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| Sl. No. | Feature | Formula | Description |
| 1 | RR\_mean |  | The mean of the RR interval sequence |
| 2 | RR\_std |  | The standard deviation of the RR interval sequence |
| 3 | HR\_mean |  | The mean heart rate |
| 4 | HR\_std |  | The standard deviation of the heart rate |
| 5 | RR\_rms |  | The RMS of the RR interval series |
| 6 | RR\_50 | – | Number of RR intervals that are larger than 50ms |
| 7 | RR\_r50 |  | Normalized number of RR intervals that are larger than 50ms |

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| Sl. No. | Feature | Description |
| 1 | SD1 | Standard deviation of Poincare plot along x = y line |
| 2 | SD2 | Standard deviation of Poincare plot along x = -y line |
| 3 | ApEn | Approximate entropy of RR interval sequence [Add Ref] |

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| Sl. No. | Feature | Formula | Description |
| 1 | pk\_freq\_vlf | – | Frequency at which the peak of PSD is seen for the VLF, LF and HF frequency bands |
| 2 | pk\_freq\_lf |
| 3 | pk\_freq\_hf |
| 4 | ab\_pow\_vlf | – | Absolute power of the VLF, LF and HF frequency bands |
| 5 | ab\_pow\_lf |
| 6 | ab\_pow\_hf |
| 7 | pw\_ttl | – | Total power contained in the signal |
| 8 | rp\_vlf |  | Ratio of the power in a particular band to the total power in the signal |
| 9 | rp\_lf |
| 10 | rp\_hf |
| 11 | norm\_lf |  | Ratio of power in a particular band to the power of the signal without considering contribution of power due to VLF band |
| 12 | norm\_hf |
| 13 | ratio |  | Ratio of the absolute power in the LF band to the absolute power of the HF band |

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| Sl. No. | Feature Type | Feature | Formula | Description |
| 1 | Time | RR\_mean |  | The mean of the RR interval sequence |
| 2 | Time | RR\_std |  | The standard deviation of the RR interval sequence |
| 3 | Time | HR\_mean |  | The mean heart rate |
| 4 | Time | HR\_std |  | The standard deviation of the heart rate |
| 5 | Time | RR\_rms |  | The RMS of the RR interval series |
| 6 | Time | RR\_50 | – | Number of RR intervals that are larger than 50ms |
| 7 | Time | RR\_r50 |  | Normalized number of RR intervals that are larger than 50ms |
| 8 | Non-Linear | SD1 | – | Standard deviation of Poincare plot along x = y line |
| 9 | Non-Linear | SD2 | – | Standard deviation of Poincare plot along x = -y line |
| 10 | Non-Linear | ApEn | – | Approximate entropy of RR interval sequence [Add Ref] |
| 11 | Frequency | pk\_freq\_vlf | – | Frequency at which the peak of PSD is seen for the VLF, LF and HF frequency bands |
| 12 | Frequency | pk\_freq\_lf |
| 13 | Frequency | pk\_freq\_hf |
| 14 | Frequency | ab\_pow\_vlf | – | Absolute power of the VLF, LF and HF frequency bands |
| 15 | Frequency | ab\_pow\_lf |
| 16 | Frequency | ab\_pow\_hf |
| 17 | Frequency | pw\_ttl | – | Total power contained in the signal |
| 18 | Frequency | rp\_vlf |  | Ratio of the power in a particular band to the total power in the signal |
| 19 | Frequency | rp\_lf |
| 20 | Frequency | rp\_hf |
| 21 | Frequency | norm\_lf |  | Ratio of power in a particular band to the power of the signal without considering contribution of power due to VLF band |
| 22 | Frequency | norm\_hf |
| 23 | Frequency | ratio | – | Ratio of the absolute power in the LF band to the absolute power of the HF band |

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| **C** | **0.01** | **0.03** | **0.1** | **0.3** | **1** | **3** | **10** | **30** | **Total Iterations** |
| **0.01** | 0 | 2 | 1 | 12 | 170 | 6 | 4 | 5 | **200** |
| **0.03** | 0 | 2 | 1 | 11 | 171 | 8 | 4 | 3 | **200** |
| **0.1** | 0 | 1 | 1 | 12 | 177 | 2 | 3 | 4 | **200** |
| **0.3** | 0 | 2 | 1 | 6 | **186** | 3 | 1 | 1 | **200** |
| **1** | 0 | 5 | 0 | 7 | 131 | 47 | 8 | 2 | **200** |
| **3** | 0 | 7 | 2 | 13 | 26 | 126 | 16 | 10 | **200** |
| **10** | 0 | 11 | 5 | 30 | 12 | 0 | 114 | 28 | **200** |
| **30** | 0 | 9 | 3 | 21 | 20 | 0 | 123 | 24 | **200** |

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| **Time Domain Features** | |
| 1 | The mean of the RR interval sequence |
| 2 | The standard deviation of the RR interval sequence |
| 3 | The mean heart rate |
| 4 | The standard deviation of the heart rate |
| 5 | The RMS of the RR interval series |
| 6 | Number of RR intervals that are larger than 50ms |
| 7 | Normalized number of RR intervals that are larger than 50ms |

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| **Non-Linear Features** | |
| 1 | – standard deviation of Poincare plot along x = y line |
| 2 | – standard deviation of Poincare plot along x = – y line |
| 3 | – Approximate entropy of RR interval sequence [Add Ref] |

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| **Frequency Domain Features** | |
| 1 | Frequency at which the peak of PSD is seen for the VLF, LF and HF frequency bands |
| 2 |
| 3 |
| 4 | Absolute power of the VLF, LF and HF frequency bands |
| 5 |
| 6 |
| 7 | Total power contained in the signal |
| 8 | Ratio of the power in a particular band to the total power in the signal |
| 9 |
| 10 |
| 11 | Ratio of power in a particular band to the power of the signal without considering contribution of power due to VLF band |
| 12 |
| 13 | Ratio of the absolute power in the LF band to the absolute power of the HF band |

1. Comparative results of SVM and ELM with and without (five parameter) ARX features

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| --- | --- | --- |
| No. of Parameters in ARX Model used for Features | SVM | ELM |
| Without ARX model coefficients | 80% | 89%or90% |
| With 2 parameter ARX model coefficients | 80% | 91% or same as above? |
| With 3 parameter ARX model coefficients | 82% | 91% |
| With 4 parameter ARX model coefficients | 83% | 93% |
| With 5 parameter ARX model coefficients | 84% | 95% |
| With 6 parameter ARX model coefficients | 86% | 95% |
| With 7 parameter ARX model coefficients |  |  |

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| Classifiers | | Feature Set  without ARX  Model | Feature Set Including: | | | | | | |
| 2 Parameter ARX Model | 3 Parameter ARX Model | 4 Parameter ARX Model | 5 Parameter ARX Model | 6 Parameter ARX Model | 7 Parameter ARX Model | 8 Parameter ARX Model |
| SVM | 7-fold  Accuracy | 80% | 80% | 82% | 83% | 84% | 86% | 88% |  |
| Sensitivity |  | 96% | 96% | 93% | 96% | 96% | 93% |  |
| Specificity |  | 68% | 64% | 71% | 71% | 82% | 86% |  |
| ELM | 7-Fold  Accuracy | 90% | 91% | 91% | 93% | 95% | 95% | 95% |  |
| Sensitivity | 75% | 71% | 93% | 86% | 86% | 96% | 89% |  |
| Specificity | 93% | 86% | 100% | 93% | 89% | 89% | 93% |  |