Machine Learning model surpassing medical dispatchers recognition of Out-of-Hospital Cardiac Arrest

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Disclosure

I have no actual or potential conflict of interest in relation to this research project

• Received an unrestricted research grant from TrygFoundation

• Received centresupport from Laerdal
Why is machine learning relevant for Out-of-Hospital Cardiac Arrest?
Methods

• All calls 2014
• Retrospective study
• Deep learning neural network
• Predictive words
Machine learning surpassing dispatchers

- 161,650 incidents with call to and from 1-1-2
- 2,157 calls regarding OHCA
- 93.1% recognised by ML (95% CI: 91.9-94.1)
- 72.9% (95% CI: 70.0-75.6). Recognised by Dispatch
- 436 previously unrecognised OHCA recognised

<table>
<thead>
<tr>
<th>Status</th>
<th>Medical dispatchers</th>
<th>Machine learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognised cardiac arrests</td>
<td>1573</td>
<td>2009</td>
</tr>
<tr>
<td>Unrecognised cardiac arrests</td>
<td>584</td>
<td>148</td>
</tr>
<tr>
<td>OHCA in population</td>
<td>2157</td>
<td>2157</td>
</tr>
</tbody>
</table>
Time-to-recognition – every second counts

Chance of Survival from Cardiac Arrest

Minutes to Defibrillation

90% 80% 70% 60% 50% 40% 30% 20% 10%

1 2 3 4 5 6 7 8 9
Time-to-recognition

79 seconds
95% CI: 73-85
Time-to-recognition

Dispatchers
79 seconds
95% CI: 73-85

Machine
48 seconds
95% CI: 46-50

p<0.0001
Time-to-recognition

- **Dispatchers**: 79 seconds, 95% CI: 73-85
- **Machine**: 48 seconds, 95% CI: 46-50

31 seconds faster with p<0.0001
Conclusions

• Machine Learning can be used on audio data

• Machine Learning surpass dispatchers
  • Recognition 93% VS 73%
  • Time to recognition 48 seconds VS 79 seconds
Perspectives

• Can this work in clinical setting?
  • Does it work on live data stream
  • Can it be implemented in a daily clinical setting
  • Does it work as a Tool to support dispatchers
Thank you.

Corti

My supervisors

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