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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **LSTM** | | | **BIDIRECTIONAL LSTM** | | **GRU** | | | **BIDIRECTIONAL GRU** | |
| **MAE** | | **RMSE** | **MAE** | **RMSE** | **MAE** | | **RMSE** | **MAE** | **RMSE** |
| P1P2 | ASM | S1 | 1.5248 | 1.8857 | | 0.9827 | 1.0921 | 1.3183 | | 1.5815 | 0.5037 | 0.6049 |
| S2 | 1.5066 | 1.8791 | | 0.6147 | 0.7078 | 1.3028 | | 1.5351 | 0.6147 | 0.7078 |
| S3 | 1.4998 | 1.8737 | | 0.8032 | 0.8869 | 1.2814 | | 1.5220 | 0.5327 | 0.6387 |
| S4 | 1.1723 | 1.7175 | | 0.9344 | 1.0252 | 1.3369 | | 1.6097 | 0.5044 | 0.6057 |
| MMH | S1 | 1.7859 | 2.3726 | | 1.6588 | 2.2964 | 1.7361 | 2.3361 | | 1.7714 | 2.3365 |
| S2 | 1.7656 | 2.3535 | | 1.6922 | 2.3113 | 1.7206 | 2.3234 | | 1.6768 | 2.2978 |
| S3 | 1.6488 | 2.2916 | | 1.6680 | 2.2987 | 1.7116 | 2.3238 | | 1.6826 | 2.2964 |
| S4 | 1.7816 | 2.3694 | | 1.6538 | 2.2941 | 1.7199 | 2.3278 | | 1.6531 | 2.2946 |
| P1P3 | ASM | S1 | 2.8369 | 3.2469 | | 2.9199 | 3.2493 | 2.7513 | | 3.1384 | 3.2009 | 3.4476 |
| S2 | 2.8068 | 3.1622 | | 2.8257 | 3.2053 | 2.6573 | | 3.1133 | 3.1063 | 3.3826 |
| S3 | 2.6017 | 3.0601 | | 2.9466 | 3.2651 | 2.7544 | | 3.1328 | 3.2552 | 3.4902 |
| S4 | 2.3068 | 3.1626 | | 2.7577 | 3.1876 | 2.6350 | | 3.1159 | 3.1944 | 3.4553 |
| MMH | S1 | 3.0358 | 3.8396 | | 3.0201 | 3.8226 | 3.0505 | 3.8396 | | 3.0358 | 3.8693 |
| S2 | 1.7656 | 2.3535 | | 1.6922 | 2.3113 | 1.7206 | 2.3234 | | 1.6768 | 2.2978 |
| S3 | 1.6488 | 2.2916 | | 1.6680 | 2.2987 | 1.7116 | 2.3238 | | 1.6826 | 2.2964 |
| S4 | 1.7816 | 2.3694 | | 1.6538 | 2.2941 | 1.7199 | 2.3278 | | 1.6531 | 2.2946 |
| P1P4 | ASM | S1 | 1.8354 | 2.2158 | | 1.2184 | 1.4069 | 1.9169 | | 2.3159 | 0.9850 | 1.1527 |
| S2 | 1.9347 | 2.3341 | | 1.2834 | 1.4748 | 1.7014 | | 2.0009 | 0.9372 | 1.0999 |
| S3 | 1.8914 | 2.2889 | | 1.1012 | 1.2976 | 1.6771 | | 1.9727 | 0.9429 | 1.1045 |
| S4 | 1.8611 | 2.2393 | | 1.2016 | 1.3965 | 1.6963 | | 1.9969 | 0.9805 | 1.1440 |
| MMH | S1 | 3.0780 | 3.5317 | | 3.2833 | 3.6399 | 3.1852 | 3.5950 | | 3.2074 | 3.6182 |
| S2 | 3.0862 | 3.5397 | | 3.2228 | 3.5992 | 3.1981 | 3.5978 | | 3.3494 | 3.7218 |
| S3 | 3.0857 | 3.5376 | | 3.2729 | 3.6287 | 3.2035 | 3.6035 | | 3.1961 | 3.6065 |
| S4 | 3.0705 | 3.5247 | | 3.1922 | 3.5819 | 3.1884 | 3.5917 | | 3.3591 | 3.7253 |
| P1P5 | ASM | S1 | 1.8467 | 2.2030 | | 2.2595 | 2.4096 | 1.8469 | | 2.1858 | 2.6136 | 2.6960 |
| S2 | 1.8516 | 2.2162 | | 2.2264 | 2.3859 | 1.8422 | | 2.1851 | 2.6558 | 2.7328 |
