

Context-aware gait monitoring in the community for patients with chronic movement disorders

Summary

Solution

The project aims for developing a smartphone-based wearable technology to automatically assess gait and balance impairments of stroke patients in real world conditions.

In the hospitals, the technology will help clinicians measure the degree of severity of various stroke-related gait disorders (e.g., foot drop, circumduction, gait asymmetry, knee flexion, etc.). In the community, it will help clinicians monitor their patients remotely: i.e., how active they are, how often they go outside and how well they walk on different surfaces encountered in the world (e.g., walking along a hospital corridor or on streets).

Challenge

The proposed technology will improve stroke care pathways by tackling two grand challenges faced by the NHS.

First, by providing objective gait assessments, the system will promote consistency of service across the country. The current gait assessment methods are based on observer-rated clinical measures which suffer from subjective-bias and low data resolution.

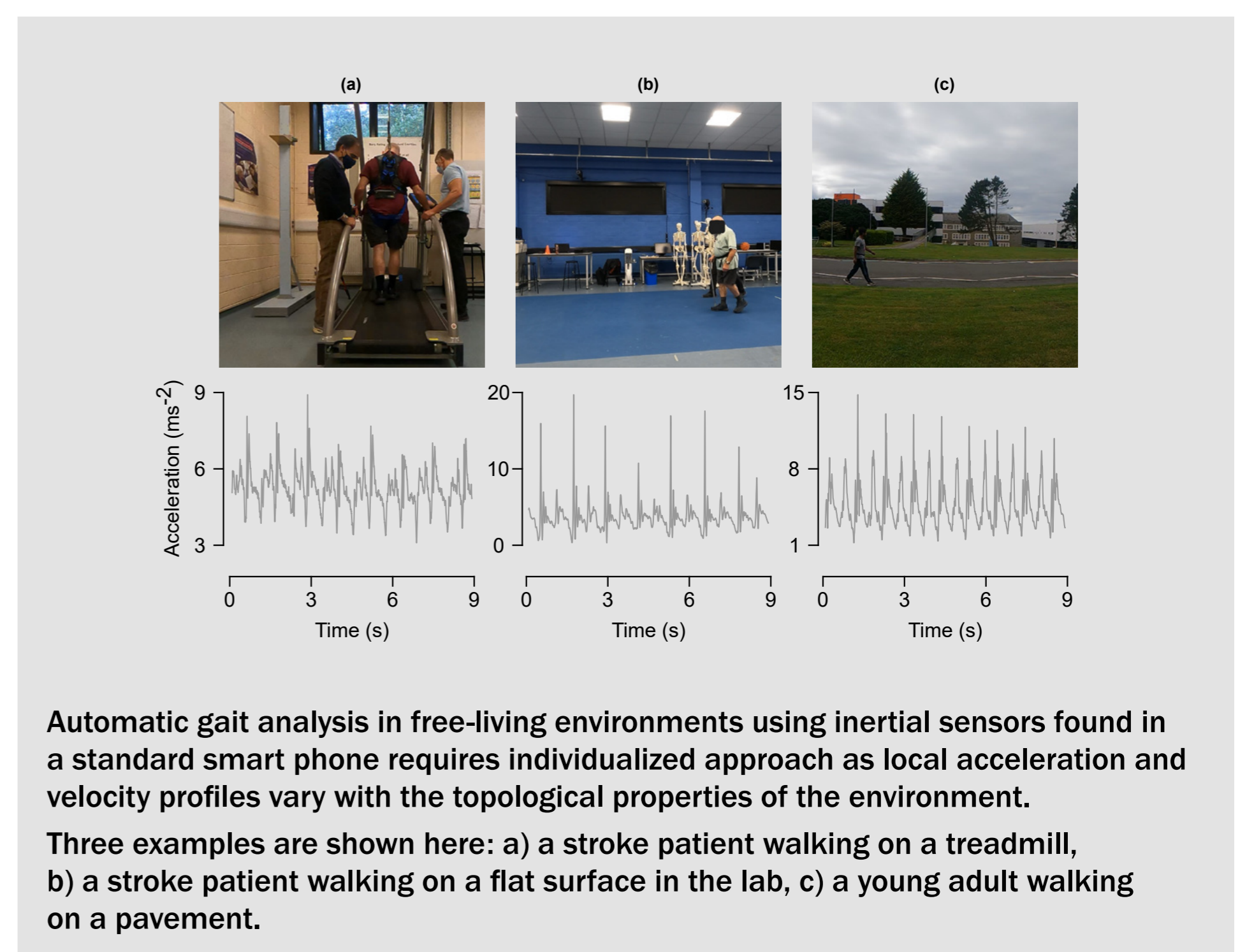
Second, the system will enable doctors to monitor their patients after discharged from the hospitals. How people walk in natural conditions will reveal new insights into long-term health outcomes (i.e., quality of life and independence) and help doctors evaluate the effectiveness of current treatment and stroke management methods.

Benefits

Thanks to the super sprint project, we have started testing our system in the community. This is a major step forward towards validating our technology. In addition, the experimental data collected from healthy participants provided novel insights into how walking patterns may vary depending on the topological properties of the environment. This data will help us establish a baseline for automatic detection of abnormal events including falls.

Further exploitation/next steps

We are currently in talks with Hywel Dda University Health Board to start testing our system in its four major hospitals.



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