

| Model Performance for SNR 6 dB |   |        | # Features | Block length (s) | Logistic regression | Fine tree | Medium tree | Coarse tree | Boosted trees ensemble | Bagged trees ensemble | Linear SVM | Quadratic SVM | Cubic SVM | Fine Gaussian SVM | Medium Gaussian SVM | Coarse Gaussian SVM | Subspace KNN | Neural Net | CNN   | LSTM NN |
|--------------------------------|---|--------|------------|------------------|---------------------|-----------|-------------|-------------|------------------------|-----------------------|------------|---------------|-----------|-------------------|---------------------|---------------------|--------------|------------|-------|---------|
|                                | Cepstral                                | 13     | 1          |                  | 75.8%               | 83.1%     | 81.1%       | 75.6%       | 85.0%                  | 86.8%                 | 77.2%      | 87.3%         | 89.1%     | 85.7%             | 88.0%               | 80.4%               |              |            |       |         |
|                                | Cepstral                                | 13     | 2          |                  | 78.3%               | 85.2%     | 82.5%       | 76.3%       | 86.3%                  | 88.2%                 | 79.0%      | 89.5%         | 91.9%     | 88.6%             | 89.3%               | 80.5%               |              | 86.7%      |       |         |
|                                | Cepstral                                | 26     | 1          |                  | 78.0%               | 81.8%     | 78.9%       | 75.6%       | 85.0%                  | 85.5%                 | 79.0%      | 88.8%         | 89.7%     | 76.3%             | 88.1%               | 79.7%               |              |            |       |         |
|                                | Cepstral                                | 26     | 2          |                  | 80.2%               | 85.2%     | 81.4%       | 74.3%       | 85.9%                  | 88.3%                 | 80.4%      | 90.7%         | 92.8%     | 80.9%             | 90.3%               | 79.7%               |              | 92.5%      |       | 61.8%   |
|                                | 1/3 Octaves                             | 29     | 1          |                  | 70.7%               | 83.7%     | 80.2%       | 75.3%       | 85.1%                  | 89.0%                 | 70.3%      | 77.5%         | 81.2%     | 71.9%             | 75.4%               | 70.1%               |              |            |       |         |
|                                | 1/3 Octaves                             | 29     | 2          |                  | 72.8%               | 87.5%     | 82.8%       | 77.3%       | 87.5%                  | 91.9%                 | 71.7%      | 79.7%         | 83.8%     | 76.6%             | 76.5%               | 71.5%               |              | 71.5%      |       |         |
|                                | Octaves                                 | 10     | 1          |                  | 67.3%               | 82.0%     | 79.4%       | 72.7%       | 82.2%                  | 86.3%                 | 66.6%      | 76.4%         | 80.0%     | 78.0%             | 75.6%               | 66.8%               |              |            |       |         |
|                                | Octaves                                 | 10     | 2          |                  | 67.8%               | 84.7%     | 80.6%       | 73.7%       | 84.2%                  | 89.0%                 | 66.5%      | 77.0%         | 81.2%     | 81.1%             | 76.8%               | 66.9%               |              | 77.4%      |       |         |
|                                | MFCC                                    | 13     | 2          |                  | 76.3%               | 82.0%     | 78.2%       | 72.1%       | 83.5%                  | 85.3%                 | 76.8%      | 85.2%         | 87.4%     | 83.8%             | 87.0%               | 77.0%               |              |            |       |         |
|                                | MFCC                                    | 13     | 1          |                  | 74.1%               | 80.4%     | 78.9%       | 68.8%       | 81.6%                  | 82.9%                 | 75.3%      | 83.0%         | 84.6%     | 80.5%             | 84.8%               | 76.4%               |              | 77.5%      |       |         |
|                                | FFT (25 Hz resolution)                  | 799    | 0.041      |                  | 61.3%               | 78.4%     | 75.8%       | 70.0%       |                        |                       |            |               |           |                   |                     |                     |              |            |       |         |
|                                | FFT (100 Hz resolution)                 | 200    | 0.01       |                  | 68.3%               | 76.8%     | 74.0%       | 69.6%       |                        |                       |            |               |           |                   |                     |                     |              |            |       |         |
|                                | CWT Scalogram                           | 150528 | 1          |                  |                     |           |             |             |                        |                       |            |               |           |                   |                     |                     |              |            | 92.9% |         |
