PoL
Physics of Life
TU Dresden

CENTER FOR
SYSTEMS BIOLOGY
DRESDEN

Recap day 3

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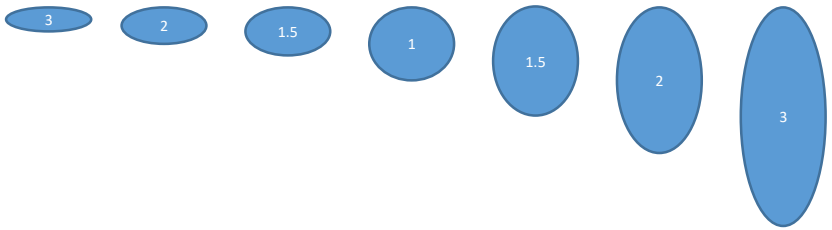
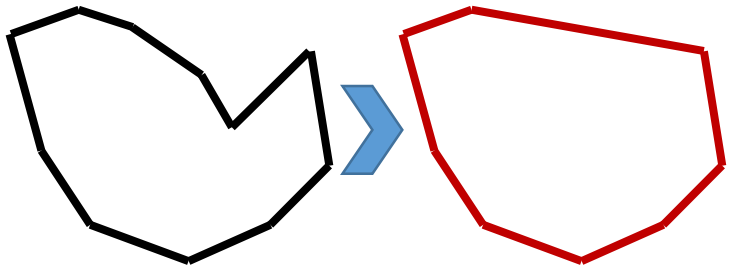
Feature extraction

