

SPOTTING THE SIGNS

Members of the European FAITH project team reveal how they're using AI and UX design to create a tool that can identify depression in patients who have undergone cancer treatment



About the authors



Giuseppe Frau leads the Tech group in Deep Blue, a team of software developers and designers.



Tommaso Vendruscolo is a UX/UI Designer at Deep Blue. He holds a Master's Degree in Human-Computer Interaction and works on several EU projects.



Alessandro Tedeschi Gallo is a Dissemination and Communication Consultant in Deep Blue, working on FAITH and other EU-funded projects.

recognise fluctuations in the patterns of patients' psychological outlook.

In its final version, the FAITH Clinician Interface UX design's objective will be to facilitate healthcare professionals' assessment of their patients' health. FAITH will provide doctors with powerful means to monitor patients without face-to-face consultations. At that stage, the AI will be deployed using a so-called federated approach, allowing raw data to be retained locally in patients' phones and preserving their privacy.

User requirements and information architecture

The Dashboard and its information architecture are tailored to the doctors, their priorities and work practices. For instance, realising that not all trial participants would start at the same time, developers needed to adapt the Dashboard so doctors could check at which point of the trial each participant is, their engagement level, and if missing data is due to poor engagement or app/wearables issues.

Another example of the application of UX design is data visualisation. FAITH collects a great number of different types of data which come in with different frequency (some weekly, others monthly). The Dashboard is working on a visualisation mode that displays all data in one page. Colour coding is also used to present data collection status, while quantitative and qualitative data are clearly divided to ease the page consultation.

UX design: why does it matter?

A well-constructed UX design can provide solid support to clinicians and facilitate the navigation of data, enhancing and simplifying their analysis. It can save doctors hours of work on skimming through data by organising, presenting, and filtering it at will.

Within the FAITH environment, UX design doesn't only support

doctors, but is also the enabler for transparency and explainability, allowing them to monitor data quality.

Applying UX methods in healthcare isn't always easy, but it's fundamental. Since healthcare's main target is people, it's necessary to build a design centred on humans, that starts from humans, and truly meets humans' needs, expectations and limitations.

Looking ahead

The FAITH tool aims to help clinicians by creating a unique channel of communication between patient and healthcare provider. Building the solution around the people who will use it and keeping their needs at the centre are the best guarantees not only for FAITH's success, but also for eHealth and healthcare's digitalisation.

The next steps will focus on designing the experience and user interface for visualising the AI results predicting the mental health fluctuations. In its final iteration, the FAITH tool will be able to monitor patients' mental health status. The AI will be able to predict fluctuations, providing early warnings in case of negative trends leading to mental health deterioration. ■

Mental health plays a pivotal role in our health and wellbeing. But it's often easily overlooked, as symptoms of poor mental health are difficult to pinpoint. This can be even more difficult in the case of cancer patients and survivors, with treatment side effects and some types of cancer showing symptoms similar to those of depression. Diagnosing poor mental health becomes even harder as face-to-face interaction between doctor and patient reduces.

FAITH is developing an AI-based supportive tool that will help clinicians monitor their patients' mental health status. It will be a unique support system consisting of two sides: a mobile app (supported by wearables) interacting with patients and gathering data on their status, and a dashboard for clinicians to consult patients' data, providing predictions on users' mental health conditions. During the current trial phase, FAITH is training its algorithm to recognise trends and fluctuations on patients' data. Simultaneously, the Clinician

Dashboard functions as a monitoring platform to check data quality. This is key to ensuring the algorithm learns from good-quality data and consequently will be able to detect downward mental health patterns. An AI and its algorithm are as only good as the data they were trained on.

Data collection

Clear identification of the right data to acquire to keep track of the relevant variables is central. In FAITH's case, these are depression markers. The FAITH protocol states the data to be monitored, how it's monitored, and its use in mental health monitoring.

To ensure effective data collection, FAITH combines passive digital tracking (i.e. sleep and physical activity monitoring) and proactive user engagement through medical questionnaires (i.e. food and water intake and quality of life).

We also asked our clinicians (mental health and cancer specialists) to monitor data quality through our Dashboard. This activity provides value in several directions: data quality, the model's accuracy and AI's explainability.

Building an inclusive user experience flow: the clinician's perspective

To build a functional user experience (UX) design, the starting point is to define users and their needs. In FAITH's case, these are cancer patients' healthcare teams. They need easy access to the data collected during the trials from the FAITH mobile app. As FAITH gathers a vast amount of data, clinicians need to fulfil a two-fold role consisting of checking data quality and retaining awareness about which data is going to actually shape the AI model. During this data collection phase, it's vital to monitor what information reaches the system, and consequently, what data the AI will train on. This is pivotal for enabling explainability and transparency.

The FAITH Clinician Dashboard arranges the collected data in such a way as to facilitate access. It also facilitates user/app interaction monitoring, as regular engagement is necessary for good data quality.

FAITH Clinician Dashboard

From a first glance at the home page of the Dashboard, doctors

can have an overview of patients' interaction with the FAITH app. It shows how long they've been using the app, their data status and the time of their last activity. Overall, the Dashboard presents the data in a way that helps clinicians identify users who are providing data inconsistently and need more engagement. Here, UX design not only aids doctors in navigating data, it's also critical to providing a way to check data quality by monitoring patients' engagement.

Users' personal pages feature each patient's data, their engagement with the app, potential gaps in data acquisition, and depression markers analytics. The analytics feed in crucial information about patients' performance in five depression markers identified by FAITH. These markers are Sleep, Nutrition, Activity, Mental Health and Voice.

During the trials, participants will also engage in regular face-to-face psychological consultations for mental health clinical assessment. This will provide the ground truth for our model, completing the training set of FAITH. The AI will be trained on the trial's data to