# Monash Time-Series Forecasting Archive Replication

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**Abstract**

The "Monash Time Series Forecasting Archive" significantly enhances research in time series forecasting, unveiling a meticulously selected assortment of 25 datasets across diverse sectors like energy, banking, and tourism.

This initiative tackles the pressing need for diverse, comprehensive datasets to benchmark a broad spectrum of forecasting models, spanning from conventional univariate to modern global and multivariate methodologies.

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Table 1: Datasets in the current time series forecasting archive

| | Dataset | Domain | No: of Series | Min. Length | Max. Length | No: of Freq | Missing | Competition | Multivariate |
|---|---|---|---|---|---|---|---|---|---|
| 0 | M1 | Multiple | 1023 | 18 | 150 | 3 | No | Yes | No |
| 1 | M3 | Multiple | 3003 | 20 | 144 | 4 | No | Yes | No |
| 2 | M4 | Multiple | 100000 | 19 | 9933 | 6 | No | Yes | No |
| 3 | Tourism | Tourism | 1311 | 11 | 333 | 3 | No | Yes | No |
| 4 | CIF 2016 | Banking | 72 | 28 | 120 | 1 | No | Yes | No |
| 5 | London Smart Meters | Energy | 5560 | 288 | 39648 | 1 | Yes | No | No |
| 6 | Aus. Electricity Demand | Energy | 5 | 230736 | 232272 | 1 | No | No | No |
| 7 | Wind Farms | Energy | 339 | 6345 | 527040 | 1 | Yes | No | No |
| 8 | Dominick | Sales | 115704 | 28 | 393 | 1 | No | No | No |
| 9 | Bitcoin | Economic | 18 | 4581 | 4581 | 1 | Yes | No | No |
| 10 | Pedestrian Counts | Transport | 66 | 576 | 96424 | 1 | No | No | No |
| 11 | Vehicle Trips | Transport | 329 | 70 | 243 | 1 | Yes | No | No |
| 12 | KDD Cup 2018 | Transport | 270 | 9504 | 10920 | 1 | Yes | Yes | No |
| 13 | Weather | Weather | 3010 | 1332 | 65981 | 1 | No | No | No |
| 14 | NN5 | Banking | 111 | 791 | 791 | 2 | Yes | Yes | Yes |
| 15 | Web Traffic | Web | 145063 | 803 | 803 | 1 | Yes | Yes | Yes |
| 16 | Solar | Energy | 137 | 52560 | 52560 | 2 | No | No | Yes |
| 17 | Electricity | Energy | 321 | 26304 | 26304 | 2 | No | No | Yes |
| 18 | Car Parts | Sales | 2674 | 51 | 51 | 1 | Yes | No | Yes |
| 19 | FRED-MD | Economics | 107 | 728 | 728 | 1 | No | No | Yes |
| 20 | San Francisco Traffic | Transport | 862 | 17544 | 17544 | 2 | No | No | Yes |
| 21 | Rideshare | Transport | 2304 | 541 | 541 | 1 | Yes | No | Yes |
| 22 | Hospital | Health | 767 | 84 | 84 | 1 | No | No | Yes |
| 23 | COVID Deaths | Nature | 266 | 212 | 212 | 1 | No | No | Yes |
| 24 | Temperature Rain | Nature | 32072 | 725 | 725 | 1 | Yes | No | Yes |
| 25 | Sunspot | Nature | 1 | 73924 | 73924 | 1 | Yes | No | No |
| 26 | Saugeen River Flow | Nature | 1 | 23741 | 23741 | 1 | No | No | No |
| 27 | US Births | Nature | 1 | 7305 | 7305 | 1 | No | No | No |
| 28 | Solar Power | Energy | 1 | 7397222 | 7397222 | 1 | No | No | No |
| 29 | Wind Power | Energy | 1 | 7397147 | 7397147 | 1 | No | No | No |

Table 2: Mean MASE results. The best model across each dataset is highlighted in boldface.

| | Dataset | SES | Theta | ETS | (DHR-) ARIMA | PR | Cat Boost | ARIMA | TBATS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | M1 Yearly | 4.9384 | 4.1905 | 3.7714 | | 4.5877 | | 4.4791 | **3.4988** |
| 1 | M1 Quarterly | 1.9291 | 1.7022 | **1.6583** | | 1.8918 | | 1.7871 | 1.6939 |
| 2 | M1 Monthly | 1.3787 | 1.0910 | **1.0739** | | 1.1230 | | 1.1648 | 1.1182 |
| 3 | M3 Quarterly | 1.4170 | **1.1168** | 1.1701 | | 1.2478 | | 1.2395 | 1.2565 |
| 4 | M3 Monthly | 1.0910 | 0.8638 | 0.8651 | | 1.0104 | | 0.8732 | **0.8608** |
| 5 | M4 Yearly | | | | | | | | **3.4368** |
| 6 | M4 Quarterly | | | | | | | | **1.1859** |
| 7 | M4 Weekly | | | | | | | | **0.5051** |
| 8 | Tourism Yearly | 3.2529 | **3.0145** | 3.3950 | | 3.5160 | | 3.7750 | 3.6848 |
| 9 | Tourism Quarterly | 3.2102 | 1.6613 | **1.5923** | | 1.6429 | | 1.7763 | 1.8345 |
| 10 | Tourism Monthly | 3.3057 | 1.6488 | **1.5262** | | 1.6784 | | 1.5865 | 1.7507 |
| 11 | Vehicle Trips | 2.2726 | 1.9144 | 1.9640 | | 2.1965 | | 2.0512 | **1.8560** |
| 12 | NN5 Daily | | | | | | 0.9700 | | **0.8580** |
| 13 | NN5 Weekly | 0.9032 | 0.8847 | 0.9107 | 0.8870 | **0.8537** | | | 0.8725 |
| 14 | Solar Weekly | 1.2151 | 1.2243 | 1.1344 | **0.8478** | 1.0526 | | | 0.9164 |
| 15 | Electricity Weekly | 1.5359 | 1.4760 | 1.5258 | 0.8779 | 0.9165 | | | **0.7923** |
| 16 | Traffic Weekly | **1.1157** | 1.1214 | 1.1254 | 1.1910 | 1.1224 | | | 1.1476 |
| 17 | Hospital | 0.8135 | **0.7612** | 0.7651 | | 0.7817 | | 0.7883 | 0.7680 |
| 18 | Sunspot | 0.1279 | 0.1279 | 0.1279 | | 0.0994 | | 0.0666 | **0.0640** |
| 19 | Bitcoin | 5.2886 | 5.2231 | **4.5383** | | 4.6164 | | 5.4980 | 4.6024 |
| 20 | CIF 2016 | 1.2908 | 0.9970 | **0.8409** | | 1.0192 | | 0.9272 | 0.8608 |
| 21 | COVID Deaths | 7.7757 | 7.7928 | **5.3264** | | 8.7311 | | 6.1041 | 5.7190 |
| 22 | Car Parts | 0.8967 | 0.9138 | 0.9250 | | **0.7547** | | 0.9269 | 1.0019 |
| 23 | Fred Md | 0.6166 | 0.6984 | **0.4676** | | 8.8267 | | 0.5323 | 0.5016 |
| 24 | M3 Yearly | 3.1675 | **2.7740** | 2.8598 | | 3.2231 | | 3.4167 | 3.1271 |
| 25 | Saugeen River Flow | 1.4259 | **1.4252** | 2.0359 | | 1.6743 | | 1.5480 | 1.4767 |
| 26 | US Births | 4.3425 | 2.1379 | 1.5289 | | 2.0942 | | 1.9171 | **1.4533** |