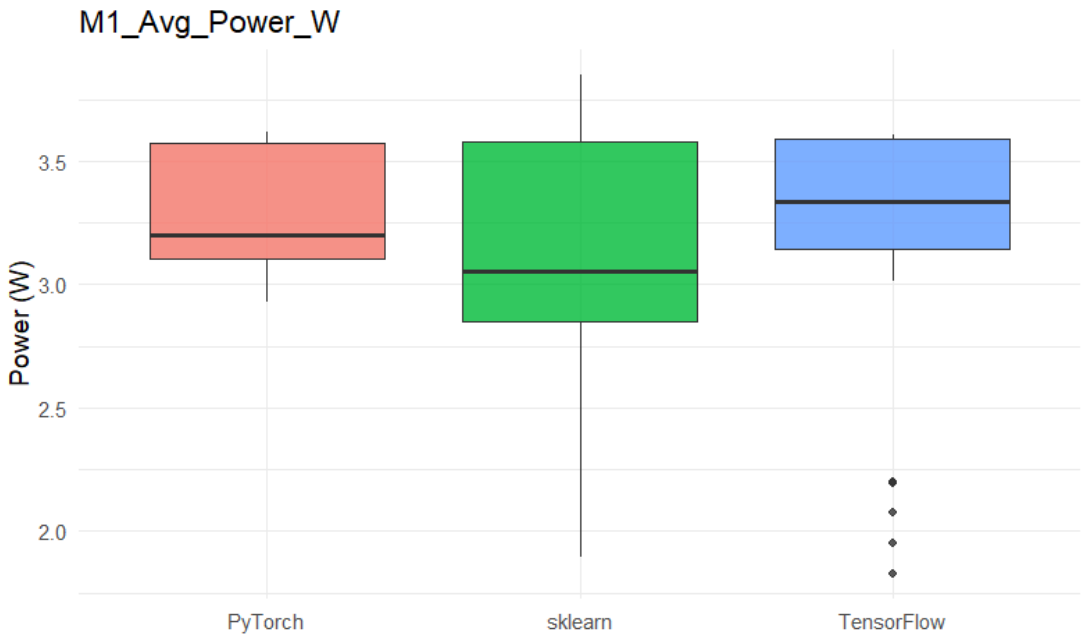
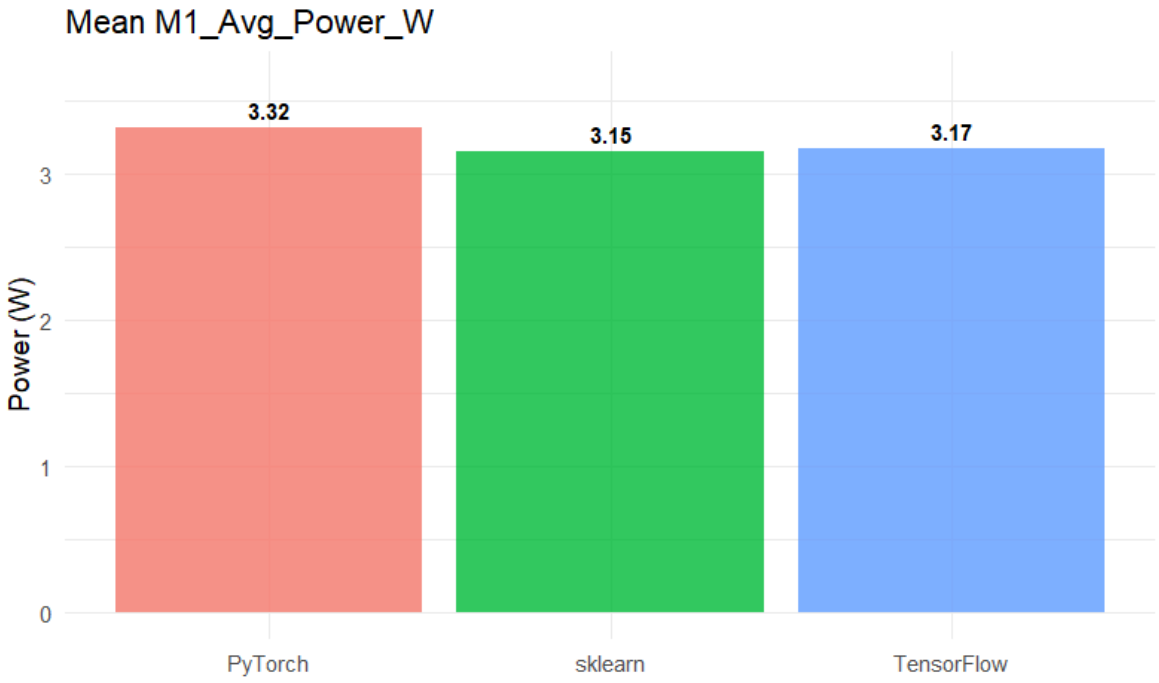
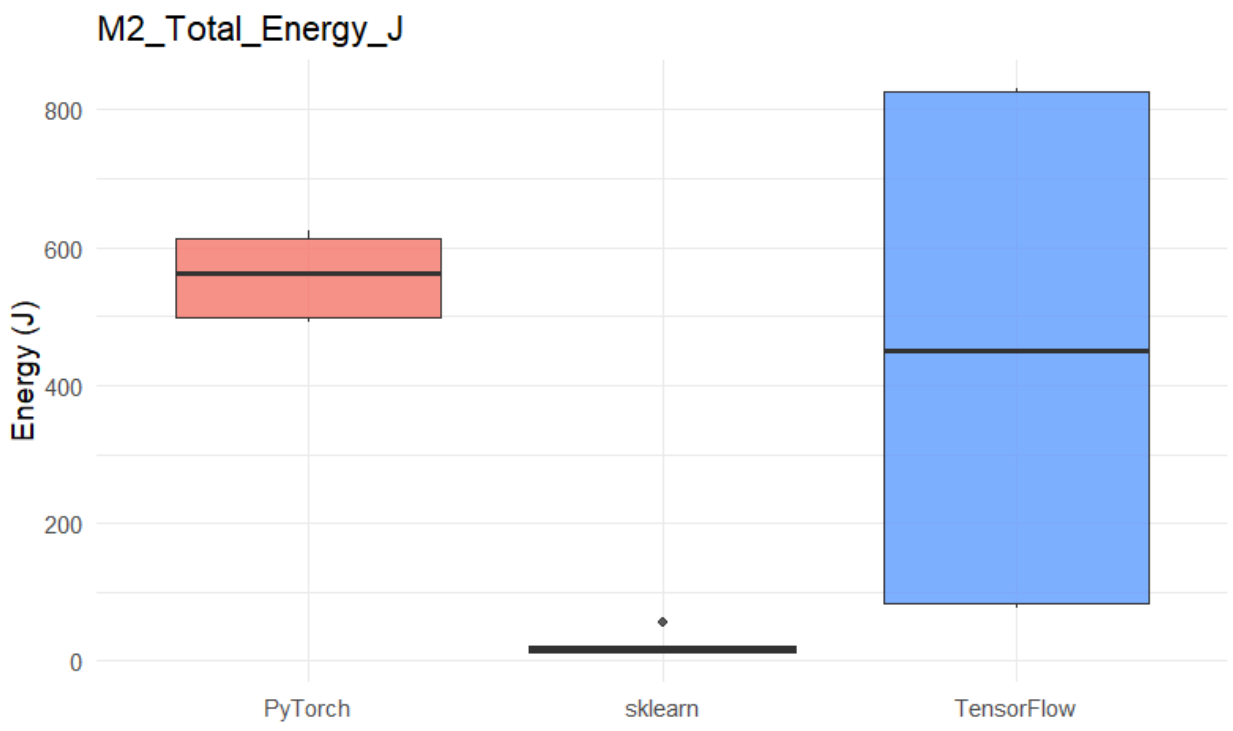
