02_trains_ai_vs_admiral_ai_02_analyse_results

June 30, 2024

1 trAIns AI vs Admiral AI - analyse results

Extracts and visualises results from 02_trains_ai_vs_admiral_ai_raw.csv.

[1]:
```
from datetime import datetime
import pandas as pd
import plotly.express as px
import numpy as np
```

[2]:
```
df_openttdlab = pd.read_csv('02_trains_ai_vs_admiral_ai_results_01_raw.csv',␣
 ↪parse_dates=[0])
df_openttdlab['terrain_type'] = df_openttdlab['terrain_type'].replace(1, 'Flat')
df_openttdlab['terrain_type'] = df_openttdlab['terrain_type'].replace(3,␣
 ↪'Mountainous')
df_openttdlab['source'] = 'OpenTTDLab'
```

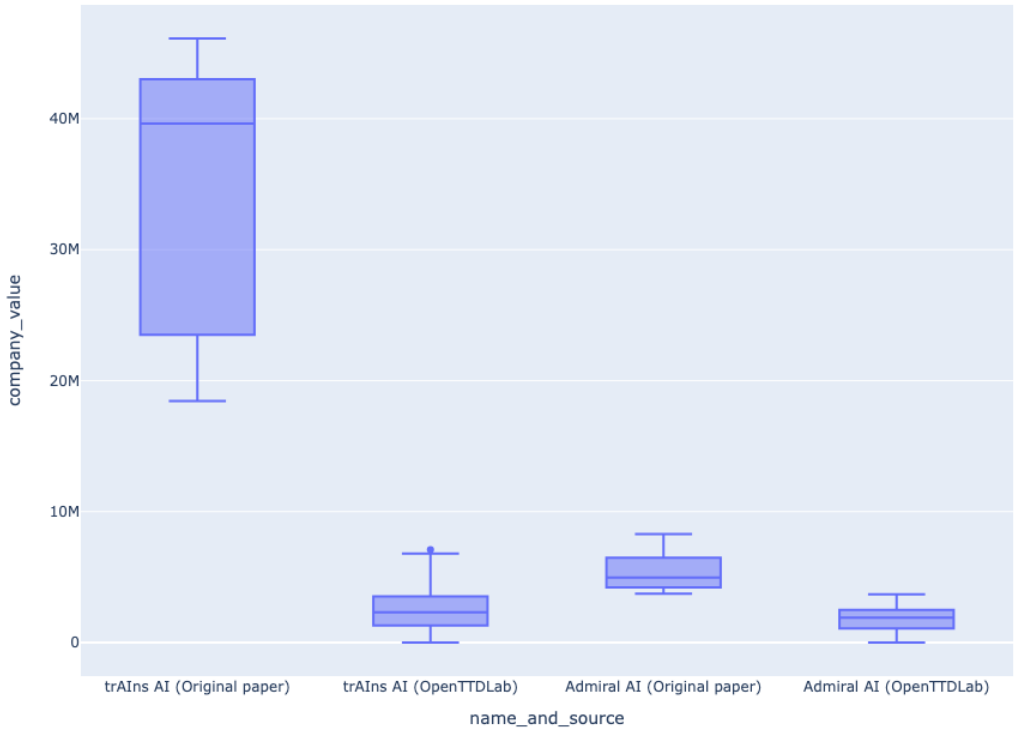
[3]:
```
# Hand copied from trAIns: An Artificial Inteligence for OpenTTD
# DOI 10.1109/SBGAMES.2009.15
# The seed here is _not_ the random seed, which is unknown. However, it allows␣
 ↪the same
# processing as for results from OpenTTDLab, in which the seeds are known
df_original = pd.DataFrame([
    {'date': datetime(1975, 6, 8), 'name': 'Admiral AI', 'company_value':␣
 ↪6090193, 'terrain_type': '1', 'seed': 1},
    {'date': datetime(1975, 6, 8), 'name': 'trAIns AI', 'company_value':␣
 ↪46124685, 'terrain_type': '1', 'seed': 1},
    {'date': datetime(1975, 2, 1), 'name': 'Admiral AI', 'company_value':␣
 ↪4634504, 'terrain_type': '1', 'seed': 2},
    {'date': datetime(1975, 2, 1), 'name': 'trAIns AI', 'company_value':␣
 ↪18437790, 'terrain_type': '1', 'seed': 2},
    {'date': datetime(1975, 1, 11), 'name': 'Admiral AI', 'company_value':␣
 ↪8272364, 'terrain_type': '1', 'seed': 3},
    {'date': datetime(1975, 1, 11), 'name': 'trAIns AI', 'company_value':␣
 ↪43477220, 'terrain_type': '1', 'seed': 3},
    {'date': datetime(1975, 1, 4), 'name': 'Admiral AI', 'company_value':␣
 ↪3729935, 'terrain_type': '1', 'seed': 4},
```

```
    {'date': datetime(1975, 1, 4), 'name': 'trAIns AI', 'company_value':␣
 ↪41622238, 'terrain_type': '1', 'seed': 4},
    {'date': datetime(1975, 1, 21), 'name': 'Admiral AI', 'company_value':␣
 ↪4073063, 'terrain_type': '1', 'seed': 5},
    {'date': datetime(1975, 1, 21), 'name': 'trAIns AI', 'company_value':␣
 ↪35198641, 'terrain_type': '1', 'seed': 5},
    {'date': datetime(1975, 11, 1), 'name': 'Admiral AI', 'company_value':␣
 ↪4955126, 'terrain_type': '1', 'seed': 6},
    {'date': datetime(1975, 11, 1), 'name': 'trAIns AI', 'company_value':␣
 ↪39619536, 'terrain_type': '1', 'seed': 6},
    {'date': datetime(1975, 1, 2), 'name': 'Admiral AI', 'company_value':␣
 ↪6591956, 'terrain_type': '1', 'seed': 7},
    {'date': datetime(1975, 1, 2), 'name': 'trAIns AI', 'company_value':␣
 ↪19586151, 'terrain_type': '1', 'seed': 7},
    {'date': datetime(1975, 1, 1), 'name': 'Admiral AI', 'company_value':␣
 ↪4581543, 'terrain_type': '3', 'seed': 1},
    {'date': datetime(1975, 1, 1), 'name': 'trAIns AI', 'company_value':␣
 ↪23004009, 'terrain_type': '3', 'seed': 1},
    {'date': datetime(1975, 9, 23), 'name': 'Admiral AI', 'company_value':␣
 ↪29700, 'terrain_type': '3', 'seed': 2},
    {'date': datetime(1975, 9, 23), 'name': 'trAIns AI', 'company_value':␣
 ↪22927440, 'terrain_type': '3', 'seed': 2},
    {'date': datetime(1975, 1, 26), 'name': 'Admiral AI', 'company_value':␣
 ↪5408988, 'terrain_type': '3', 'seed': 3},
    {'date': datetime(1975, 1, 26), 'name': 'trAIns AI', 'company_value':␣
 ↪21110332, 'terrain_type': '3', 'seed': 3},
    {'date': datetime(1975, 8, 5), 'name': 'Admiral AI', 'company_value':␣
 ↪2280652, 'terrain_type': '3', 'seed': 4},
    {'date': datetime(1975, 8, 5), 'name': 'trAIns AI', 'company_value':␣
 ↪40170005, 'terrain_type': '3', 'seed': 4},
    {'date': datetime(1975, 5, 7), 'name': 'Admiral AI', 'company_value':␣
 ↪3030691, 'terrain_type': '3', 'seed': 5},
    {'date': datetime(1975, 5, 7), 'name': 'trAIns AI', 'company_value':␣
 ↪34544942, 'terrain_type': '3', 'seed': 5},
    {'date': datetime(1975, 6, 26), 'name': 'Admiral AI', 'company_value':␣
 ↪1283846, 'terrain_type': '3', 'seed': 6},
    {'date': datetime(1975, 6, 26), 'name': 'trAIns AI', 'company_value':␣
 ↪33816215, 'terrain_type': '3', 'seed': 6},
    {'date': datetime(1975, 1, 5), 'name': 'Admiral AI', 'company_value':␣
 ↪1462148, 'terrain_type': '3', 'seed': 7},
    {'date': datetime(1975, 1, 5), 'name': 'trAIns AI', 'company_value':␣
 ↪17162685, 'terrain_type': '3', 'seed': 7},
])
df_original['terrain_type'] = df_original['terrain_type'].replace('1', 'Flat')
```

