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| **Panel 1 - Average SNR values for individual EEG datasets**  |
| **Artifact** | **Electrode type** | **N. of ICs per dataset** | **Datasets used for the testing of the best SVM** |
| **EyeBlinkS - SVM-6** | **WET** |  | dataset-1 | dataset-2 | dataset-8 | dataset-9 | dataset-10 | dataset-11 |
|  | channel: R1 | channel: L1 | channel: Z1 | channel: L1 | channel: R1 | channel: R1 |
|  | pre | post | pre | post | pre | post | pre | post | pre | post | pre | post |
| 20 | 23.7±2.9 | 4.9±3.0 | 25.3±1.6 | 6.4±4.8 | 21.8±2.3 | 4.8±2.9 | 23.9±2.8 | 3.4±3.0 | 24.4±5.7 | 6.5±2.1 | 20.2±3.0 | 4.5±2.6 |
| 50 | 5.2±2.9 | 6.3±4.7 | 4.9±2.7 | 3.8±2.8 | 6.6±2.1 | 5.1±2.8 |
| 80 | 4.9±2.5 | 6.6±4.6 | 4.7±2.6 | 3.8±2.6 | 6.2±2.3 | 5.3±2.9 |
| **DRY** |  | dataset-1 | dataset-4 | dataset-5 | dataset-6 | dataset-7 | dataset-8 |
|  | channel: L1 | channel: L1 | channel: LD1 | channel: L1 | channel: LD1 | channel: L1 |
|  | pre | post | pre | post | pre | post | pre | post | pre | post | pre | post |
| 20 | 24.0±1.7 | 7.4±2.4 | 22.2±2.5 | 3.5±2.2 | 18.1±2.1 | 3.3±1.9 | 11.0±1.2 | 1.4±1.0 | 18.8±5.1 | 2.9±2.7 | 22.9±1.2 | 3.0±1.4 |
| 50 | 8.8±3.0 | 3.9±2.0 | 3.5±2.1 | 1.8±1.1 | 3.7±2.9 | 3.3±2.0 |
| 80 | 8.7±2.9 | 4.4±2.0 | 3.9±2.2 | 1.7±1.1 | 5.2±2.8 | 3.4±2.0 |
| **Eye MovementS - SVM-2** | **WET** |  | dataset-3 | dataset-4 | dataset-8 | dataset-10 |  |  |
|  | channel: LE1 | channel: LE1 | channel: LD2 | channel: LE1 |  |  |
|  | pre | post | pre | post | pre | post | pre | post |  |  |  |  |
| 20 | 15.0±3.3 | 3.4±2.9 | 12.9±1.9 | 3.1±2.3 | 15.1±2.8 | 3.9±2.8 | 13.8±2.5 | 1.6±1.8 |  |  |  |  |
| 50 | 4.7±3.2 | 3.2±1.9 | 5.3±2.6 | 3.5±1.7 |  |  |  |  |
| 80 | 4.3±2.8 | 4.8±2.4 | 4.2±2.2 | 3.1±2.0 |  |  |  |  |
| **DRY** |  | dataset-2 | dataset-3 | dataset-6 | dataset-9 |  |  |
|  | channel: RD2 | channel: LD2 | channel: LD2 | channel: LE1 |  |  |
|  | pre | post | pre | post | pre | post | pre | post |  |  |  |  |
| 20 | 8.2±2.1 | 3.5±2.4 | 10.9±2.2 | 3.8±2.0 | 12.3±3.2 | 2.0±2.4 | 13.3±3.5 | 2.9±3.6 |  |  |  |  |
| 50 | 4.2±2.2 | 4.3±3.4 | 2.7±1.8 | 3.8±2.5 |  |  |  |  |
| 80 | 4.6±1.5 | 3.7±2.5 | 3.1±2.4 | 3.6±2.1 |  |  |  |  |
| **myogenic artifacts - SVM-8** | **WET** |  | dataset-1 | dataset-3 | dataset-6 | dataset-8 | dataset-9 |  |
|  | channel: RD2 | channel: RC2 | channel: RC4 | channel: RA1 | channel: RE1 |  |
|  | pre | post | pre | post | pre | post | pre | post | pre | post |  |  |
| 20 | 29.1±4.1 | 12.1±3.5 | 33.1±1.0 | 19.3±2.8 | 13.4±4.6 | 4.9±2.4 | 27.9±2.3 | 13.5±2.3 | 33.7±2.8 | 23.3±2.8 |  |  |