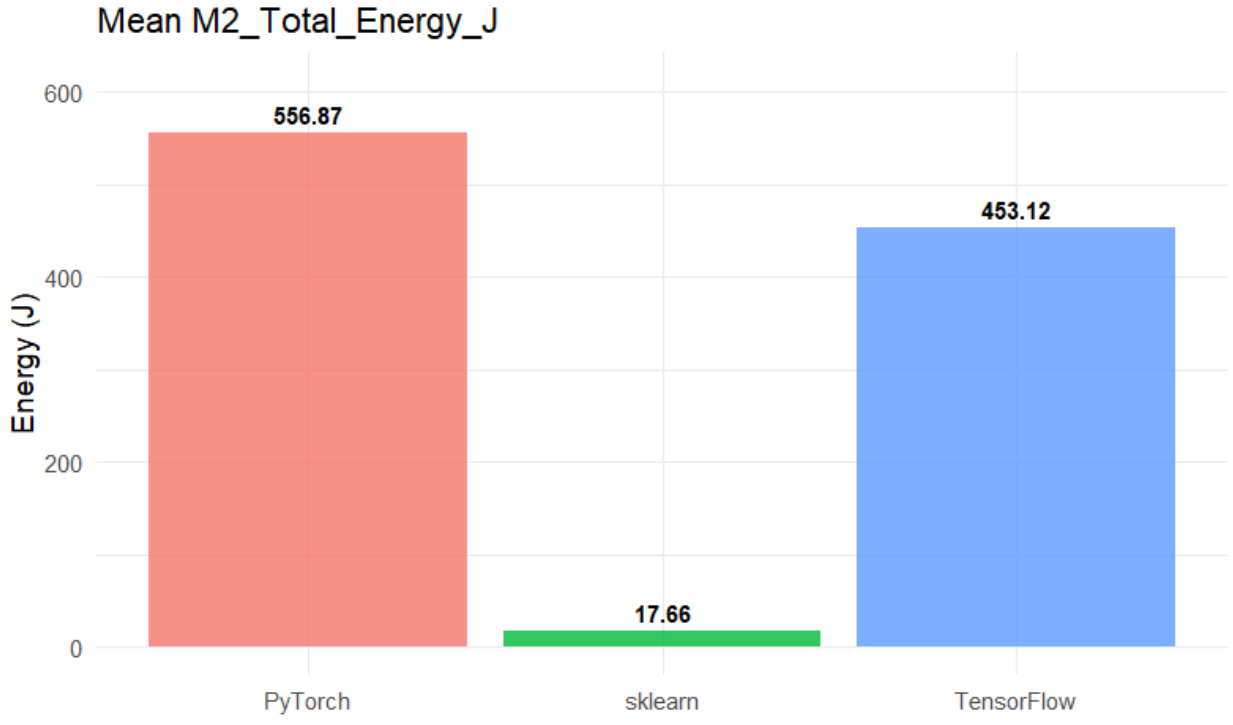
Data analysis results on the comparison Sklearn, TensorFlow, PyTorch on Rasberry Pi

