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1  """
2  Plot a CSV dataset for a run of the line follower course
3  """
4
5  import pandas as pd
6  import matplotlib
7  import matplotlib.pyplot as plt
8  import numpy as np
9
10 # Needed this for WSL rendering
11 matplotlib.use('TkAgg')
12
13 # Import CSV of full run
14 df = pd.read_csv('./currentrun.csv')
15
16 # Create objects for full run plots
17 fig1, ax1 = plt.subplots(3, 1)
18
19 # Plot sensor readouts for full run
20 df.plot(kind='line', x='Time', y='sensorLL',
21         color='green', ax=ax1[0], ylim=(30, 60))
22 df.plot(kind='line', x='Time', y='sensorCL',
23         color='yellow', ax=ax1[0], ylim=(30, 60))
24 df.plot(kind='line', x='Time', y='sensorCR',
25         color='orange', ax=ax1[0], ylim=(30, 60))
26 df.plot(kind='line', x='Time', y='sensorRR',
27         color='red', ax=ax1[0], ylim=(30, 60))
28
29 # Plot reflectivity threshold line
30 ax1[0].plot(df['Time'], np.zeros_like(df['Time']) +
31            40, '--', label='Reflectivity Threshold')
32
33 # Add graph labels
34 ax1[0].legend(loc='upper right')
35 ax1[0].set_xlabel("Time (ms)")
36 ax1[0].set_ylabel('Analog Sensor Response (0-1023)')
37
38 # Plot motor responses over full run
39 df.plot(kind='line', x='Time', y='motorL', color='blue', ax=ax1[1])
40 df.plot(kind='line', x='Time', y='motorR', color='purple', ax=ax1[1])
41
42 # Add graph labels
43 ax1[1].legend(loc='upper right')
44 ax1[1].set_xlabel("Time (ms)")
45 ax1[1].set_ylabel('Commanded Motor Speed (0-255)')
46
47 # Plot net motor response (left motor minus right motor)
48 ax1[2].plot(df['Time'], df['motorL']-df['motorR'], label='motorL - motorR')
49 ax1[2].plot(df['Time'], np.zeros_like(df['Time']), '--', label='0: Straight')
50
51 # Add graph labels
52 ax1[2].legend(loc='upper right')
53 ax1[2].set_xlabel("Time (ms)")
54 ax1[2].set_ylabel('Net Motor Speed (left minus right, -255 - 255)')
55
56 # Layout subplots
57 fig1.tight_layout()
58
59
60 # Create objects for smaller time period plots
61 fig2, ax2 = plt.subplots(2, 1)
62
63 # Plot sensor responses over small time period
64 df.plot(kind='line', x='Time', y='sensorLL', color='green',
65         ax=ax2[0], xlim=(10000, 12000), ylim=(30, 60))
66 df.plot(kind='line', x='Time', y='sensorCL', color='yellow',

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67         ax=ax2[0], xlim=(10000, 12000), ylim=(30, 60))
68 df.plot(kind='line', x='Time', y='sensorCR', color='orange',
69         ax=ax2[0], xlim=(10000, 12000), ylim=(30, 60))
70 df.plot(kind='line', x='Time', y='sensorRR', color='red',
71         ax=ax2[0], xlim=(10000, 12000), ylim=(30, 60))
72
73 # Plot reflectivity threshold line
74 ax2[0].plot(df['Time'], np.zeros_like(df['Time']) +
75            40, ':', label='Reflectivity Threshold')
76
77 # Add graph labels
78 ax2[0].legend(loc='upper right')
79 ax2[0].set_xlabel("Time (ms)")
80 ax2[0].set_ylabel('Analog Sensor Response (0-1023)')
81
82 # Graph motor response over small time period
83 df.plot(kind='line', x='Time', y='motorL', color='blue',
84         ax=ax2[1], xlim=(10000, 12000), style='--')
85 df.plot(kind='line', x='Time', y='motorR', color='purple',
86         ax=ax2[1], xlim=(10000, 12000), style='--')
87
88 # Add graph labels
89 ax2[1].legend(loc='upper right')
90 ax2[1].set_xlabel("Time (ms)")
91 ax2[1].set_ylabel('Commanded Motor Speed (0-255)')
92
93 # Layout subplots
94 fig2.tight_layout()
95
96 plt.show()
97

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