Topic: Create and evaluate a predictive model for engagement drop-off for digital health applications

Mobile health (mHealth) applications have been on the rise in recent years, particularly in the management of chronic disease, as these patient-centric applications can extend care into patients` homes and provide self-management assistance crucial to improving patient outcomes [1]. Evidence-based strategies for chronic disease management with mobile health application deploy comprehensive behavior change curricula concentrating on support with physical activity and dietary modification. Yet, limited patient engagement with digital interventions presents a significant barrier to translating evidence-based digital behavioral interventions into pragmatic, scalable solutions [2,3]. An observational trial of a large real-world cohort revealed only a 2% sustained, continuous use of the application that would improve clinical outcomes [4].

To address this critical patient engagement issue, various technologies and interventions have been developed to provide targeted support to patients using digital health apps to improve engagement and sustained use [5].

More recent strategies have also leveraged machine learning (ML) and big data analytics to deploy more advanced tools, such as engagement algorithms and AI-driven chatbots. ML solutions can provide 1) more nuanced patient segmentation/phenotyping, 2) more precise, tailored interventions, with enhanced ability to respond dynamically to changes in individual trends, and 3) improved resource alignment by intervention implementers, as automated processes (e.g., chatbots) can free up human capital for more appropriate tasks [6].

The goal of this thesis is to explore machine learning methods to identify users with a high risk of attrition in a remote patient monitoring program based on their activity patterns with the application.

The proposed work consists of the following parts:
- Literature research: identify relevant work resulting in a comprehensive overview about existing studies on user engagement with digital health applications.
- Evaluation of different ML or AI models to predict engagement and identify patients that are at risk of attrition.
- Development of the best suited ML or AI models to predict engagement and identify patients that are at risk of attrition. (predict)
- Evaluation of the implemented model regarding the accuracy
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This thesis is conducted in collaboration with Veta Health Inc. which has developed a remote patient monitoring app for cardiac diseases and support patietns in the management of their health. The provided dataset will be used for the development and evaluation of the algorithms. The thesis must contain a detailed description of all developed and used algorithms as well as profound result evaluation and discussion. The implemented code has to be documented and provided. An extended research on literature, existing patents and related work in the corresponding areas has to be performed.

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