AR = major / minor



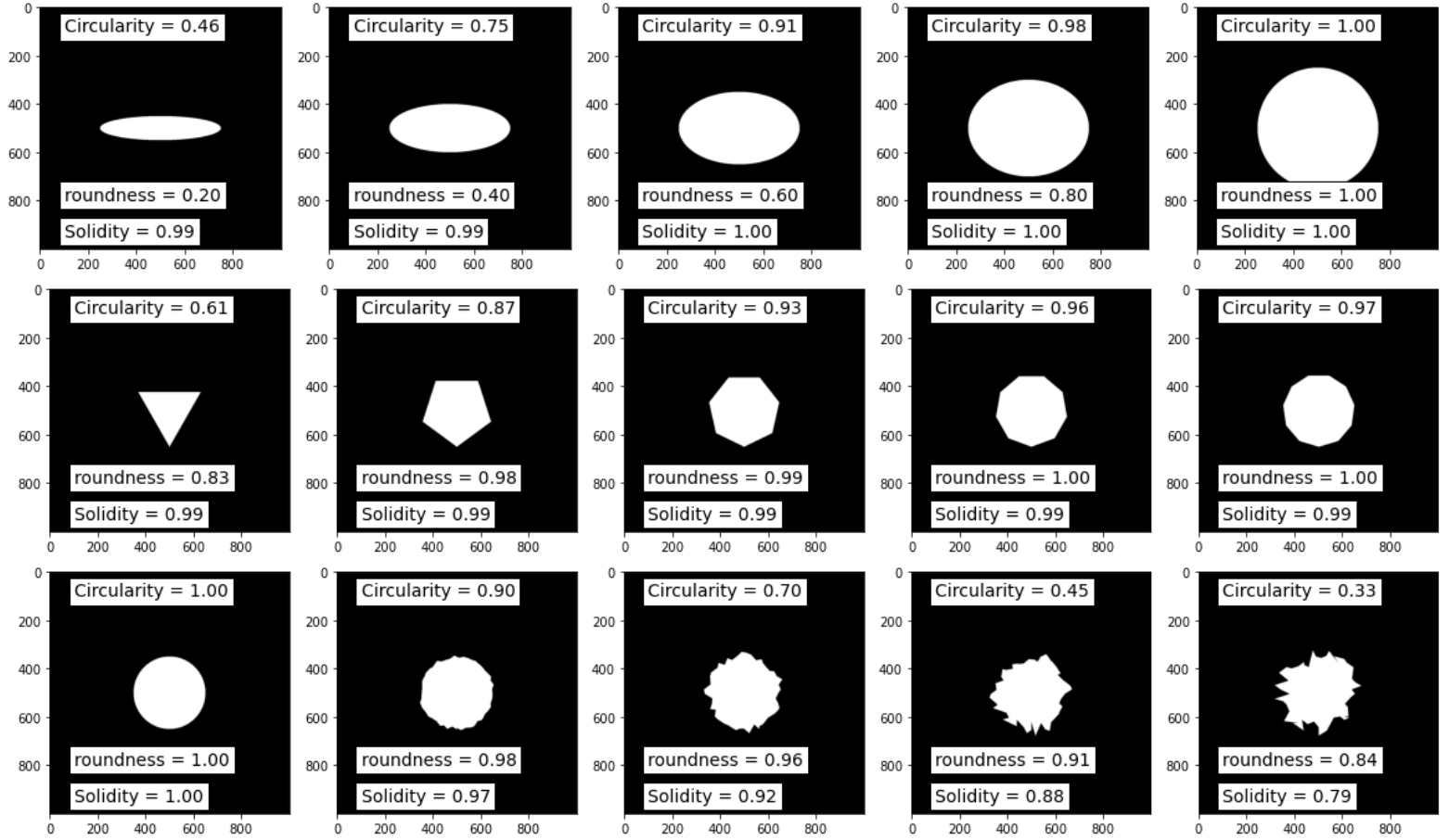
Convex hull



$$solidity = \frac{A}{A_{convexHull}}$$

$$roundness = \frac{4 * A}{\pi\, major^2}$$

$$circularity = \frac{4\pi * A}{perimeter^2}$$



The concepts of roundness and circularity compare objects to….

The shape of a circle with the same area

The shape of a square with the same area

The shape of a triangle with the same area

Method validation & Correlation

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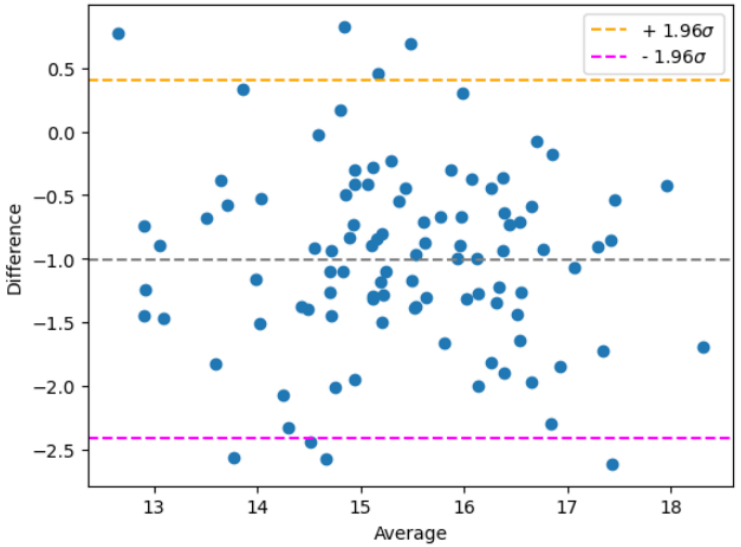
- You have two devices to measure the same quantity – what do you do?

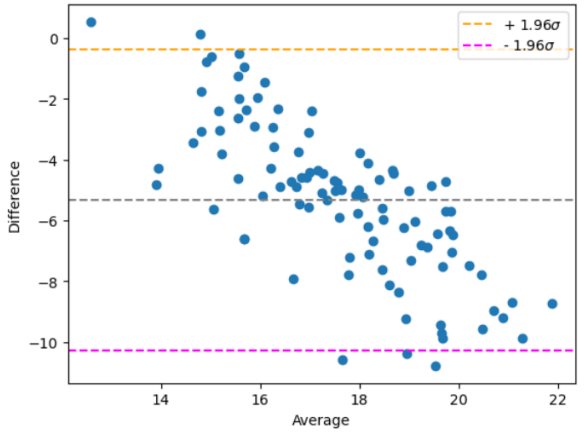
Paired T-test | T-test | Bland Altmann analysis | Use only one



- What happened here?

Factor between methods | Offset between methods

One method performing worse | Too many outliers



- The Spearman/Pearson correlation coefficient

Range between 0 and 1 | Are only different in using ranks/data | Capture correlation of any kind | Can be used agnostic of units

Correlation & testing

- Adjusting the α-level (significance threshold) with the Bonferroni method

Ensures statistical power | Minimizes the risk of false positives | Is always the best choice

- In comparing multiple groups, an ANOVA can be used to find out…

…whether differences exist | …the magnitude of existing differences | …the magnitude of existing differences

Statistics

Which of these is a measure of spread?

