**Tables: Data Overview**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Frequency** | **Micro** | **Industry** | **Macro** | **Finance** | **Demographic** | **Other** | **Total** |
| **Yearly** | 6,538 | 3,716 | 3,903 | 6,519 | 1,088 | 1,236 | 23,000 |
| **Quarterly** | 6,020 | 4,637 | 5,315 | 5,305 | 1,858 | 865 | 24,000 |
| **Monthly** | 10,975 | 10,017 | 10,016 | 10,987 | 5,728 | 277 | 48,000 |
| **Weekly** | 112 | 6 | 41 | 164 | 24 | 12 | 359 |
| **Daily** | 1,476 | 422 | 127 | 1,559 | 10 | 633 | 4227 |
| **Hourly** |  |  |  |  |  | 414 | 414 |
| **Total** | 25,121 | 18,798 | 19,402 | 24,534 | 8,708 | 3,437 | 100,000 |

|  |  |
| --- | --- |
| **Frequency** | **Forecast horizon** |
| Yearly | 6 |
| Quarterly | 8 (2 years) |
| Monthly | 18 (1.5 years) |
| Weekly | 13 (3 months) |
| Daily | 14 (2 weeks) |
| Hourly | 48 (2 days) |

**Benchmark methods overview:**

|  |  |  |
| --- | --- | --- |
| **Method** | **Description** | **Type** |
| Naïve 2 | Seasonally adjusted naïve forecast using multiplicative decomposition. | M4 Benchmark used for calculating OWA. |
| Comb | Combination benchmark consisting of three forecasts: SES, Holt, Damped exponential smoothing. Combined using the arithmetic average of the three methods. | M4 Benchmark |
| Legaki & Koutsouri | Theta method after Box-Cox transformation with optimized transformation parameter. | M4 Competition method (Rank 8) |
| ARIMA | Automatically selected ARIMA model. Selection based on information criteria. | Comparison benchmark |
| ETS | Automatically selected exponential smoothing model. Selection based on information criteria. | Comparison benchmark |
| ETSARIMA | Arithmetic average of ETS and ARIMA forecasts. | Comparison benchmark |

**Data: All, freq:{H, D, W, M, Q, Y}, N=100,00**

**Data: m4\_hourly, freq: H, N=414**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| M4 Hourly | | | | | | |
| **Method** | **OWA** | **MASE** | **sMAPE** | **Epochs** | **NBE** | **Passes** |
| **Benchmark Methods** | | | | | | |
| Naïve2 | 1.000 | 2.395 | 0.1838 |  |  |  |
| Comb | 1.556 | 4.583 | 0.2205 |  |  |  |
| ARIMA | 0.577 | 0.943 | 0.1398 |  |  |  |
| ETS | 0.852 | 1.824 | 0.1731 |  |  |  |
| ETSARIMA | 0.667 | 1.276 | 0.1474 |  |  |  |
| Theta | 1.006 | 2.455 | 0.1814 |  |  |  |
| **M4 Competition Methods** | | | | | | |
| MM | 0.4839 | 0.8190 | 0.1151 |  |  |  |
| Doornik | 0.4096 | 0.8010 | 0.0891 |  |  |  |
| Smyl | 0.4401 | 0.8930 | 0.0933 |  |  |  |
| **RNN Methods** | | | | | | |
| DeepAR | 0.6280 | 1.4217 | 0.1237 | 100 | 50 | 386.5 |
| DeepAR | 0.5887 | 1.3338 | 0.1141 | 200 | 100 | 1545.9 |
| DeepAR |  |  |  | 500 | 100 | 3864.7 |
| DeepState | 0.6349 | 1.2506 | 0.1373 | 100 | 50 | 386.5 |
| DF-RNN | 3.8124 | 13.7530 | 0.3461 | 100 | 50 | 386.5 |
| MQ-RNN | 4.5135 | 15.8835 | 0.4652 | 200 | 100 | 1545.9 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**Data: m4\_daily, freq:D, N=4227**

**Data: m4\_weekly, freq:W, N=359**

**Data:** **m4\_monthly, freq: M, N=48,000**

**Data:** **m4\_quarterly, freq: Q, N=24,000**

**Data:** **m4\_yearly, freq: Y, N=23,000**