

Smartphone Technology Applied to Spinal Cord Injury Research: Use and Clinical Utility

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Abstract

- Interactive smartphone technologies can inform and extend clinical care to help individuals with spinal cord injury (SCI) meet their health and rehabilitation needs.
- Advanced analysis provides customized feedback for physical and psychosocial wellbeing.
- **Aim** - Identify smartphone technologies applied to improve daily activities of those with SCI and analyze their impact.

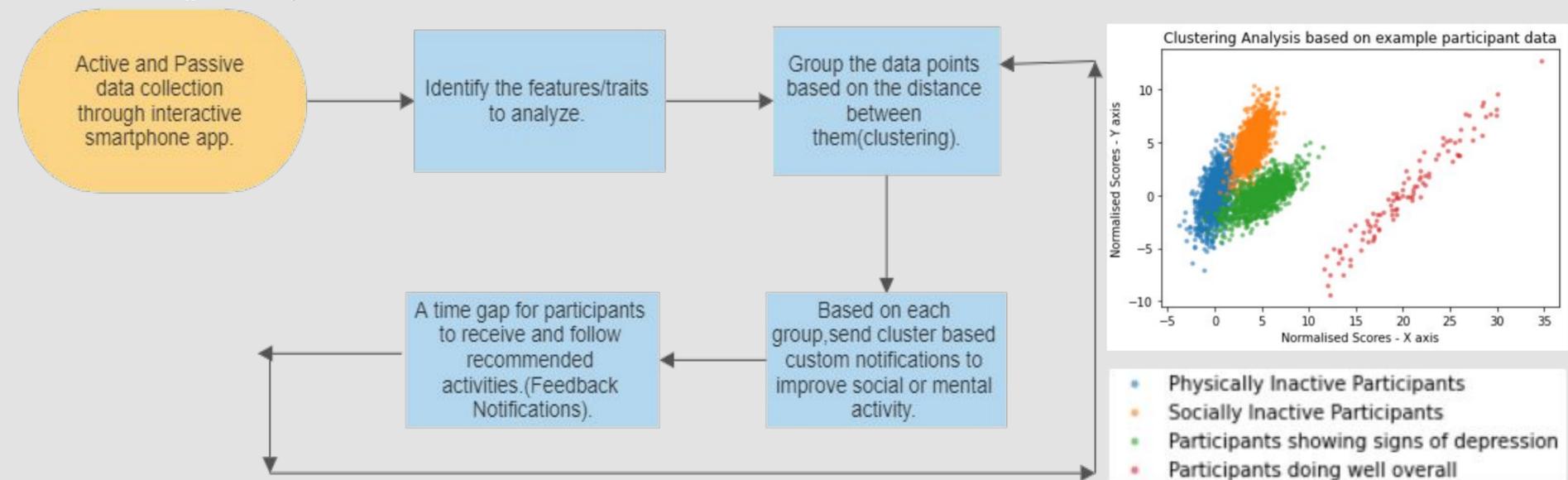
Clinical Utility of Smartphone mHealth Technology

- **Goal Achievement**
 - Checklists, data tracking, and fact-finding tools
 - Accountability with peer, partner, or clinician
- **Health Self-Management**
 - Reminders: medication, pressure relief, physical activity, mindfulness
 - Build self-awareness: track self-report and symptoms
- **Regular collection of Active and Passive data**
 - In-situ and frequent time points
 - Objective behavioral data
- **Mechanism to provide Just-In-time Adaptive interventions (JITAI)**
 - Opportunely timed
 - Individualized and responsive

Analyses to Inform JITAI

- **Test data:** Assessed depression symptom severity, social activity, and mobility.

Clustering Analysis



Parallel Predictive Model

- To determine how patients are doing overall, their active and passive data can be analyzed **relative to** participants doing well in all health and rehabilitation domains.
- Use this approach to **create feedback loops** for improvement of physical and psychosocial wellbeing

Scope for Future Enhancement

- Telehealth and mobile technologies can greatly help those affected by SCI, especially during the COVID-19 pandemic
 - Improved access to tools for health self-management
 - Greater geographical reach for SCI-specific care (peers and clinicians)
- Analyses require large samples, but smartphone technologies are easily scaled for larger populations.
 - The ease at which patients can be added helps in collecting more data, helping in the fine tuning of the algorithm.

Conclusion

- Smartphone technology is widely accessible and has great utility for self reporting to clinicians and for the patient's reference.
- It is readily available to participants and hence is an innovative mechanism to supplement care.
- With the help of JITAI we can provide the right kind of support at the right time by adapting to the participant's environment and contextual state.

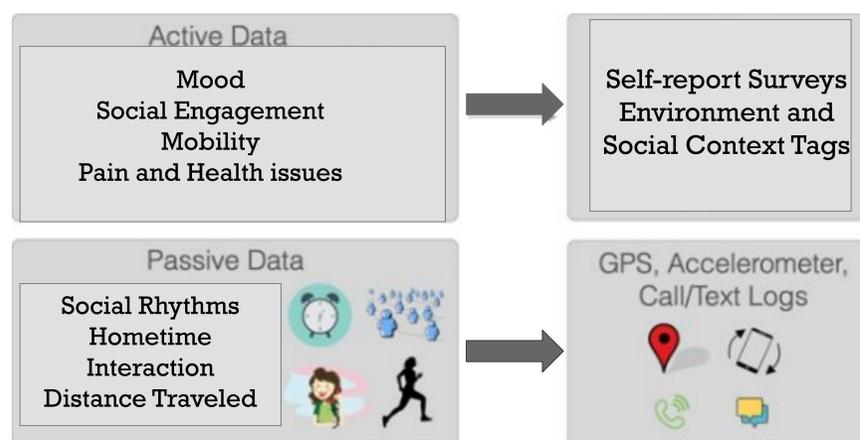


Figure 1. Collection of active and passive data taken from the mobile application.