Median

Variance

Spearman Correlation

Mode

Pandas

How can I read this column?

	intensity_mean_ch1	intensity_mean_ch2	intensity_max_ch1	intensity_max_ch2
time_0	23	112	53	143
time_1	45	113	255	157
time_2	68	111	255	141

```
df[intensity_mean_ch2]
```

```
df[:,1]
```

```
df['intensity_mean_ch2']
```

```
df[:,'intensity_mean_ch2']
```

Pandas

How can I read these column?

	intensity_mean_ch1	intensity_mean_ch2	intensity_max_ch1	intensity_max_ch2
time_0	23	112	53	143
time_1	45	113	255	157
time_2	68	111	255	141

```
df['intensity_mean_ch1', 'intensity_mean_ch2']
```

```
df.give_me_the_two_first_columns()
```

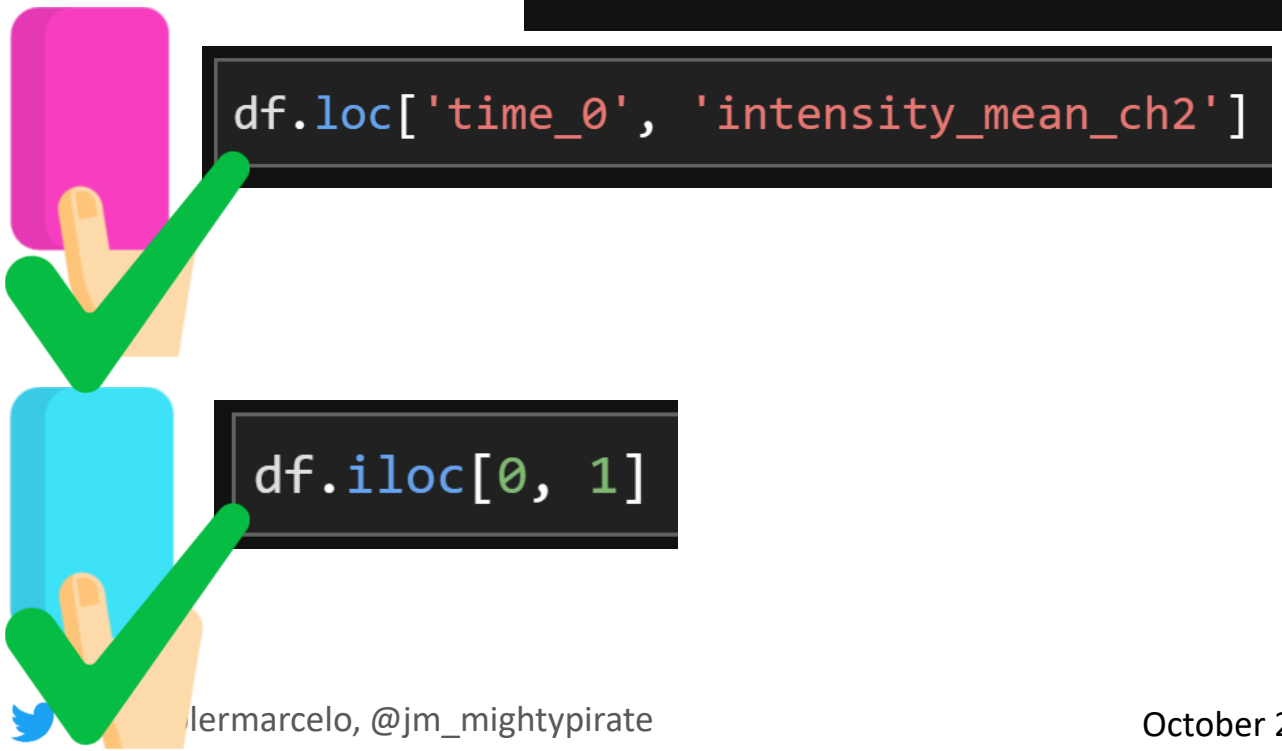
```
df[['intensity_mean_ch1', 'intensity_mean_ch2']]
```

