# Real-time Self-directed Behavior and Intervention Management Framework

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## Goal

- Find a way for healthcare experts to monitor the health problems of their patients and to observe their day to day progress
- Find if there is a way for patients to become motivated to fix their health problems and everyday life via a virtual contingency management system

## Motivations and Objectives

### Motivations

- Management for health care can be expensive, but if guidance can be given through a virtual system, costs for the user can be lowered dramatically

### Objectives

- Create a system that provides rewards in the virtual world for health progress in the real world
- Use sensors to gather information about the everyday health of the user in the real world

## Application of Virtual Contingency Management System

**Contingency Management** is a form of reinforcement in which patients are rewarded for following their given health programs. Because this is a *Virtual* Contingency Management System, the users are given virtual rewards, such as upgrades in the created game.

The process is as follows:

1. Collect data from user during the day
2. Shimmer stream and store the data in the subject’s mobile devices
3. Algorithms performed on data to determine fitness state
4. Higher fitness leads to greater rewards in the virtual world, i.e., more upgrades in the game

### No Upgrades

### Upgrade 1: Tri-shot

Users can show preferences for upgrades, achieving unique gameplay

## Resources

- The sensors used are the Biomedical and kinematic sensors from Shimmer (Can measure accelerometer, ECG, GSR)
- The virtual reward system created is a mobile game created using the Unity game engine. The game was initially an open source project, but many changes have been made for it to work with the contingency management system

## Facebook Application

- Social Media integration created as an additional method of reinforcement.
- Users can observe the scores of their friends, and of others who are following the same program.
- This creates friendly competition between users, motivating them to achieve more upgrades, thus motivating users to improves fitness levels in the real world

## References

- Unity Game Engine <https://unity3d.com/>
- Shimmer Sensing <http://www.shimmersensing.com/>