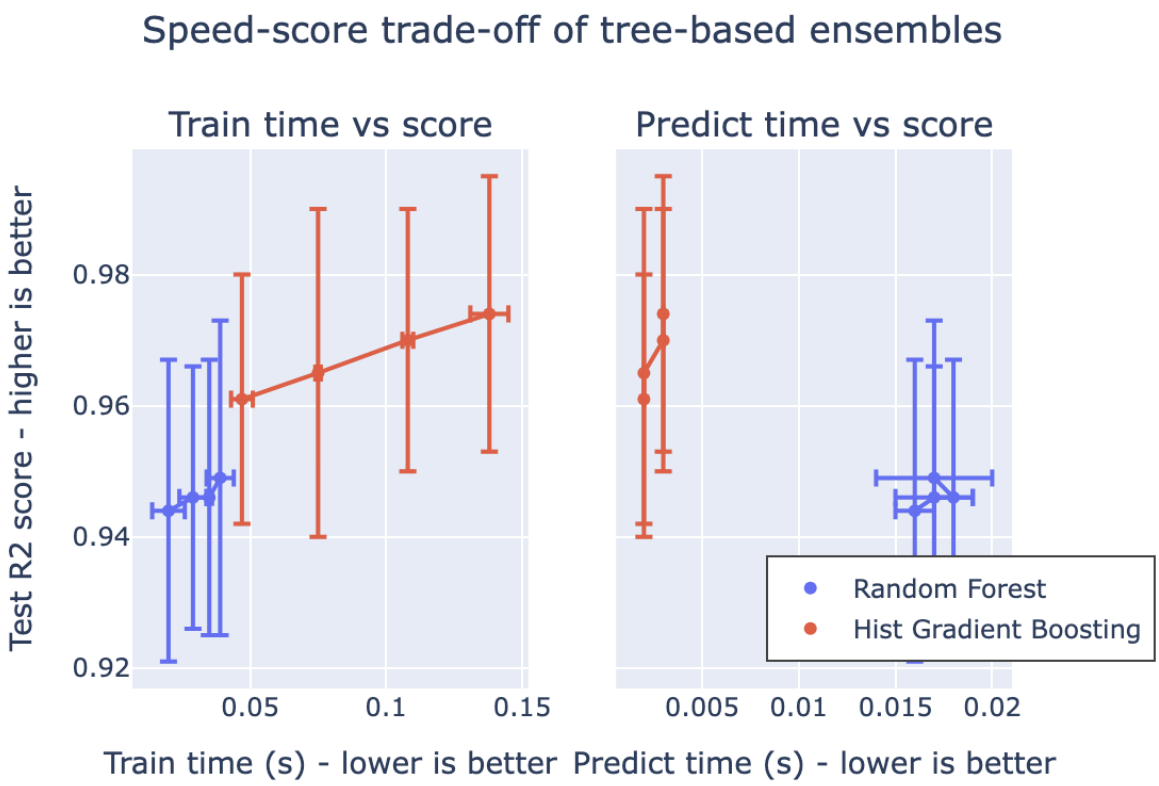
Question 1:

n_estimators	Gini Avg	Entropy Avg
10	0.9630957926	0.9507995652
25	0.9525850024	0.9560937742
50	0.9543393882	0.9578481602

Number of physical cores: 8
[{'model': 'Random Forest', 'cv_results':   mean_fit_time std_fit_time ... mean_train_score std_train_score
0   0.116068   0.157353 ...   0.970563   0.005660
1   0.048829   0.001452 ...   0.980226   0.005208
2   0.052915   0.001886 ...   0.981986   0.001647
3   0.071135   0.002308 ...   0.982866   0.002143

[4 rows x 21 columns]}, {'model': 'Hist Gradient Boosting', 'cv_results':   mean_fit_time std_fit_time ... mean_train_score std_train_score
0   0.074950   0.004682 ...   0.989456   0.002557
1   0.116507   0.002719 ...   1.000000   0.000000
2   0.162627   0.013374 ...   1.000000   0.000000
3   0.197447   0.013229 ...   1.000000   0.000000

[4 rows x 21 columns]}]



Question 4: Utility

Rocky: 2km/h = 30min/km
Sandy: 3km/h = 20min/km
Smooth: 5km/h = 12min/km

Part 1:
EU(Route1): (0.2 * 20 + 0.3 * 12 + 0.5 * 30)*5 = 113

EU(Route2): (0.4 * 20 + 0.2 * 12 + 0.4 * 30)*7 = 156.8

EU(Route3): (0.5 * 20 + 0.4 * 12 + 0.1 * 30)*6 = 106.8

Route 3 would be the fastest.

Part 2:
Route1 edit: -20 * 0.7 + 0.3 * 15 = -9.5
113 - 9.5 = 103.5

Route2 edit: 40 * 0.6 + 0 * 0.4 = 24
106.8 + 24 = 130.8

This would make route1 the fastest

Part 3:
(0.6 * 20 + 0.4 * 12)*7 = 117.6

Part 4:
0.4 Rocky so 0.6 not Rocky

Part 5:
30*7 = 210

Part 6:
0.4*210 + 0.6*117.6 = 142.8

156.8 - 142.8 = 14

We should wait 14 minutes for the satellite