| 50 | 6.2±2.8 | 16.6±3.7 | 5.8±2.6 | 11.5±2.8 | 13.2±3.3 |  |  |
| 80 | 10.2±1.4 | 14.9±2.2 | 4.6±2.1 | 11.9±1.9 | 10.4±2.9 |  |  |
| **DRY** |  | dataset-1 | dataset-2 | dataset-6 | dataset-7 | dataset-9 |  |
|  | channel: RB1 | channel: LD1 | channel: RC4 | channel: LB1 | channel: RC2 |  |
|  | pre | post | pre | post | pre | post | pre | post | pre | post |  |  |
| 20 | 21.7±3.3 | 17.5±3.2 | 26.2±2.2 | 13.4±2.5 | 22.5±5.2 | 12.8±3.5 | 15.3±4.0 | 6.6±2.5 | 13.5±4.2 | 6.1±3.5 |  |  |
| 50 | 18.6±3.4 | 8.5±2.3 | 7.2±1.7 | 5.1±2.5 | 5.0±2.2 |  |  |
| 80 | 17.8±2.6 | 8.7±2.2 | 5.9±1.6 | 6.1±2.3 | 5.5±3.0 |  |  |
| **cardiac interference -SVM-7** | **WET** |  | dataset-2 | dataset-6 | dataset-7 | dataset-8 | dataset-10 |  |
|  | channel: L13 | channel: Z14 | channel: LE4 | channel: LE4 | channel: LE4 |  |
|  | pre | post | pre | post | pre | post | pre | post | pre | post |  |  |
| 20 |  |  | 4.4±3.2 | 2.7±3.2 |  |  |  |  |  |  |  |  |
| 50 | 3.1±3.0 | 2.6±3.4 | 2.3±2.8 |  |  |  |  | 5.9±1.9 | 2.6±2.5 |  |  |
| 80 | 2.5±3.2 |  |  | 7.6±5.0 | 3.0±3.3 | 6.2±2.4 | 3.0±2.9 | 1.8±2.5 |  |  |
| **DRY** |  | dataset-2 | dataset-5 | dataset-6 | dataset-8 | dataset-9 |  |
|  | channel: | channel: | channel: LL9 | channel: R4 | channel: LB3 |  |
|  | pre | post | pre | post | pre | post | pre | post | pre | post |  |  |
| 20 |  |  |  |  | 2.6±2.4 | 1.1±2.7 |  |  | 2.6±2.0 | 2.3±1.9 |  |  |
| 50 |  |  |  |  | 1.3±2.9 |  |  |  |  |  |  |
| 80 |  |  |  |  | 1.4±2.5 | 6.6±4.5 | 5.4±4.3 |  |  |  |  |
| **Panel 2 - Average SNR values of EEG signals before and after artifact removal**  |
| **Artifact type** | **EEG type**  | **SNR in filtered EEG (dB)** | **SNR in artifact-free EEG (dB)** | **Relative SNR reduction (%)** |
| **20 ICs** | **50 ICs** | **80 ICs** | **20 ICs** | **50 ICs** | **80 ICs** |
| Eyeblink | WET | 23.2 ± 1.9 | 5.1 ± 1.2 | 5.3 ± 1.0 | 5.3 ± 1.0 | 78.2 ± 4.4 | 77.1 ± 3.9 | 77.3 ± 4.0 |
| DRY | 19.5 ± 4.8 | 3.6 ± 2.0 | 4.1 ± 2.4 | 4.5 ± 2.3 | 82.4 ± 6.7 | 79.5 ± 8.2 | 77.5 ± 8.1 |
| Eye Movem. | WET | 14.2 ± 2.4 | 3.0 ± 1.1 | 4.2 ± 1.0 | 4.1 ± 1.1 | 78.7 ± 6.3 | 70.3 ± 5.9 | 70.9 ± 5.8 |
| DRY | 11.1 ± 2.4 | 3.1 ± 1.0 | 3.7 ± 0.8 | 3.7 ± 0.7 | 70.8 ± 13.4 | 64.6 ± 12.4 | 64.3 ± 13.8 |
| Myogenic artifact | WET | 27.4 ± 8.2 | 14.6 ± 7.0 | 10.7 ± 4.7 | 10.4 ± 3.7 | 49.1 ± 13.0 | 61.0 ± 10.7 | 62.3± 6.0 |
| DRY | 19.8 ± 5.3 | 11.3 ± 4.9 | 8.9 ± 5.6 | 8.8 ± 5.2 | 44.5 ± 15.3 | 55.7 ± 23.3 | 55.5 ± 21.8 |
| Cardiac interfer. | WET | 5.5 ± 1.8 | 4.4 | 2.5 ± 0.2 | 2.6 ± 0.6 | 37.7 | 40.6 ± 20.7 | 50.3± 21.6 |
| DRY | 3.9 ± 2.3 | 1.7 ± 0.8 | 1.3 | 3.4 ± 2.8 | 35.4 ± 29.8 | 49.1 | 33.2 ± 20.8 |