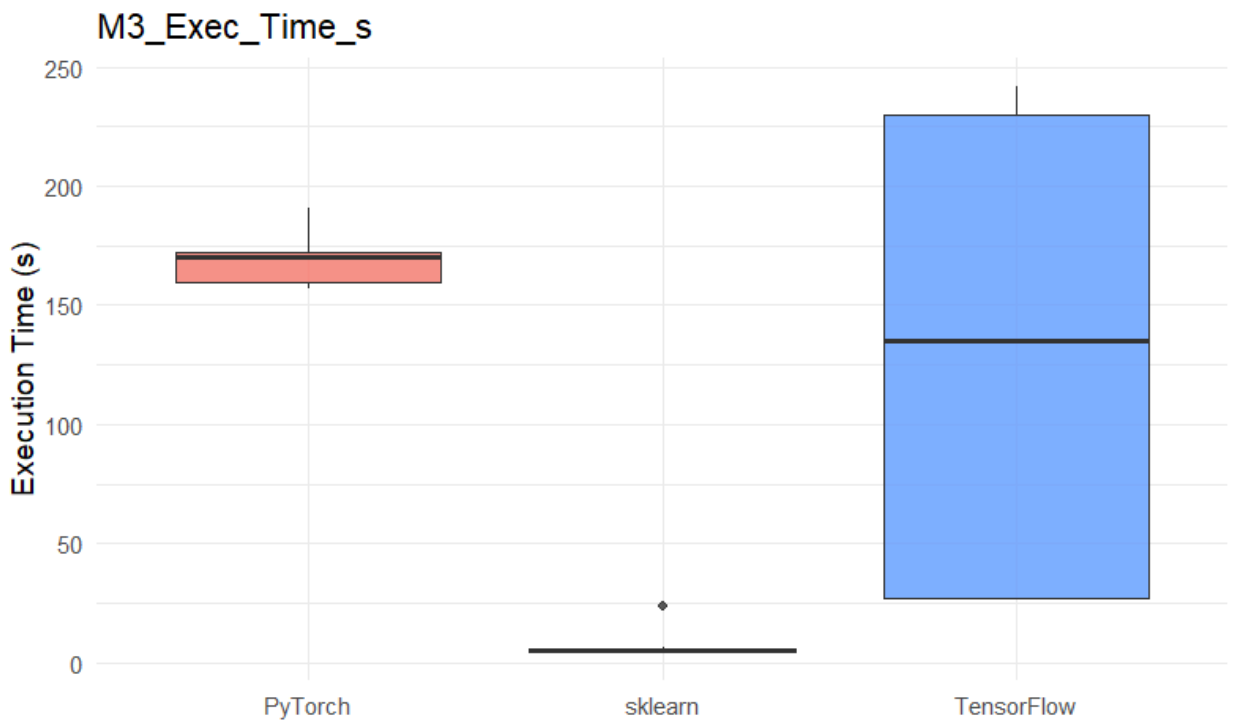
1. **Box Plots and bar plots for metrics M1, M2, M3, M5**

