Table 3. ML models hyper-parameters optimization.

<table>
<thead>
<tr>
<th>Category</th>
<th>Hyper-parameter</th>
<th>Search space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature selection</td>
<td>Number of variables</td>
<td>{150, 200, 250, 300, 350}</td>
</tr>
<tr>
<td>Feature extraction</td>
<td>Number of components</td>
<td>{150, 200, 250, 300, 350}</td>
</tr>
<tr>
<td>SMOTE</td>
<td>Resampling ratio</td>
<td>{1:1, 2:1, 3:1, 4:1}</td>
</tr>
<tr>
<td></td>
<td>K-neighbours</td>
<td>{3, 5, 7, 9}</td>
</tr>
<tr>
<td>LR</td>
<td>Regularization</td>
<td>{L1, L2}</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>log U(1 × 10^{-4}, 1 × 10^{3})</td>
</tr>
<tr>
<td></td>
<td>Maximum iterations</td>
<td>{1 × 10^{4}, 1 × 10^{5}, 1 × 10^{6}, 1 × 10^{7}}</td>
</tr>
<tr>
<td>SVM</td>
<td>Gamma</td>
<td>log U(1 × 10^{-4}, 1 × 10^{3})</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>log U(1 × 10^{-4}, 1 × 10^{3})</td>
</tr>
<tr>
<td></td>
<td>Maximum iterations</td>
<td>{1 × 10^{4}, 1 × 10^{5}, 1 × 10^{6}, 1 × 10^{7}}</td>
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<tr>
<td>NN</td>
<td>Number of hidden units</td>
<td>{25, 50, 75, 100}</td>
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<tr>
<td></td>
<td>L2 regularization</td>
<td>log U(1 × 10^{-6}, 1 × 10^{-1})</td>
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<tr>
<td></td>
<td>Learning rate</td>
<td>log U(5 × 10^{-5}, 1 × 10^{-1})</td>
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<tr>
<td></td>
<td>Batch size</td>
<td>{20, 50, 80, 110, 140, 170}</td>
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<tr>
<td>RF</td>
<td>Number of trees</td>
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<td></td>
<td>Maximum depth</td>
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<td></td>
<td>Minimum samples split</td>
<td>{0.05, 0.1, 0.15, 0.2, 0.3}</td>
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<tr>
<td></td>
<td>Minimum samples leaf</td>
<td>{0.03, 0.06, 0.1, 0.2}</td>
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</tbody>
</table>