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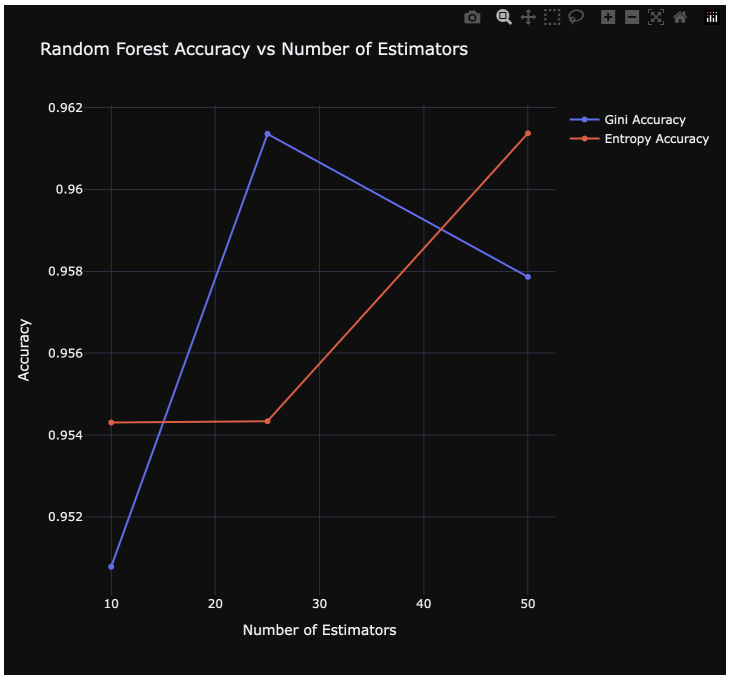
Assignment 5: Working with Uncertainty



Part 4. Utility

Notes:

- 2km/h for **Rocky Terrain** = 30min/km
- 3km/h for **Sandy Terrain** = 20min/km
- 5km/h for **Smooth Terrain** = 12min/km

Route 1 = (0.2 * 20) + (0.3 * 12) + (0.5 * 30) = 4 + 3.6 + 15 = 22.6 * 5km = **113mins**
Route 2 = (0.4 * 20) + (0.2 * 12) + (0.4 * 30) = 8 + 2.4 + 12 = 22.4 * 7km = **156.8mins**
Route 3 = (0.5 * 20) + (0.4 * 12) + (0.10 * 30) = 10 + 4.8 + 3 = 17.8 * 6km = **106.8mins**

As a result, **Route 3** is the best!

With updated constraints:

Route 1 = 113mins + (0.7 * -20) + (0.3 * 15) = 113 + -14 + 4.5 = **103.5mins**
Route 2 = **156.8mins**
Route 3 = **106.8mins** + (0.6 * 40) + (0.0 * 0) = 106.8 + 24 = **130.8mins**

Now, **Route 1** is the best!

Q: If the satellite said that route 2 was not rocky then it would take:
A: Route 2 = (0.6 * 20) + (0.4 * 12) = 12 + 4.8 = 16.8 * 7km = **117.6mins**

Q: What's the probability the satellite will tell us this:
A: There is a 60% chance that it is not rocky in route 2

Q: If the satellite tells us that route 2 is in fact Rocky, what do we do? How long will it take:
A: If the satellite tells us that Route 2 is in fact rocky then it will take: 30min/km * 7km = **210mins**. This would mean we should **not** take Route 2 and instead take **Route 1**

Q: Last, given all of this, how long should we wait for the satellite:
A: If the path is rocky it will take 210 minutes, but if the satellite is not rocky it would take 117.6 minutes. So at most we should wait for the satellite (210 - 117.6) = **92.4 minutes**