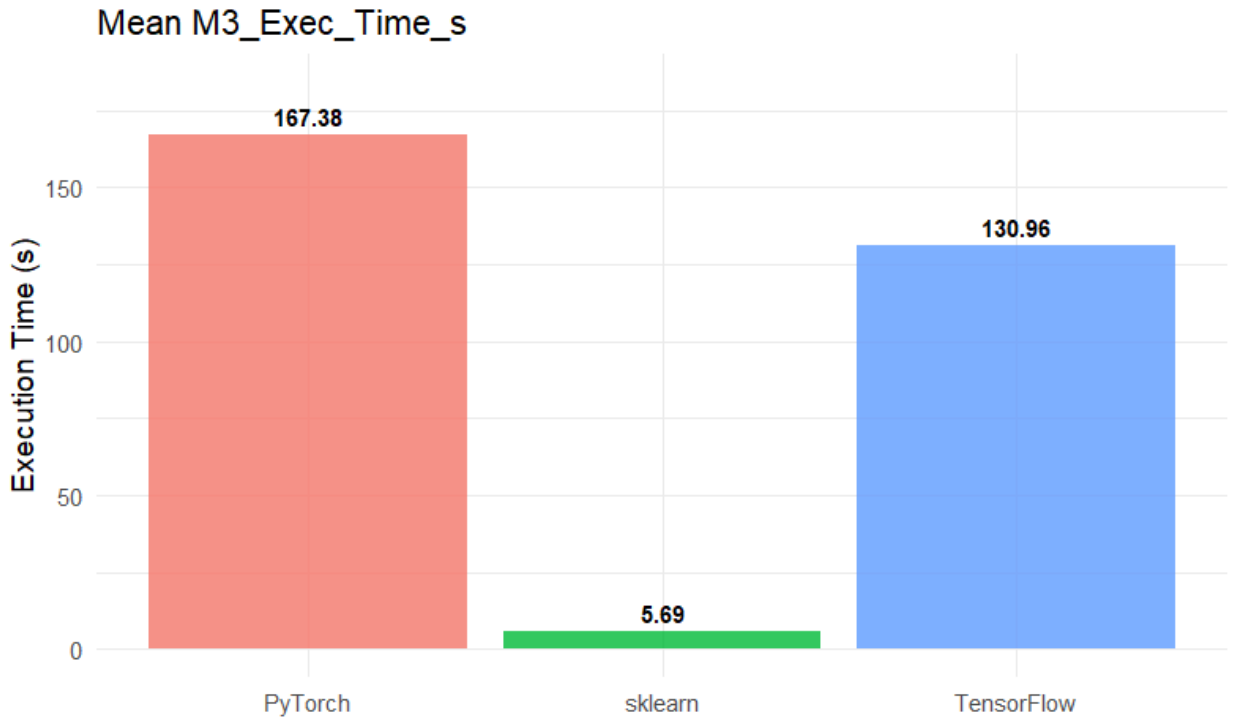


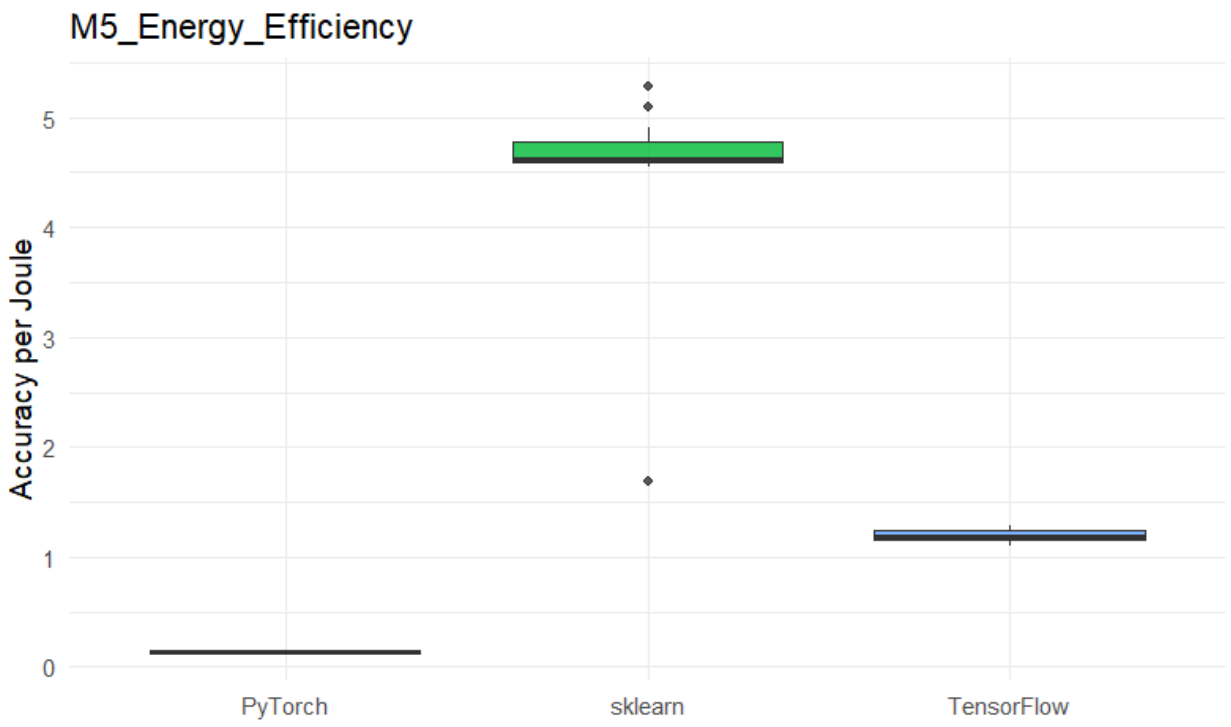


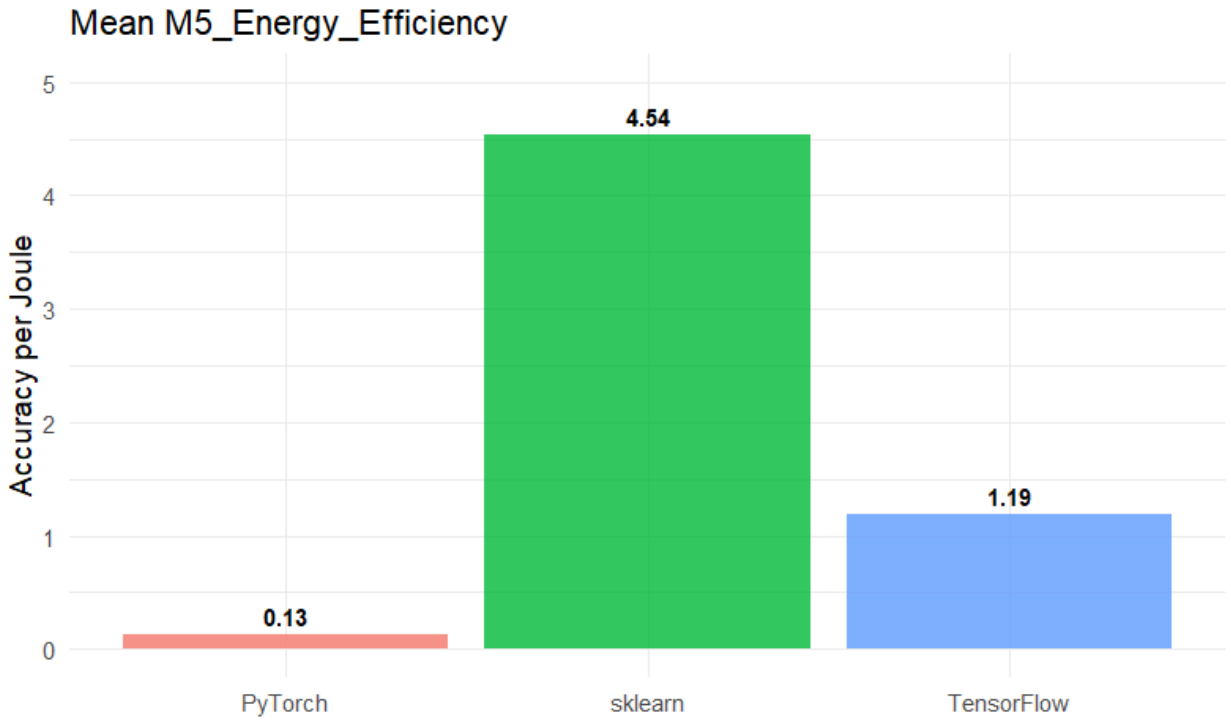

M2_Total_Energy_J
Energy (J)
800
600
400
200
0
PyTorch
sklearn
TensorFlow


