|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 4.7: Configuration Matrix Using UCI Test datasets with c0 Configuration** | | | | | | | | |
|  | | **Predicted Class** | | | | | |  |
| **W** | **WU** | **WD** | **Si** | **St** | **L** | **Recall** |
| **Actual Class** | **Walking** | 492 | 2 | 2 | 0 | 0 | 0 | 99.19% |
| **W. Upstair** | 37 | 416 | 18 | 0 | 0 | 0 | 88.32% |
| **W. Downstair** | 1 | 3 | 416 | 0 | 0 | 0 | 99.05% |
| **Sitting** | 0 | 25 | 0 | 413 | 53 | 0 | 84.11% |
| **Standing** | 0 | 1 | 0 | 109 | 422 | 0 | 79.32% |
| **Laying** | 0 | 27 | 0 | 0 | 0 | 510 | 94.97% |
|  | **Precision** | 92.83% | 87.76% | 95.41% | 79.12% | 88.84% | 100% | **90.57%** |

The table 2 and table 3 show the confusion matrix for UCI and WISDM dataset. Static postures such as standing and sitting are the two most easily confused activity class in the UCI dataset. This can be attribute to both activity classes are relatively similar. However, it has less difficulty in differentiating dynamic postures such as walking, walking upstairs and walking downstairs. For WISDM dataset, however, a different scenario can be observed, the model has a hard time differentiating dynamic postures such as walking downstairs and upstairs, albeit it can recognize static postures with ease.

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 4.8: Result Comparison using UCI test dataset** | | | |
| **Model** | **Authors** | **Architecture** | **Accuracy** |
| CNN | (Ronao & Cho, 2016) | C(96)-MAX-C(96)-MAX-C(96)-MAX-DL(1000)-DL(6) | 89.41% |
| CNN | (Lee, S. M., Cho, H., & Yoon, 2017) | C(128)-MAX-C(128)-MAX-DL(384)-DL(6) | 89.24% |
| LSTM | (Chen, Zhong, Zhang, Sun, & Zhao, 2016) | L(100)-L(100)-DL(128)-DL(6) | 89.79% |
| Bidir-LSTM | (Yu & Qin, 2018) | B(L(28))-B(L(28)-B(L(28))-DL(128)-DL(6) | 89.07% |
| Bidir-LSTM | (Hernández, Suárez, Villamizar, & Altuve, 2019) | B(L(175))-B(L(175)-B(L(175))-DL(128) | 87.41% |
| CNN4-MAX4-BidirLSTM | - | C(32)-MAX-C(32)-MAX-C(32)-MAX-C(32)-MAX-B(L(128))-DL(128)-DL(6) | **90.57%** |

|  |
| --- |
| **Table 4.10: Configuration Matrix using the WISDM test dataset with c9 Configuration** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Predicted label** | | | | | |  |
| **Down** | **J** | **Si** | **St** | **Up** | **W** | **Recall** |
| **Actual Label** | **Downstair** | 456 | 9 | 0 | 0 | 136 | 49 | 70.15% |
| **Jogging** | 18 | 1902 | 0 | 0 | 22 | 48 | 95.58% |
| **Sitting** | 0 | 0 | 412 | 0 | 1 | 39 | 91.15% |
| **Standing** | 0 | 0 | 41 | 328 | 1 | 0 | 88.89% |
| **Upstairs** | 73 | 20 | 2 | 0 | 592 | 38 | 81.66% |
| **Walking** | 38 | 231 | 1 | 0 | 48 | 2079 | 86.73% |
|  | **Precision** | 77.95% | 87.97% | 90.35% | 100% | 74.00% | 92.28% | **87.62%** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 4.11: Result Comparison using the WISDM dataset** | | | |
| **Model** | **Authors** | **Architecture** | **Accuracy** |
| CNN | (Ronao & Cho, 2016) | C(96)-MAX-C(96)-MAX-C(96)-MAX-DL(1000)-DL(6) | 74.79% |
| CNN | (Lee, S. M., Cho, H., & Yoon, 2017) | C(128)-MAX-C(128)-MAX-DL(384)-DL(6) | 85.98% |
| LSTM | (Chen, Zhong, Zhang, Sun, & Zhao, 2016) | L(100)-L(100)-DL(80)-DL(6) | 79.62% |
| Bidir-LSTM | (Yu & Qin, 2018) | B(L(28))-B(L(28)-B(L(28))-DL(80)-DL(6) | 72.98% |
| Bidir-LSTM | (Hernández, Suárez, Villamizar, & Altuve, 2019) | B(L(175))-B(L(175)-B(L(175))-DL(80)-DL(6) | 82.09% |
| CNN-Bidir-LSTM\* | - | C(220)-MAX-C(220)-MAX-C(220)-MAX-C(220)-MAX-B(L(80))-DL(80)-DL(6) | **87.62**% |