

visualization

May 13, 2024

1 Visualizations and Analysis for the results obtained by Gibbs Sampling

```
[ ]: import numpy as np
import matplotlib.pyplot as plt

[ ]: headers = ["Gene Name", "Transcript Length", "si", "koni", "koffi", "skoffi", "exi"]
data = np.genfromtxt("result.txt", delimiter="\t", skip_header=1, dtype=None, encoding=None, unpack=True)
gene_names = data[0].astype(str)
si = data[2].astype(float)
transcript_length = data[1].astype(float)
koni = data[3].astype(float)
koffi = data[4].astype(float)
skoffi = data[5].astype(float)
exi = data[6].astype(float)

#plot si vs transcript length
plt.scatter(transcript_length, si)
plt.xlabel("Transcript Length")
plt.ylabel("si")
plt.title("si vs Transcript Length")
plt.show()

# find the correlation between si and transcript length
correlation = np.corrcoef(transcript_length, si)
print("Correlation between si and transcript length: ", correlation[0,1])

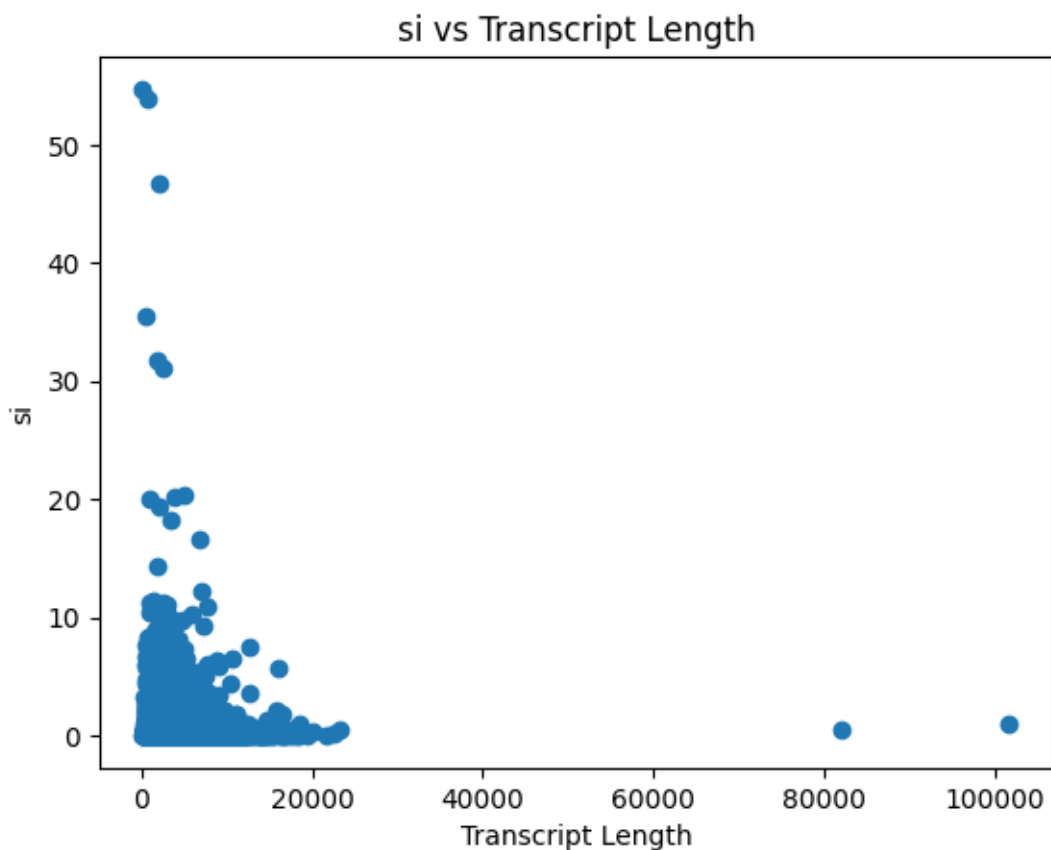
# find the correlation between koni and koffi
correlation = np.corrcoef(koni, koffi)
# plot koni vs koffi
plt.scatter(koni, koffi)
plt.xlabel("koni")
plt.ylabel("koffi")
plt.title("koni vs koffi")
```

```

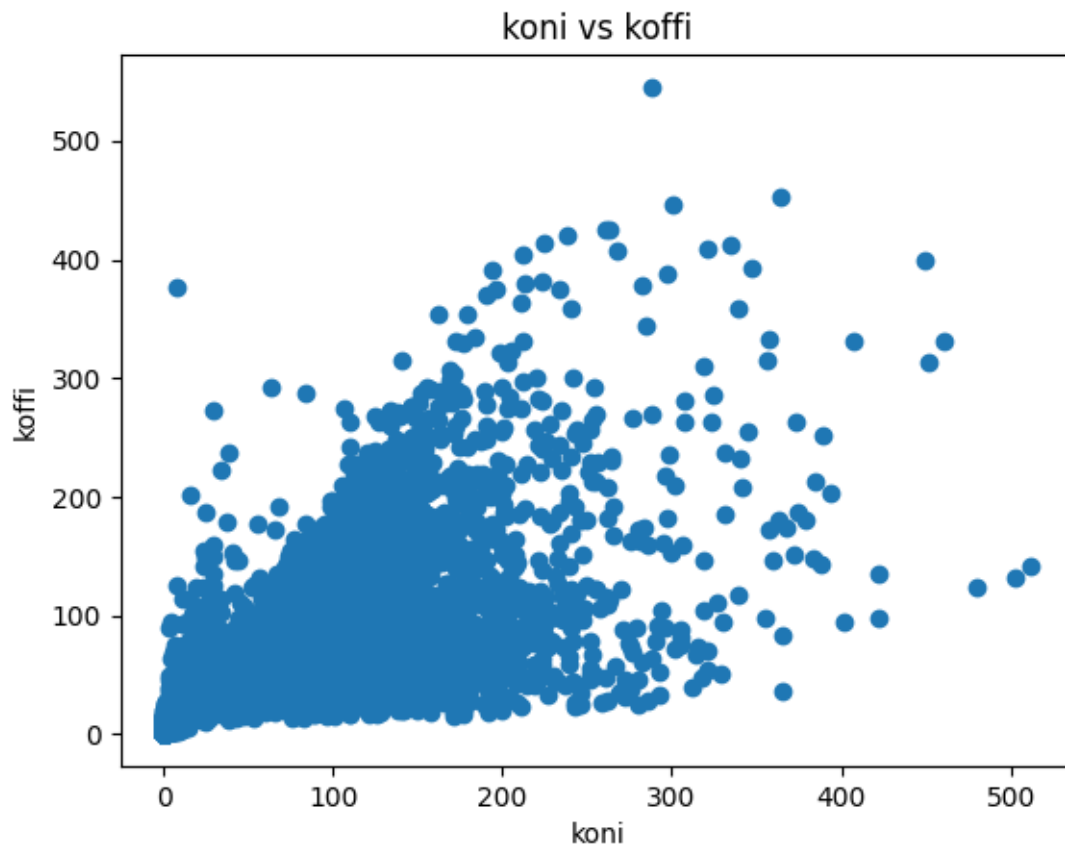
plt.show()
print("Correlation between koni and koffi: ", correlation[0,1])
# print covariance matrix between koni and koffi
covariance = np.cov(koni, koffi)
print("Covariance matrix between koni and koffi: ", covariance)