Mean M2_Total_Energy_J
Energy (J)
600
400
200
0
556.87
17.66
453.12
PyTorch
sklearn
TensorFlow

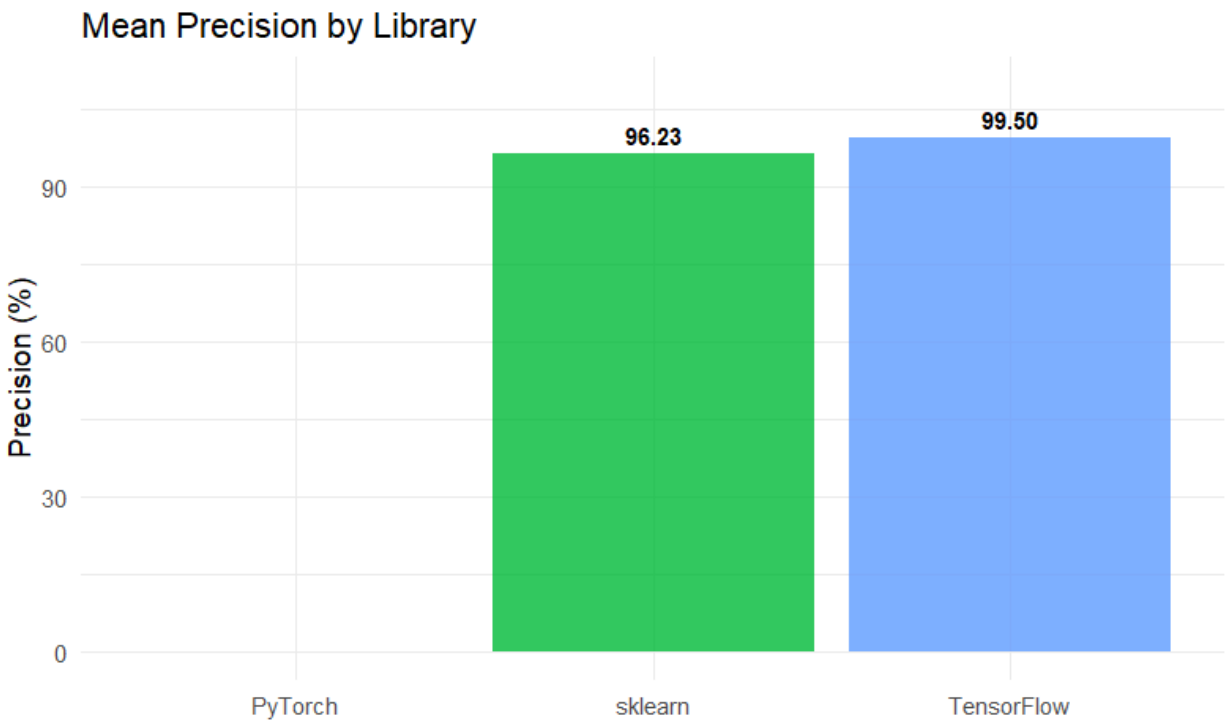

M3_Exec_Time_s
Execution Time (s)
250
200
150
100
50
0
PyTorch
sklearn
TensorFlow