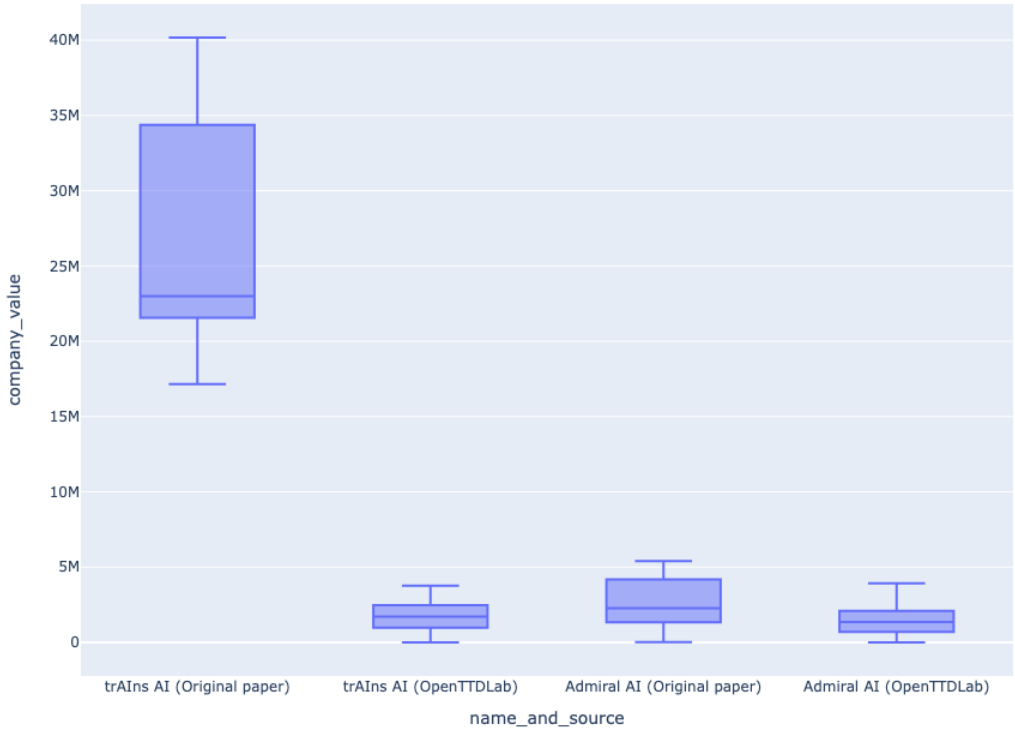
```
df_original['terrain_type'] = df_original['terrain_type'].replace('3',␣
  ↪'Mountainous')
df_original['source'] = 'Original paper'
```