# make a correlation matrix between si, koni, koffi, skoffi, exi
data = np.array([transcript_length, si, koni, koffi, skoffi, exi])
correlation = np.corrcoef(data)
print("Correlation matrix between si, koni, koffi, skoffi, exi:\n ",
      ↪correlation)
# print the pairs with correlation higher than 0.5
for i in range(data.shape[0]):
    for j in range(i+1, data.shape[0]):
        if correlation[i,j] > 0.5:
            print("Correlation between ", headers[i+1], " and ", headers[j+1],
                  ↪" is: ", correlation[i,j])

```



Correlation between si and transcript length: 0.005717807729022441



Correlation between koni and koffi: 0.8055642726213191

Covariance matrix between koni and koffi: $\begin{bmatrix} 2487.67251349 & 1823.73771177 \\ 1823.73771177 & 2060.30329132 \end{bmatrix}$

Correlation matrix between si, koni, koffi, skoffi, exi:

```
[[ 1.          0.00571781  0.00285494  0.00265964  0.01047814  0.0052909 ]
 [ 0.00571781  1.          -0.06186055  0.03469592  0.44635901  0.86715441]
 [ 0.00285494 -0.06186055  1.          0.80556427 -0.16189324 -0.06129007]
 [ 0.00265964  0.03469592  0.80556427  1.          -0.15264258 -0.00414808]
 [ 0.01047814  0.44635901 -0.16189324 -0.15264258  1.          0.52235117]
 [ 0.0052909   0.86715441 -0.06129007 -0.00414808  0.52235117  1.          ]]
```

Correlation between si and exi is: 0.8671544101189494

Correlation between koni and koffi is: 0.8055642726213191

Correlation between skoffi and exi is: 0.5223511698997131