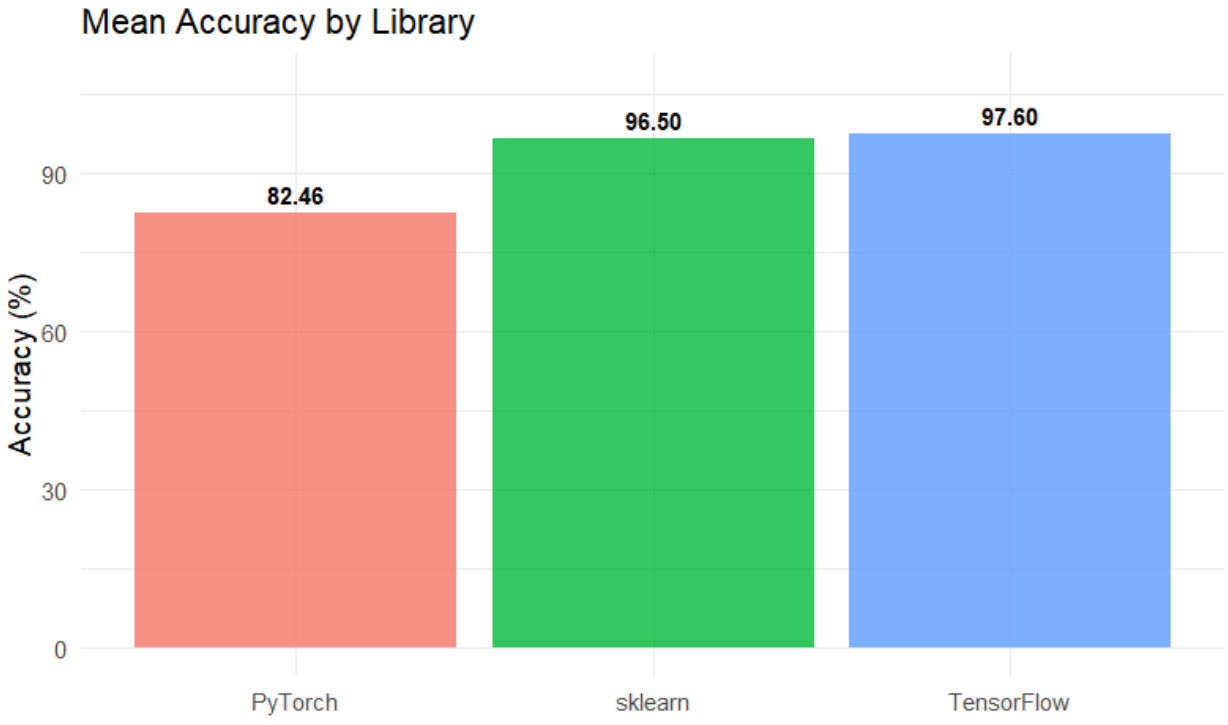

Mean M3_Exec_Time_s
Execution Time (s)
150
100
50
0
167.38
5.69
130.96
PyTorch
sklearn
TensorFlow


M5_Energy_Efficiency
Accuracy per Joule
0
1
2
3
4
5
PyTorch
sklearn
TensorFlow

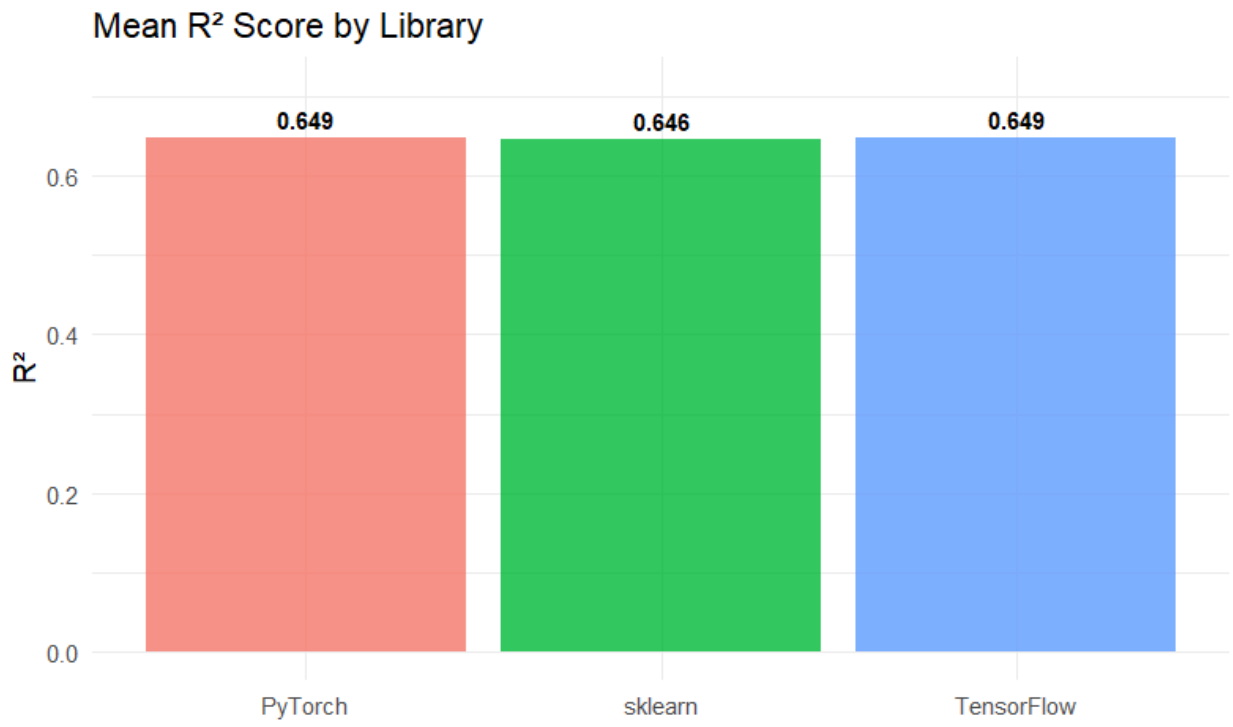

Mean M5_Energy_Efficiency
Accuracy per Joule
0
1
2
3
4
5
0.13
4.54
1.19
PyTorch
sklearn
TensorFlow