| S3 | 1.8135 | 2.1857 | | 2.3270 | 2.4597 | 1.8372 | | 2.1832 | 2.5212 | 2.6158 |
| S4 | 1.8530 | 2.2101 | | 2.2297 | 2.3881 | 1.8501 | | 2.1863 | 2.5672 | 2.6600 |
| MMH | S1 | 4.0069 | 4.3435 | | 4.3230 | 4.5908 | 4.3060 | 4.5910 | | 4.4530 | 4.7470 |
| S2 | 4.3615 | 4.6308 | | 4.3562 | 4.6198 | 4.3250 | 4.6042 | | 4.4173 | 4.7052 |
| S3 | 4.2289 | 4.5238 | | 4.4203 | 4.6694 | 4.2861 | 4.5709 | | 4.2409 | 4.5438 |
| S4 | 4.1477 | 4.4532 | | 4.3138 | 4.5833 | 4.3238 | 4.6063 | | 4.4804 | 4.7666 |
| P1P6 | ASM | S1 | 4.3938 | 4.4746 | | 3.6216 | 3.7677 | 4.2026 | 4.2746 | | 3.1551 | 3.3302 |
| S2 | 4.3794 | 4.4590 | | 3.7825 | 3.8797 | 4.2053 | 4.2757 | | 3.2823 | 3.4360 |
| S3 | 4.3358 | 4.4121 | | 3.5556 | 3.7235 | 4.1818 | 4.2535 | | 3.3634 | 3.5032 |
| S4 | 4.4221 | 4.5060 | | 3.8287 | 3.9166 | 4.1814 | 4.2481 | | 3.4017 | 3.5345 |
| MMH | S1 | 1.7508 | 1.9878 | | 1.6519 | 1.8748 | 1.6512 | 1.8744 | | 1.6584 | 1.8749 |
| S2 | 1.7240 | 1.9683 | | 1.6332 | 1.8505 | 1.6433 | 1.8639 | | 1.7014 | 1.9347 |
| S3 | 1.7249 | 1.9709 | | 1.6154 | 1.8298 | 1.6560 | 1.8776 | | 1.6403 | 1.8602 |
| S4 | 1.7700 | 2.0283 | | 1.6295 | 1.8455 | 1.6575 | 1.8805 | | 1.6710 | 1.8918 |
| P1P7 | ASM | S1 | 2.3656 | 2.7211 | | 1.6975 | 1.8319 | 2.2273 | 2.4900 | | 1.3638 | 1.5387 |
| S2 | 2.3317 | 2.6510 | | 1.6855 | 1.8210 | 2.1969 | 2.4480 | | 1.3656 | 1.5407 |
| S3 | 2.3310 | 2.6482 | | 1.7241 | 1.8610 | 2.2063 | 2.4608 | | 1.3295 | 1.5145 |
| S4 | 2.2990 | 2.6104 | | 1.9175 | 2.0828 | 2.3227 | 2.6390 | | 1.3894 | 1.5574 |
| MMH | S1 | 2.0077 | 2.2250 | | 1.9246 | 2.1416 | 1.9879 | 2.1978 | | 1.9606 | 2.1849 |
| S2 | 2.0048 | 2.2171 | | 1.9024 | 2.1244 | 1.9613 | 2.1738 | | 1.9843 | 2.1974 |
| S3 | 2.0025 | 2.2166 | | 1.9118 | 2.1322 | 1.9624 | 2.1746 | | 1.9682 | 2.1908 |
|  |  | S4 | 2.0123 | 2.2229 | | 1.9911 | 2.2031 | 1.9574 | 2.1698 | | 1.9663 | 2.1910 |
| P1P8 | ASM | S1 | 2.4282 | 3.0107 | | 1.7320 | 2.0999 | 2.2913 | 2.8163 | | 1.3965 | 1.6106 |
| S2 | 2.4662 | 3.0706 | | 1.7074 | 2.0722 | 2.5278 | 3.1591 | | 1.4237 | 1.6444 |
| S3 | 2.4262 | 3.0104 | | 1.7639 | 2.1292 | 2.3792 | 2.9401 | | 1.3661 | 1.5721 |
| S4 | 2.3102 | 2.8408 | | 1.7170 | 2.0810 | 2.3027 | 2.8338 | | 1.3344 | 1.5336 |
| MMH | S1 | 4.9971 | 5.2479 | | 5.2624 | 5.4555 | 5.1386 | 5.3595 | | 5.2917 | 5.5067 |
| S2 | 5.0361 | 5.2812 | | 5.1877 | 5.3914 | 5.1472 | 5.3606 | | 5.2930 | 5.5060 |
| S3 | 5.0243 | 5.2717 | | 5.1953 | 5.4072 | 5.1446 | 5.3657 | | 5.5438 | 5.7353 |
| S4 | 5.0413 | 5.2855 | | 5.2028 | 5.4028 | 5.1380 | 5.3594 | | 5.3766 | 5.5918 |