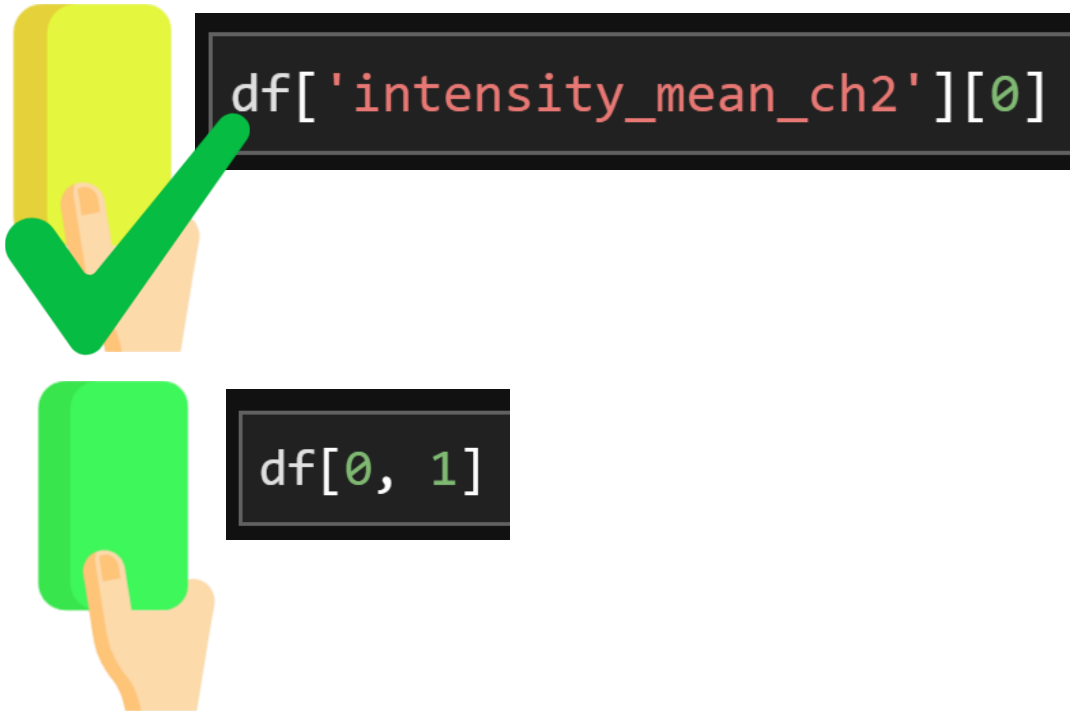
```
df[:,0:2]
```

Pandas

How can I read the this cell from this table?

	intensity_mean_ch1	intensity_mean_ch2	intensity_max_ch1	intensity_max_ch2
time_0	23	112	53	143
time_1	45	113	255	157
time_2	68	111	255	141





Pandas

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time_1	45	113	255	157
time_2	68	111	255	141

```
df.loc['time_0', 'intensity_mean_ch2']
```

```
df.loc['time_0', ['intensity_mean_ch1', 'intensity_mean_ch2']]
```

```
df['intensity_mean_ch2'][0]
```

```
df[['intensity_mean_ch1', 'intensity_mean_ch2']][0]
```

```
df.iloc[0, 1]
```

```
df.iloc[0, 0:2]
```

