



# A Framework for securing edge computing in Medical Devices

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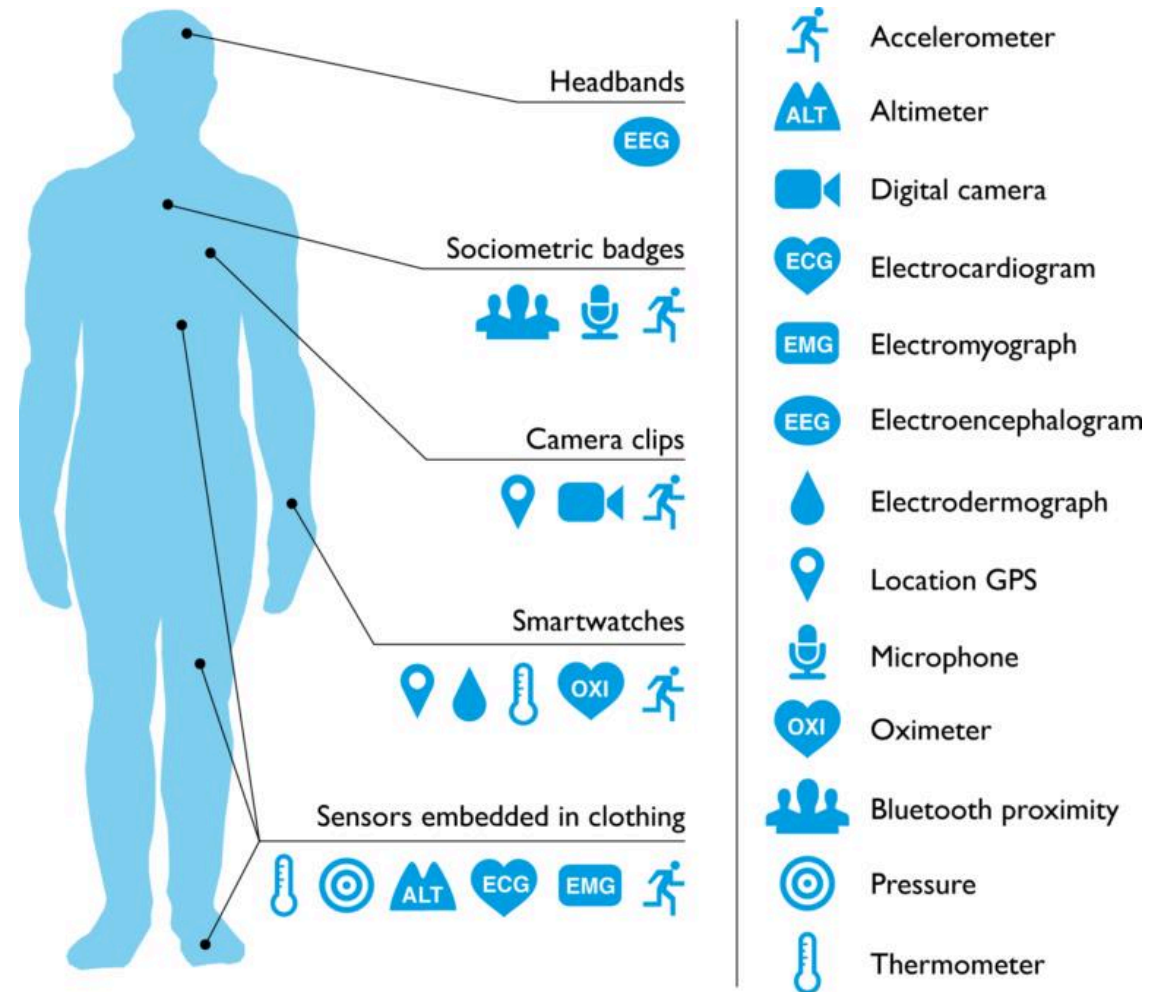
David McQuaid

# What is Edge Computing?

Edge computing brings data collection, processing and analysis closer to data sources, either enabling execution within devices themselves or outsourcing to local servers and data centres instead of central locations.

The basic idea is to minimize data transmission time as much as possible and to leverage the implicit processing power that most IOT's hardware possess.

# Edge Computing and Medical Devices



Examples of wearables and the associated medical capabilities. Source: Plos Medicine

## Edge Computing Use Cases

- Telehealth and patient monitoring
- Pharmaceutical supply chain
- Infection control
- Patient data transmission and security
- Surgery
- Diagnostics

“A lot of patient care now happens at retail level. With edge computing capabilities and tools, that can now take place on-site, on a real-time basis, so you don’t have to send things to a lab and wait a day or week to get results back.”

Paul Savill, Senior Vice President, Product Management and Services, Lumen

# Security Considerations in Edge Computing for Medical Devices

In a survey of 232 security decision-makers in healthcare, 82% reported they have experienced an Internet-of-Things (IoT) focused cyberattack in the past year. Of those organizations attacked, 30% reported experiencing compromised end-user safety, 43% operational downtime, 42% compromised patient data and 31% brand or reputational damage. (Ponemon, 2020)

According to a 2020 IBM report (ibid) , the average total cost of a breach in healthcare is \$7.13 million – the highest of all industries – where 50% of these breaches are due to malicious activities, as opposed to accidents or negligence.

Loopholes in edge security can provide hackers easy access to the core of a network. This is of particular concern if edge devices are rushed to market before thorough testing is performed or companies race to adopt the technology without a full understanding of the security risks involved. The smaller size of edge devices also makes them more vulnerable to being stolen or otherwise physically manipulated



Source: ZDNET

### Example Threats to Edge Medical Devices

- Malicious Hardware/Software Injections
- Physical Tampering & Attacks
- Routing Information Attacks
- Distributed Denial of Service (DDoS) Attacks



# Can Edge Medical Devices be made Safe?

A framework based on the European Medical Device Regulations (MDR) that all suppliers, engineers and CS professionals as well as the implementation of best practice in ALL mission critical systems will ensure that Hardware, Software and Communication between Devices, will be secure.

Such a framework will allow the creation of new tools using AI, Machine Learning and Cryptography to constantly improve the security of Edge devices and increase the availability of new patient centric care

Thank you for your time!

Any Questions?

# Bibliography

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