

Personalized Recommendation and Context-Aware Avatar for Motivating Children to Physical Activity

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Over the last few decades, overweight and obesity became a problem of global proportions. Insufficient amount of physical activity and unhealthy dietary habits have been cited as its primary causes. While measures that need to be taken have been known for a long time, their execution has been hindered by a lack of motivation present in all age groups.

Tracking activity is an important step towards improvement. Most current activity tracking solutions rely on stand-alone single-purpose measurement and tracking devices, which are not very popular among users [2]. The current generation of smartphones has made it possible to track movement using built-in sensors such as GPS receivers, accelerometers and gyroscopes. We use smartphones of this class to provide an activity tracking solution.

Using a device people already carry, we are now able to collect data and provide the user with statistics and recommendations, which are a powerful source of motivation. However, a different approach to motivation is necessary for children, who are not easily motivated by figures and charts. Our solution is based on rewarding, a natural and effective way to motivate. We provide parents by means to specify short-term and long-term, non-repeating or recurring rewards for their children. Children exchange points they have earned by being physically active for these rewards.

When performing a physical activity, one requires a certain extent of knowledge on the right kind and amount of activity. Not enough activity may result in no improvement while too much activity may be harmful. It is therefore vital that users are advised on these matters. Our solution provides the user with advices and recommendations. We use the concept of a daily plan to give recommendation on the type and amount of activity for a given day. Daily plans are generated automatically

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based on several factors, such as the current weather conditions or previous activity, but also take into account fulfilment of the previous plans.

Much like motivation, advising children requires some additional consideration. Animated pedagogical agents have proven to be effective in capturing children's attention. We propose an animated character (avatar), which is fully customizable in terms of appearance. The main role of the pedagogical agent is to provide a better communication interface between the system and the child, which is necessary in order to provide the child with educational content, such as advice on healthy lifestyle and exercise. We also use a social networking model to incite competition among friends in order to provide an even stronger source of motivation [1]. In conjunction with competition, motivation is also achieved through engaging data visualization, which provides an overview of the accomplished progress.

While the general concept of our solution is not limited to a specific age group, we have chosen to target children as our primary focus group for a number of reasons. Most importantly, the differences in the approach that needs to be taken with younger users are too numerous and require a fundamentally different design of the overall solution. In particular, the described means of motivation we employ could not have been implemented as an afterthought. Moreover, experience with children suggests that if any measurable progress is to be achieved, the involvement of parents in the process is necessary. In addition to being the source of rewards for children, we provide means for parents to oversee their children's progress and interfere when and where appropriate.

To achieve the above goals, we have created a Move2Play system consisting of a mobile phone application for children and a web application for parents. The mobile application serves to track activity and provides recommendation and advice through the avatar. It is a social hub designed to connect friends and encourage competition. It also gives children access to rewards provided by their parents. Parent application, provides parents with information on the progress of their children and activity recommendation. It is also the entry point to specify rewards for children.

Move2Play takes a new, unique approach to solving the problem of sedentary lifestyle. It brings together several ideas and concepts such as activity tracking, motivation through rewarding, motivation through competition, activity recommendation and, specifically for young users, an animated pedagogical agent and the involvement of parental guidance.

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References

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