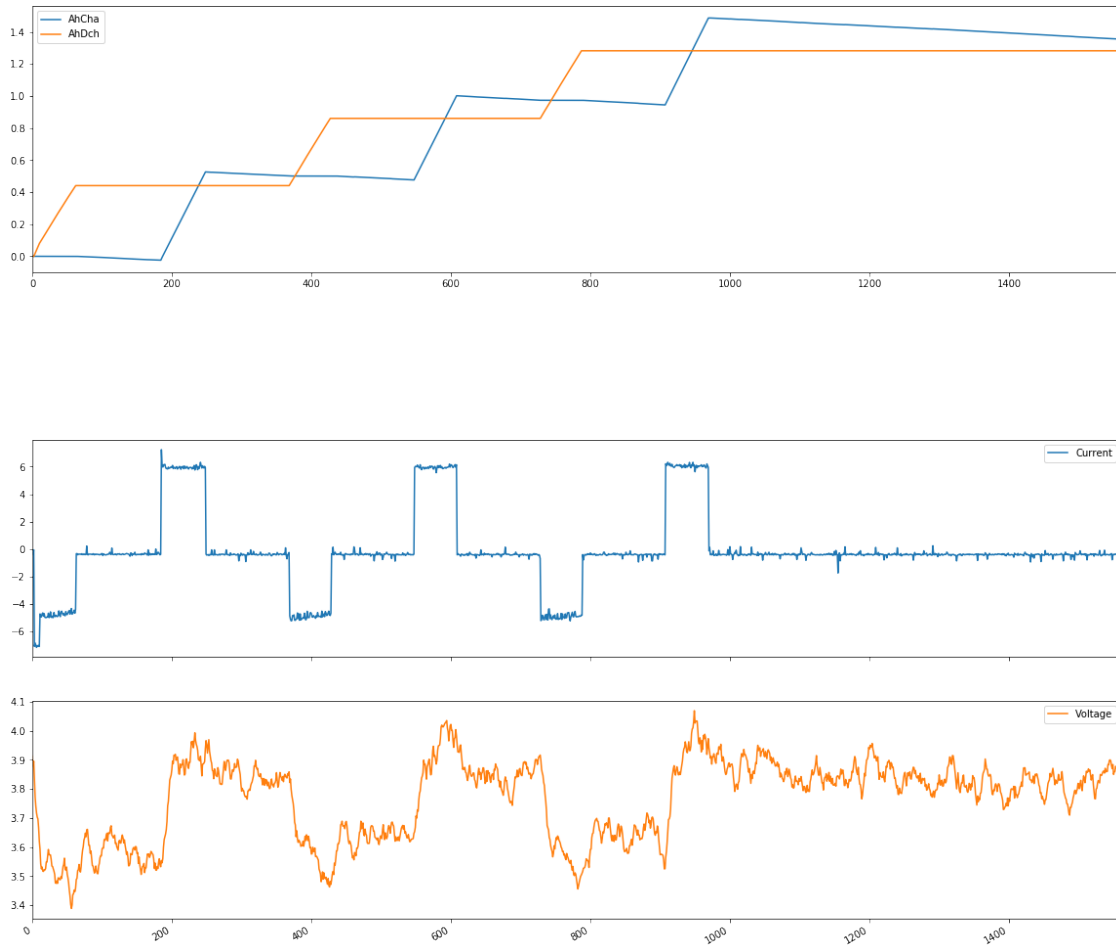
Data loaded!

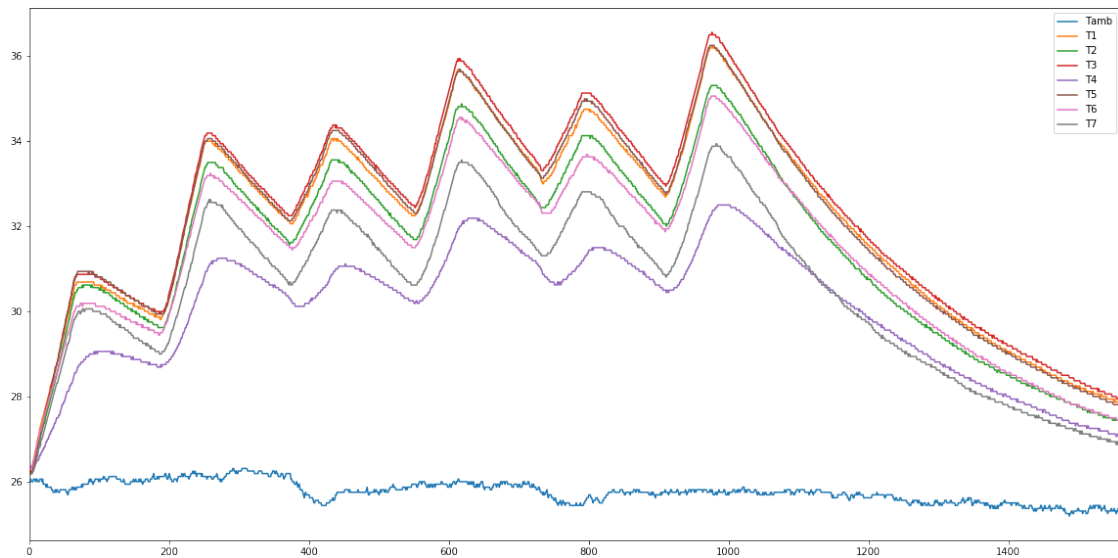


3.0.2 Load 'AhCha','AhDch','Amb','Temp' data for datasets with 2.5 C-rate and Load 'Current','Voltage','Amb','Temp' data for datasets with 2.5 C-rate

```
[9]: b2p5c_1 = tm_gc.load_preprocess_csv(filename = 'battery_2_2point5_C.csv',  
    ↪to_plot = True)
```

Data loaded!





3.1 KIV - 3C with varying rest periods between charge-discharge cycles

```
[10]: b_c_v_1 = tm_gc.load_preprocess_csv(filename = 'battery_2_varying_rest.csv',
      ↪to_plot = True)
```

Data loaded!