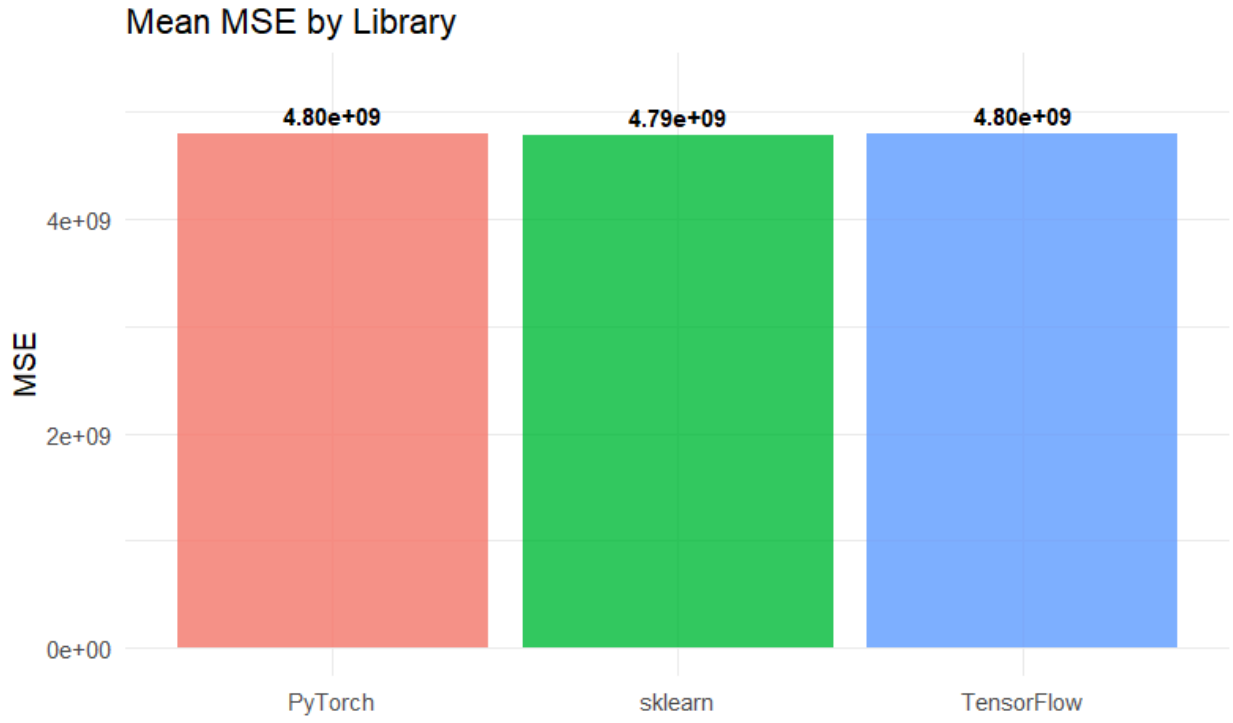
2. **Bar plots for average precision and accuracy per library:**



