02a - DataVis-Performance

April 6, 2025

0.1 Comparative Study - Aligner Performance

NOTE: This notebook assumes that all previous notebooks in this directory have already been run to completion.

Imports

[1]:
```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import seaborn as sns
```

Reading Results

[2]:
```
variants = ["MAli-v1.31", "ClustalW2-MAli-Refine", "ClustalW2", "ClustalOmega",␣
 ↪"MUSCLE"]

paths = []
for variant in variants:
    filename = f"sbench_{variant}_on_BALIS-1.csv"
    filepath = f"results/{filename}"
    paths.append(filepath)
```

Creating Combined Dataset 1

[3]:
```
data = {
    "Q_score": [],
    "method": [],
    "time_elapsed_ms": [],
}

for i in range(len(variants)):
    label = variants[i]
    path = paths[i]
    df = pd.read_csv(path)

    score_values = list(df["Q_score"].values)
    time_elapsed_values = list(df["time_elapsed_ms"].values)
    method_labels = [label for j in range(len(score_values))]
    data["Q_score"] += score_values
    data["time_elapsed_ms"] += time_elapsed_values
```

```
    data["method"] += method_labels
```

[4]:
```
df1 = pd.DataFrame(data)
df1.head()
```

[4]:

	Q_score	method	time_elapsed_ms
0	0.0851	MAli-v1.31	10241
1	0.0512	MAli-v1.31	14767
2	0.2450	MAli-v1.31	13136
3	0.0917	MAli-v1.31	8319
4	0.1150	MAli-v1.31	6031

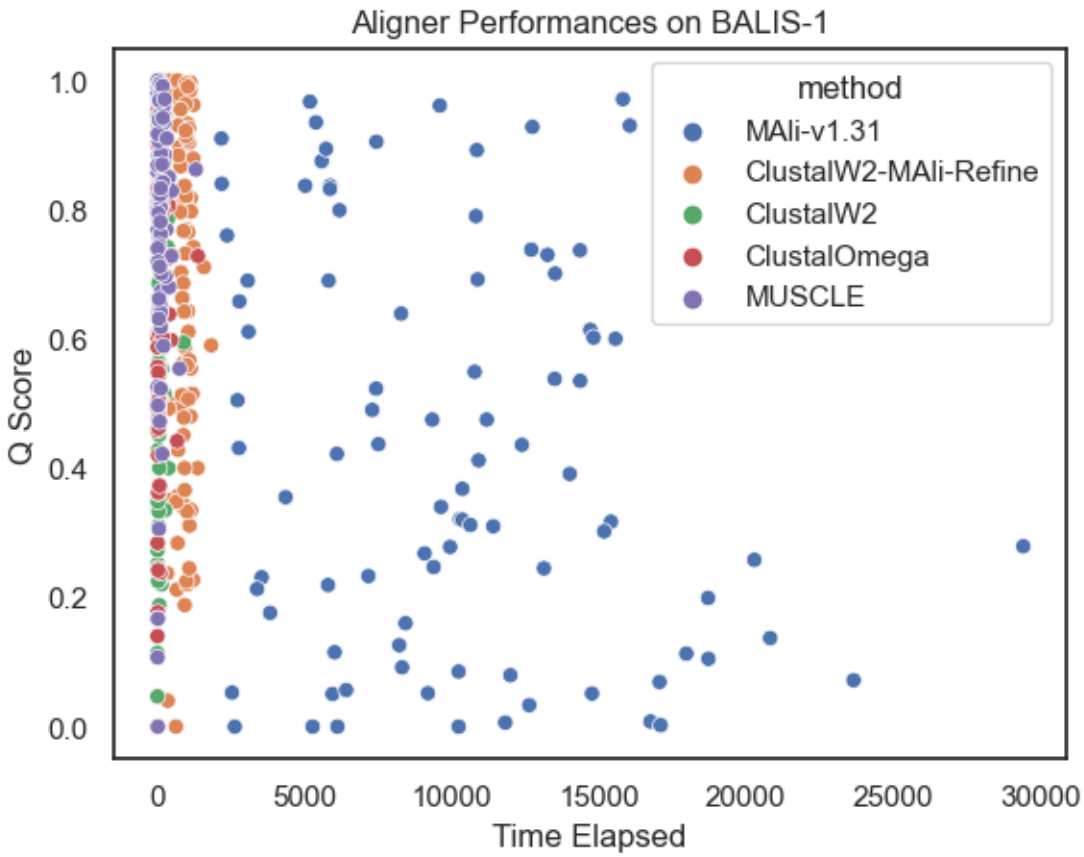
0.1.1 Scatter Plot (Performance)

[5]:
```
sns.set_theme(style="white")

sns.scatterplot(data=df1, x="time_elapsed_ms", y="Q_score", hue="method")
plt.ylim([-0.05, 1.05])
plt.ylabel("Q Score")
plt.xlabel("Time Elapsed")
plt.title("Aligner Performances on BALIS-1")

plt.savefig("images/CaseStudy_performances_all_BALIS-1")

plt.show()
```



Creating Combined Dataset 2

[6]:
```
dataset = {
    "method": [],
    "mean_Q_score": [],
    "mean_time_elapsed_ms": []
}
```

[7]:
```
for i in range(len(variants)):
    method_name = variants[i]
    path = paths[i]
    df = pd.read_csv(path)
    dataset["method"].append(method_name)
    dataset["mean_Q_score"].append(df['Q_score'].mean())
    dataset["mean_time_elapsed_ms"].append(df['time_elapsed_ms'].mean())
```

[8]:
```
df2 = pd.DataFrame(dataset)
df2.head()
```

[8]:

	method	mean_Q_score	mean_time_elapsed_ms
0	MAli-v1.31	0.427114	10029.422222
1	ClustalW2-MAli-Refine	0.655389	884.288889
2	ClustalW2	0.655497	91.011111
3	ClustalOmega	0.724278	104.900000
4	MUSCLE	0.774211	143.411111

0.1.2 Scatter Plot (Average Performance)

[9]:
```
sns.set_theme(style="white")

sns.scatterplot(data=df2, x="mean_time_elapsed_ms", y="mean_Q_score",␣
↪hue="method", s=500, marker="^")
plt.ylim([0, 1])
plt.ylabel("Avg. Q Score")
plt.xlabel("Avg. Time Elapsed (ms)")
plt.title("Aligner Performances on BALIS-1 (Avg.)")

plt.savefig("images/CaseStudy_performances_avg_BALIS-1")

plt.show()
```