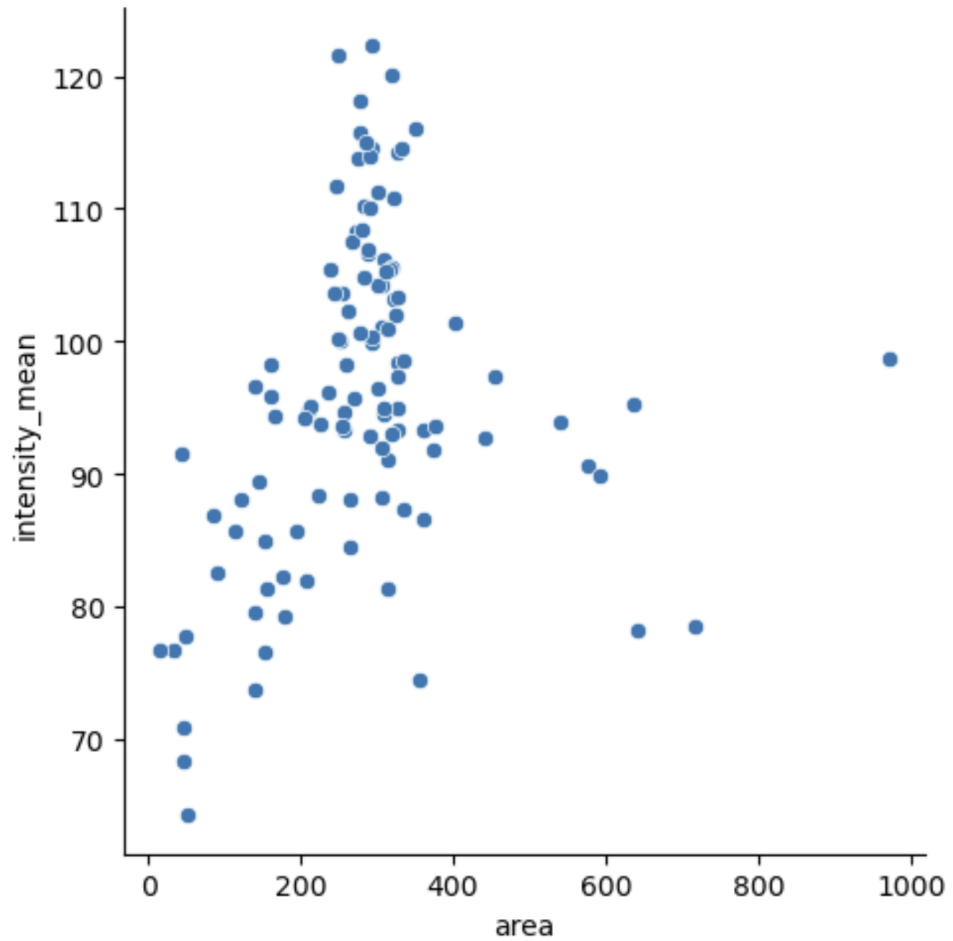
```
df[0, 1]
```

```
df[0, 0:2]
```

Seaborn

	area	intensity_mean	round
0	139	96.546763	False
1	360	86.613889	False
2	43	91.488372	False
3	140	73.742857	False
4	144	89.375000	True
...	...	...	...

```
sns.relplot(data = df, x = 'area', y = 'intensity_mean')
```




```
hue = 'round'
```

```
col = 'round'
```

How can display ‘’round” with different colors?

Seaborn

	area	intensity_mean	round
0	139	96.546763	False
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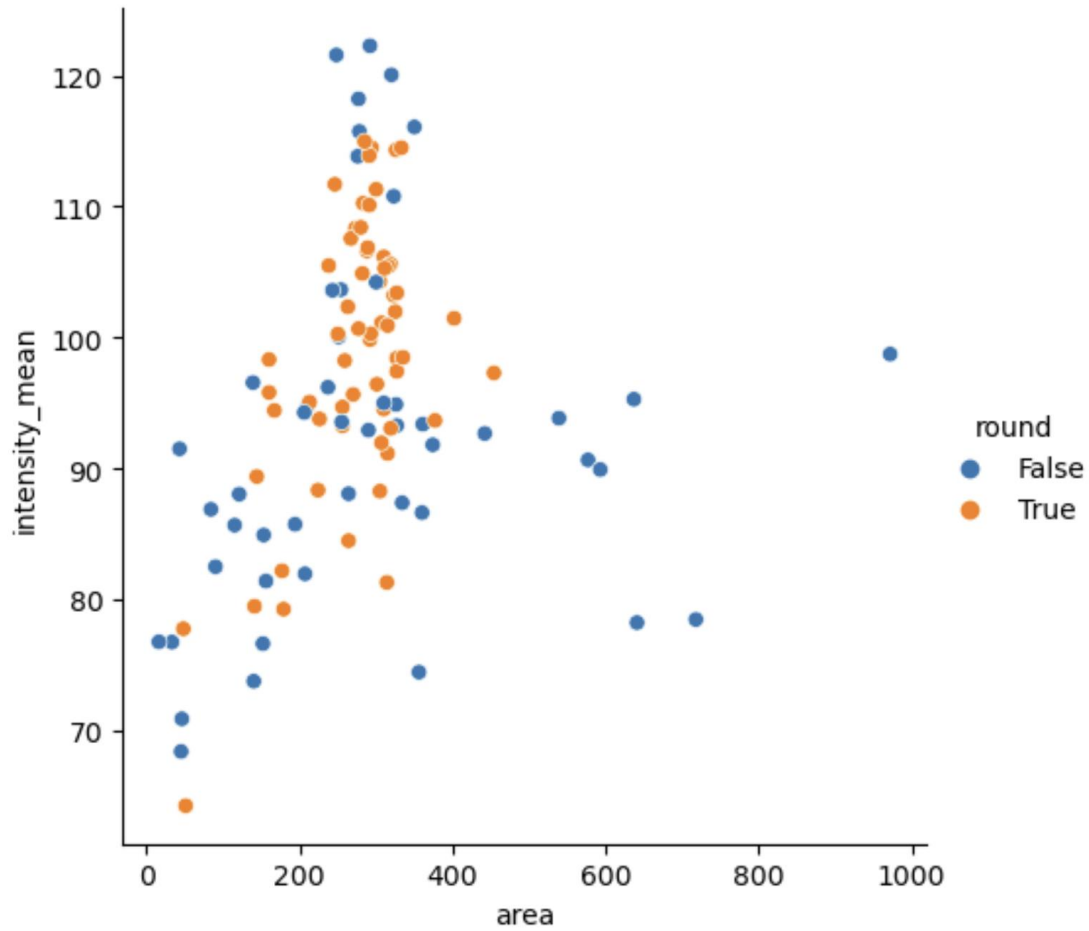