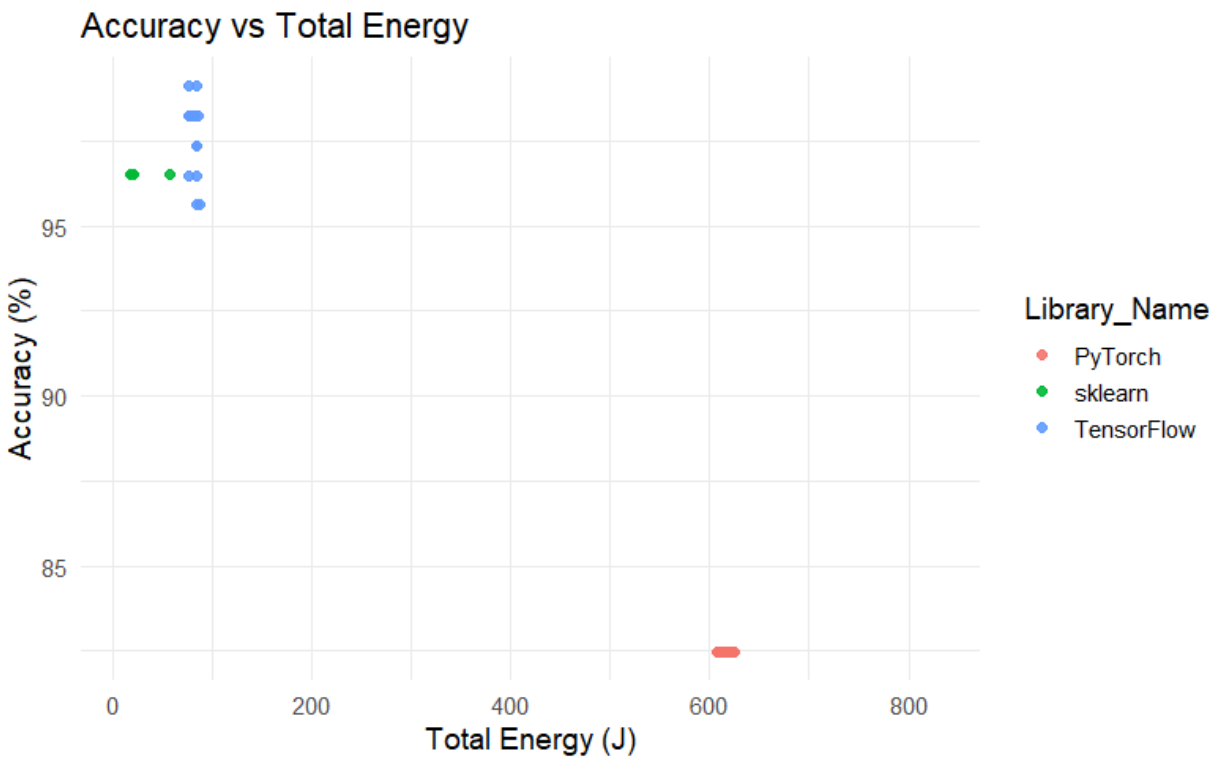


3. **Average R2 score and MSE for the libraries in linear regression only**

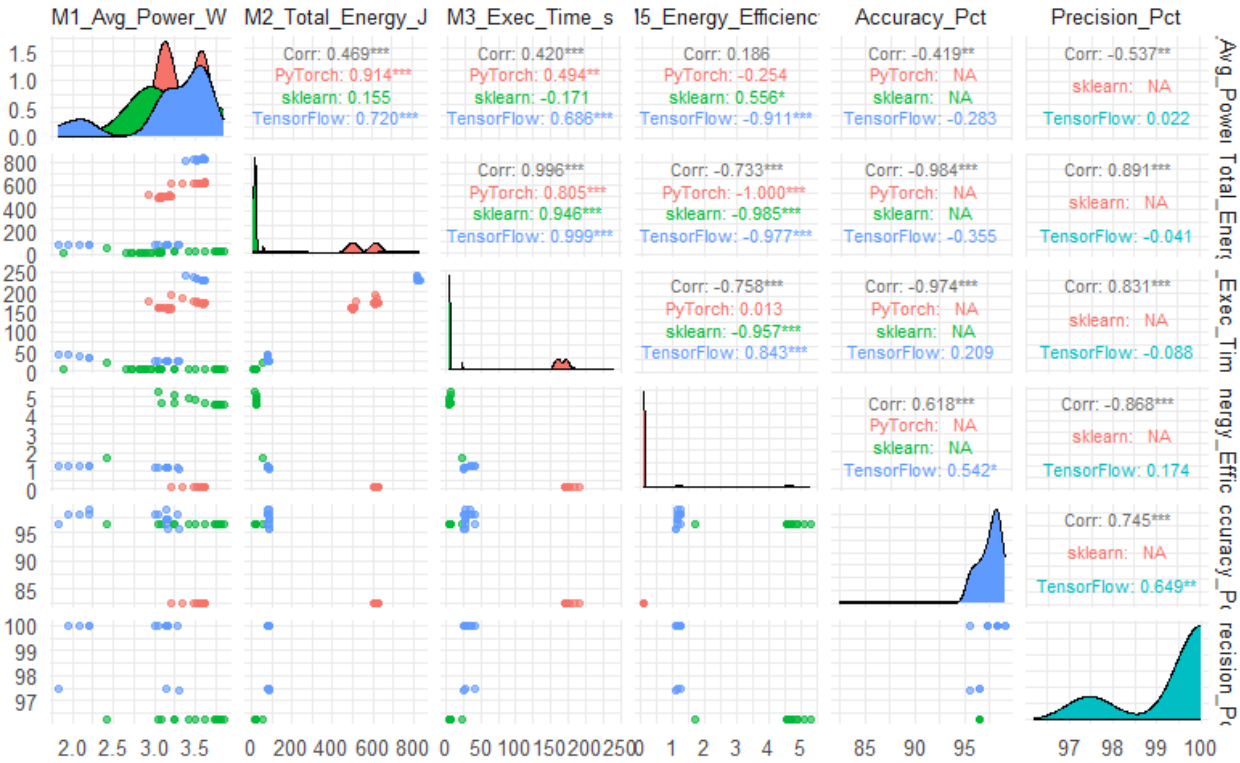




4. **Accuracy vs Total energy**



5. Scatter Matrix



6. Summary table:

Library	N	Power (W)	Energy (J)	Time (s)	Efficiency	Precision (%)	Accuracy (%)	MSE	R^2
PyTorch	30	3.32	557.0	167.0	0.134	N/A	82.5	4.80×10^9	0.649
TensorFlow	30	3.17	453.0	131.0	1.19	99.5	97.6	4.80×10^9	0.649
sklearn	30	3.15	17.7	5.69	4.54	96.2	96.5	4.79×10^9	0.646

7. ANOVA and Kruskal for the metrics M1, M2, M3, M5 output

```
Metric: M1_Avg_Power_W
ANOVA:
             Df Sum Sq Mean Sq F value Pr(>F)
Library_Name  2   0.52  0.2599   1.333  0.269
Residuals    87  16.95  0.1949
Kruskal-Wallis:

      Kruskal-Wallis rank sum test

data:  M1_Avg_Power_W by Library_Name
Kruskal-Wallis chi-squared = 2.5603, df = 2, p-value = 0.278


----------------------------------------
Metric: M2_Total_Energy_J
ANOVA:
             Df  Sum Sq Mean Sq F value   Pr(>F)
Library_Name  2 4911459 2455730   50.44 2.85e-15 ***
Residuals    87 4235633   48685
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Kruskal-Wallis:

      Kruskal-Wallis rank sum test

data:  M2_Total_Energy_J by Library_Name
Kruskal-Wallis chi-squared = 59.341, df = 2, p-value = 1.301e-13


----------------------------------------
Metric: M3_Exec_Time_s
ANOVA:
             Df Sum Sq Mean Sq F value Pr(>F)
Library_Name  2 431615  215808   61.34 <2e-16 ***
Residuals    87 306094    3518
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

```
Kruskal-Wallis:

      Kruskal-Wallis rank sum test

data:  M3_Exec_Time_s by Library_Name
Kruskal-Wallis chi-squared = 59.341, df = 2, p-value = 1.301e-13


----------------------------------------
Metric: M5_Energy_Efficiency
ANOVA:
             Df Sum Sq Mean Sq F value Pr(>F)
Library_Name  2 158.75   79.37   356.4 <2e-16 ***
Residuals    42   9.35    0.22
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Kruskal-Wallis:

      Kruskal-Wallis rank sum test

data:  M5_Energy_Efficiency by Library_Name
Kruskal-Wallis chi-squared = 39.13, df = 2, p-value = 3.184e-09
```