[4]:
```
df_combined_final = pd.concat([df_original, df_openttdlab[df_openttdlab['date']␣
  ↪== '1975-01-01']])
df_combined_final['name_and_source'] = df_combined_final['name'] + ' (' +␣
  ↪df_combined_final['source'] + ')'
df_combined_final.to_csv('02_trains_ai_vs_admiral_ai_results_02_combined_final.
  ↪csv', index=False)
```

[5]:
```
fig = px.box(df_combined_final[df_combined_final["terrain_type"] == 'Flat'],␣
  ↪x='name_and_source', y="company_value", height=700)
fig.update_xaxes(categoryorder='category descending')
fig.show()
```

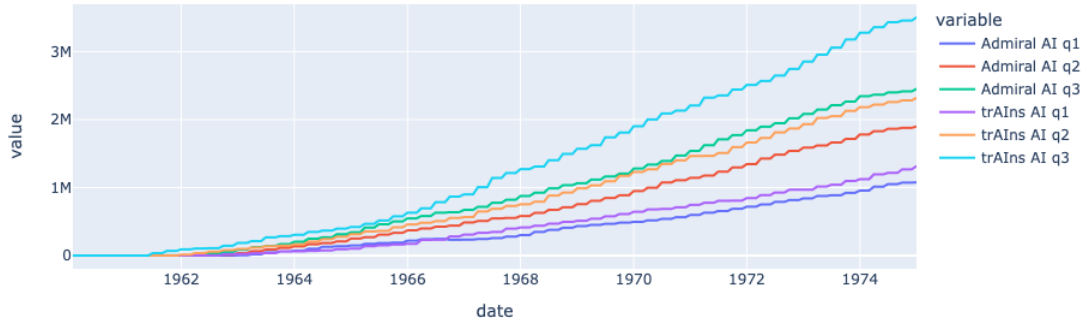


[6]:
```
fig = px.box(df_combined_final[df_combined_final["terrain_type"] ==␣
  ↪'Mountainous'], x="name_and_source", y="company_value", height=700)
fig.update_xaxes(categoryorder='category descending')
fig.show()
```



[7]:
```
df_to_group = df_openttdlab[['company_value','terrain_type','name','date']] \
    .groupby(['terrain_type', 'name', 'date'])
df_company_value_quartiles = pd.concat([
    df_to_group.agg('quantile', 0.25)['company_value'].rename('q1'),
    df_to_group.agg('quantile', 0.5)['company_value'].rename('q2'),
    df_to_group.agg('quantile', 0.75)['company_value'].rename('q3'),
], axis=1).stack().unstack(level=0).unstack(level=0).unstack(level=1) \
  .rename_axis(['terrain_type', 'name', 'quartile'], axis='columns')
df_company_value_quartiles.
 ↪to_csv('02_trains_ai_vs_admiral_ai_results_03_openttdlab_company_value_quartiles.
 ↪csv')
```

[8]:
```
df_company_value_quartiles_flat = df_company_value_quartiles.xs('Flat',␣
 ↪level='terrain_type', axis=1)
df_company_value_quartiles_flat.columns = [' '.join(col).strip() for col in␣
 ↪df_company_value_quartiles_flat.columns.values]
px.line(df_company_value_quartiles_flat)
```



[9]:
```
df_company_value_quartiles_mountainous = df_company_value_quartiles.
 ↪xs('Mountainous', level='terrain_type', axis=1)
df_company_value_quartiles_mountainous.columns = [' '.join(col).strip() for col␣
 ↪in df_company_value_quartiles_mountainous.columns.values]
px.line(df_company_value_quartiles_mountainous)
```