Lifting Lockdown

Insights and experimentation into IoT opportunities for remote healthcare monitoring

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Background

COVID-19 highlights the need for a paradigm shift in healthcare research, moving from laboratories/clinics to remote assessment (i.e. home). Restrictions imposed by COVID often result in a cessation of clinical research [1]. Previously, proposals for remote individualised measurement at scale were made but cost and complexity of physiological and environmental sensing made this unfeasible [2].

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Purpose

Internet of Things (IoT) technologies are increasing feasibility, making it more achievable and affordable to conduct remote monitoring [3]. This removes dependency on clinics/laboratories and longitudinal free-living assessment can provide an abundance of information on habitual behaviours [4] and pathology characteristics, often not attainable during supervised assessments [5].

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Methods

Here, we reviewed emergent low-cost/accessible IoT technologies to inform healthcare researchers about opportunities and constraints. Through experimentation, we explored and demonstrate workflows for individualised remote monitoring with wearables alongside environmental conditions of the buildings they occupy. We also explored the costs associated with cloud platforms and explored the ThingSpeak platform - as an extension of MATLAB to identify its suitability within healthcare research

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Results

We found that data/computer science are becoming increasingly common in healthcare, which is resulting in more reliance on multi-disciplinary teams to make innovations with disruptive IoT technologies. The latter enable researchers to experiment with low-cost devices that incorporate a range of sensors for monitoring patients and the environments they inhabit. However, the requirement for high-frequency data (often required in healthcare research, e.g. electrocardiogram, gait analysis) are challenging with current technologies [1].

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Conclusions

More research is needed to identify workflows that make low-cost IoT technologies feasible to healthcare researchers measuring high-frequency physiological data from wearables. Alternatively, environmental data is readily attainable from current technologies, which would be useful to provide context and greater insights to free-living physiological/wearable assessments.

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References

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