# Supplementary Information: Imputation of Human Mobility Data for Comprehensive Risk Models

Shashee Kumari, Sakyajit Bhattacharya, Arnab Chatterjee and Avik Ghose

May 15, 2023

## 1 Performance

All the experiments were performed on Intel Core i7-9750H CPU @ 2.60GHz using hwcounter python library [1]. Inference steps were repeated for 1000 iterations for all the time windows $\{6, 8, 10\}$. Refer to Table S1 for detailed statistics of the compute cycles taken by each model. Figure S1 shows the average number of compute cycles taken by different models for the time windows $\{6, 8, 10\}$. Figure S2 shows compute cycles statistics for XGBoost for time window 10. The left panel of the figure shows the mean and median of the compute cycles till a particular iteration of imputation. The right panel shows the compute cycles taken at each iteration of imputation along with overall mean, median, standard deviation.
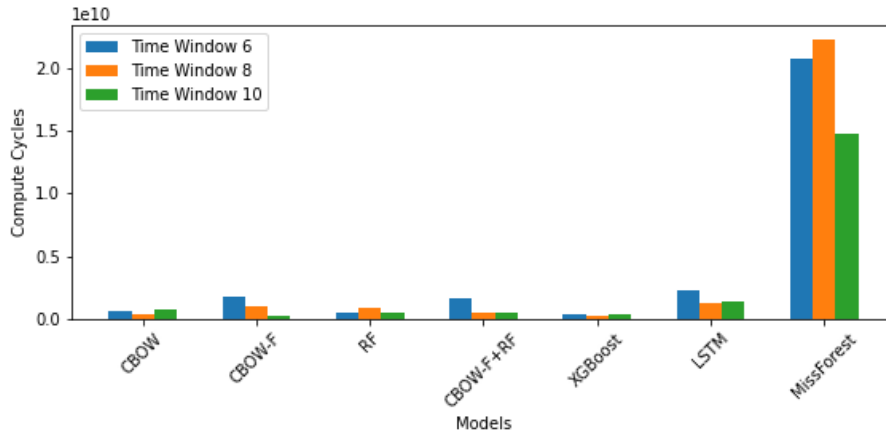


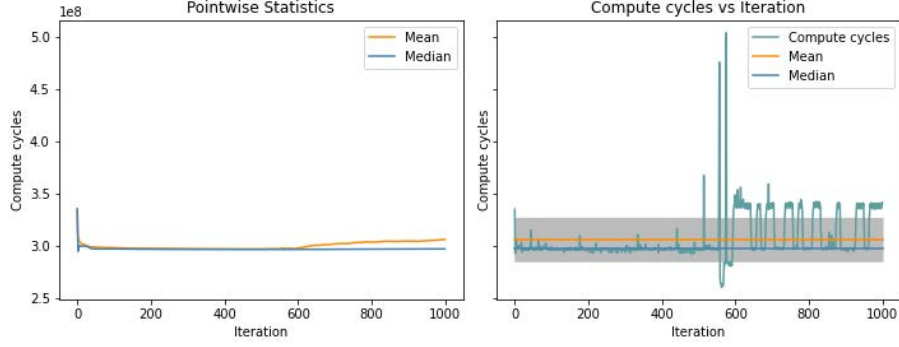Figure S1: Average number of compute cycles for inference for each model

---

[1] https://github.com/paulsmith/hwcounter

Figure S2: Compute cycles for inference for XGBoost (Time window = 10)

Table S1: Compute Cycles (Approach 2)

| Model (time window = 6) | Compute Cycles | | |
|---|---|---|---|
| | Mean | Median | Standard Deviation |
| CBOW | 878469877.1 | 865436958 | 93638473.84 |
| CBOW-Flattened | 1757049358.24 | 1730466742 | 184574988.44 |
| Random Forest | 545178881.51 | 534292431 | 52459514.49 |
| LSTM | 2291567375.85 | 1740107018 | 925891877.66 |
| XGBoost | 299388880.09 | 327552970 | 43498719.8 |
| CBOW-Flattened + Random Forest | 1593245692.62 | 1580898600 | 51466284.91 |
| MissForest | 20822662991.2 | 17401735478 | 5375277194.5 |

| Model (time window = 8) | Compute Cycles | | |
|---|---|---|---|
| | Mean | Median | Standard Deviation |
| CBOW | 353058393.84 | 345793593 | 44340357.86 |
| CBOW-Flattened | 1042749011.84 | 1034731821 | 81185364.97 |
| Random Forest | 897417777.93 | 798252416 | 130655499.6 |
| LSTM | 1229503483.41 | 1086791249 | 290399941.45 |
| XGBoost | 285705977.30 | 284674774 | 15513296 |
| CBOW-Flattened + Random Forest | 548916310.53 | 543664362 | 13979689.99 |
| MissForest | 548916310.54 | 543664362 | 13979689.99 |

| Model (time window = 10) | Compute Cycles | | |
|---|---|---|---|
| | Mean | Median | Standard Deviation |
| CBOW | 772615399.67 | 767968664 | 68372075.02 |
| CBOW-Flattened | 289374134.37 | 287342497 | 26816181.34 |
| Random Forest | 541265964.01 | 550761859 | 49233297.25 |
| LSTM | 1430210195.12 | 1272155718 | 325377532.13 |
| XGBoost | 306460204.23 | 297353462 | 20543342.58 |
| CBOW-Flattened + Random Forest | 547090937.99 | 541731176 | 13229097.09 |
| MissForest | 14828986900.16 | 14775966656 | 3899594239.31 |