|                                | CWT Scalogram                           | 150528 | 3          |                  |                     |           |             |             |                        |                       |            |               |           |                   |                     |                     |              |            | 85.1% |         |
|                                | CWT Scalogram                           | 150528 | 5          |                  |                     |           |             |             |                        |                       |            |               |           |                   |                     |                     |              |            | 83.3% |         |
|                                | CWT Scalogram Bag of Features           | 500    | 1          |                  | 81.0%               | 75.5%     | 74.2%       | 73.3%       | 82.1%                  | 82.0%                 | 83.1%      | 86.4%         | 87.1%     | 60.5%             | 86.1%               | 79.9%               |              |            |       |         |
|                                | CWT Scalogram Bag of Features           | 500    | 3          |                  | 80.7%               | 73.2%     | 73.7%       | 75.3%       | 84.8%                  | 82.7%                 | 86.7%      | 87.7%         | 88.6%     | 59.1%             | 87.9%               | 81.6%               |              |            |       |         |
|                                | CWT Scalogram Bag of Features           | 500    | 5          |                  | 55.0%               | 73.0%     | 74.1%       | 70.6%       | 82.3%                  | 81.7%                 | 88.0%      | 89.4%         | 90.9%     | 60.2%             | 87.7%               | 81.6%               |              |            |       |         |
|                                | DWT (Coiflet2, 4 levels)                | 29     | 1          |                  | 70.0%               | 90.4%     | 88.3%       | 78.1%       | 91.2%                  | 93.1%                 | 80.1%      | 86.2%         | 88.6%     | 84.8%             | 82.3%               | 76.0%               |              | 81.5%      |       | 76.4%   |
|                                | DWT (Coiflet2, 4 levels)                | 29     | 2          |                  | 75.4%               | 91.6%     | 88.1%       | 80.1%       | 91.0%                  | 93.3%                 | 80.5%      | 87.3%         | 90.5%     | 85.8%             | 82.4%               | 77.6%               |              | 81.5%      |       | 78.2%   |
|                                | DWT (Coiflet2, 5 levels)                | 49     | 2          |                  | 81.5%               | 91.7%     | 89.1%       | 79.3%       | 92.3%                  | 94.2%                 | 82.1%      | 88.0%         | 90.6%     | 87.2%             | 83.5%               | 78.8%               |              | 82.3%      |       |         |
|                                | DWT (Coiflet2, 5 levels, Hampel Filter) | 49     | 2          |                  | 81.0%               | 91.7%     | 88.7%       | 79.3%       | 92.1%                  | 94.0%                 | 82.0%      | 88.9%         | 91.5%     | 87.6%             | 83.8%               | 76.8%               | 76.5%        | 84.9%      |       |         |
|                                | DWT (Coiflet2, 4 levels, Hampel Filter) | 29     | 2          |                  | 70.1%               | 92.1%     | 88.6%       | 80.0%       | 91.1%                  | 93.5%                 | 80.7%      | 87.9%         | 90.8%     | 86.3%             | 82.7%               | 77.8%               |              | 83.1%      |       |         |
|                                | DWT (Coiflet2, 3 levels, Hampel Filter) | 17     | 2          |                  | 67.1%               | 89.7%     | 87.5%       | 78.1%       | 89.6%                  | 92.9%                 | 79.0%      | 84.4%         | 52.0%     | 85.9%             | 81.1%               | 76.5%               | 81.3%        | 81.4%      |       |         |
|                                | DWT (Debauchies4, 4 levels)             | 29     | 1          |                  | 64.4%               | 90.1%     | 86.0%       | 81.1%       | 88.9%                  | 91.6%                 | 77.2%      | 80.6%         | 51.4%     | 81.5%             | 77.6%               | 66.1%               |              | 71.1%      |       |         |
|                                | DWT (Haar, 4 levels)                    | 29     | 1          |                  | 53.8%               | 77.0%     | 73.1%       | 68.7%       | 76.4%                  | 80.5%                 | 71.5%      | 76.4%         | 58.7%     | 76.1%             | 73.9%               | 70.4%               | 67.1%        |            |       |         |
|                                | DWT (Coiflet2, 4 levels, no entropy)    | 25     | 2          |                  | 71.6%               | 90.6%     | 85.7%       | 81.6%       | 88.3%                  | 92.1%                 | 79.2%      | 57.1%         | 49.9%     | 76.3%             | 67.9%               | 61.0%               | 54.1%        |            |       |         |
|                                | DWT (Coiflet2, 2 levels)                | 7      | 2          |                  | 70.1%               | 89.0%     | 84.6%       | 78.9%       | 88.2%                  | 92.3%                 | 68.8%      | 71.8%         | 53.9%     | 77.7%             | 74.0%               | 61.5%               | 73.7%        |            |       |         |