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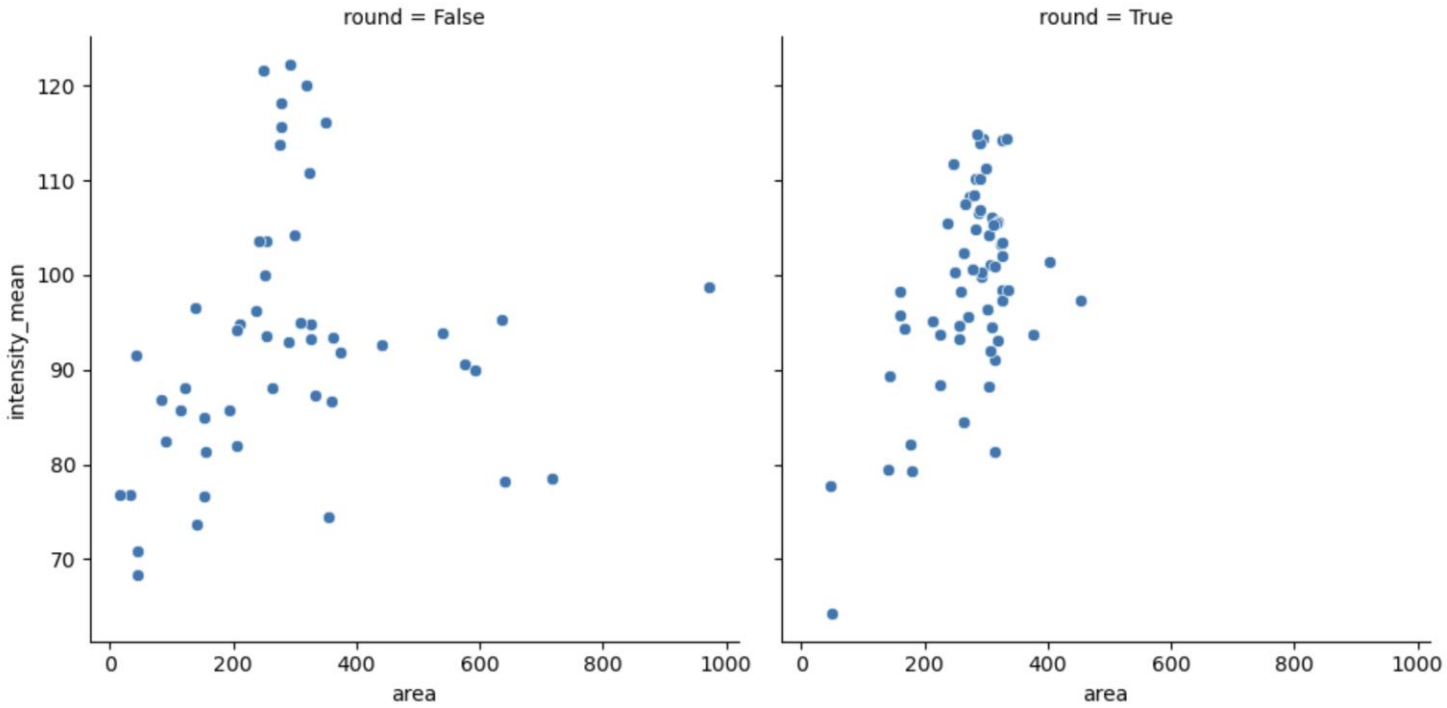


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