WATCHING THE RISK FACTORS

WARIFA

ARTIFICIAL INTELLIGENCE AND THE PERSONALIZED PREVENTION AND MANAGEMENT OF CHRONIC CONDITIONS

Enjoy reading the WARIFA newsletter!

UPDATES ON THE THIRD-YEAR PROJECT RESULTS

The WARIFA Project is approaching its fourth and final year, and many results have been achieved by the consortium! Check out this newsletter to uncover the progress made by the partners.

Remember to follow WARIFA on LinkedIn, Facebook and Twitter to be up to date with the project progress at all times!

DATA ACQUISITION AND PREPARATION

Work package 3, led by The Arctic University of Norway (UiT), has recently focused primarily on the design and functionalities of the WARIFA app, including the applications data collection functionalities which have almost been finalized and fully implemented. This includes features such as the automatic input from various sensors, online personal cloud services as well as online databases for UV-index and air pollution data. In close collaboration with the commercial partner Netsun from Romania, the work package enabled the end-users to provide additional data through questionnaires. Additionally, the WARIFA app is fetching data from our second commercial partner, Sensotrend from Finland, through their cloud solution for managing diabetes-specific health data. Furthermore, work package 3 has prototyped two predictions as output based on the the data acquired by the patient. The above-mentioned functionalities are about to be tested practically by end-users as part of WP7, managed by Universidad de Las Palmas de Gran Canaria, in Spain.

DATA PROCESSING AND MACHINE LEARNING ALGORITHMS

The Rey Juan Carlos University (URJC), in close collaboration with the University of Las Palmas de Gran Canaria (ULPGC), have jointly worked on the development of artificial intelligence (AI)-based algorithms to predict noncommunicable diseases (NCDs), specifically cardiovascular disease (CVD) risk and skin cancer melanoma. These algorithms were designed with interpretability capabilities, which enabled the extraction of relevant features involved in the onset and development of both diseases. To achieve this, several public datasets have been used for this purpose, which have been extensively used and validated in previous studies. ULPGC is currently developing novel instrumentation to study the spectral properties of skin cancer with the goal of achieving miniaturized smartphone-based systems for the self-monitoring of skin cancer. Additionally, URJC and ULPGC have developed novel approaches for processing data extracted from continuous glucose monitoring systems to accurately forecast blood glucose levels in individuals with type 1 diabetes (T1D). Experiments were carried out using public datasets and data collected by ULPGC at the Complejo Hospitalario Universitario Insular-Materno Infantil from T1D patients within WP7. The current results show the high potential of AI-based algorithms for supporting both the primary and tertiary prevention of NCDs.

BAYESIAN BELIEF NETWORKS

The research performed by WP6 up to now made it possible to develop a new methodology for the quantification of the risk along time of cardiovascular events. The developed methods rely on advanced informative statistical models describing the underlying involved mechanisms. Both population and individual risk quantification is possible also with missing values of some risk factors, among those involved, e.g., total cholesterol, blood pressure. The methodology has been implemented and applied to a large database. The results produced outperformed those obtained by using the basic methodology, i.e., Cox proportional hazard, on which existing validated risk calculators are based.

USABILITY, PERSONALIZATION AND VALIDATION

In the third year, work package 7 conducted several focus groups with potential users. In these focus groups, the WARIFA prototype and its functionalities were demonstrated through different activities and evaluated by the attending users. The feedback received, was then passed on to other WPs, for them to make improvements and modifications to the app's functionalities based on the opinions and needs of the end-users.
These focus groups consisted of various participants in different ages and educational levels to have a truly representative sample of the population. These focus groups were additionally conducted with type 1 diabetes patients, considering their specific needs.
Individual interviews were performed with people with limited or restricted access to this type of mobile application.
In total, two focus groups with diabetes patients and three focus groups with participants from the general population were conducted in Gran Canaria, as well as several, individual interviews with people who have difficulty accessing this type of mobile applications.
In addition, two focus groups were conducted in Norway, one in Tenerife and one in Bucharest. More than 73 people participated in all the focus groups. In some of the focus groups, data collection was initiated to support other working groups with real user data for the development of algorithms for the prevention of chronic diseases and management of diabetes mellitus type 1.

Figure 1:
Users working on focus group activities

WARIFA PROJECT MEETING IN FRANKFURT

From November 06th to 08th, the WARIFA consortium convened in Frankfurt, Germany, for the project's second General Assembly and was led by the project coordinator, The Norwegian Centre for E-health Research (NSE). On the first day of the assembly, each partner presented their achievements within their respective Work Package during the past six months before the day concluded with the evaluation of the progress achieved in the project so far.

Figure 3: WARIFA consortium in Frankfurt

The second day was dedicated to the cooperation and collaboration between the various work packages, with presentations on *Disease prevention versus disease management, mHelth and NCDs – challenges and lessons from around the world* and *On the prevention and management of Diabetes* in the morning, before the accuracy of data collection from devices, the finalization of focus groups and the study plan for the pilots were discussed together in the afternoon. The day concluded with the joint planning for the final year of the project as well as an outlook on the third and final plenary meeting.
To do honor to the social aspect of such an event, the participants of the meeting gathered at 19:00 for a joint dinner in Frankfurt Höchst and let the day come to a relaxed end together.
The third and final day was primarily dedicated to agile project work, during which various smaller groups were formed to coordinate their next steps in the project.



Figure 4: WARIFA working groups

The Plenary Meeting indicated that the consortium is making strides in developing a comprehensive personalized early risk assessment tool. The developed tools aim to support preventive measures and lifestyle changes. The system, grounded in artificial intelligence, will be accessible to individuals and patients through the WARIFA app on smartphones upon completion.

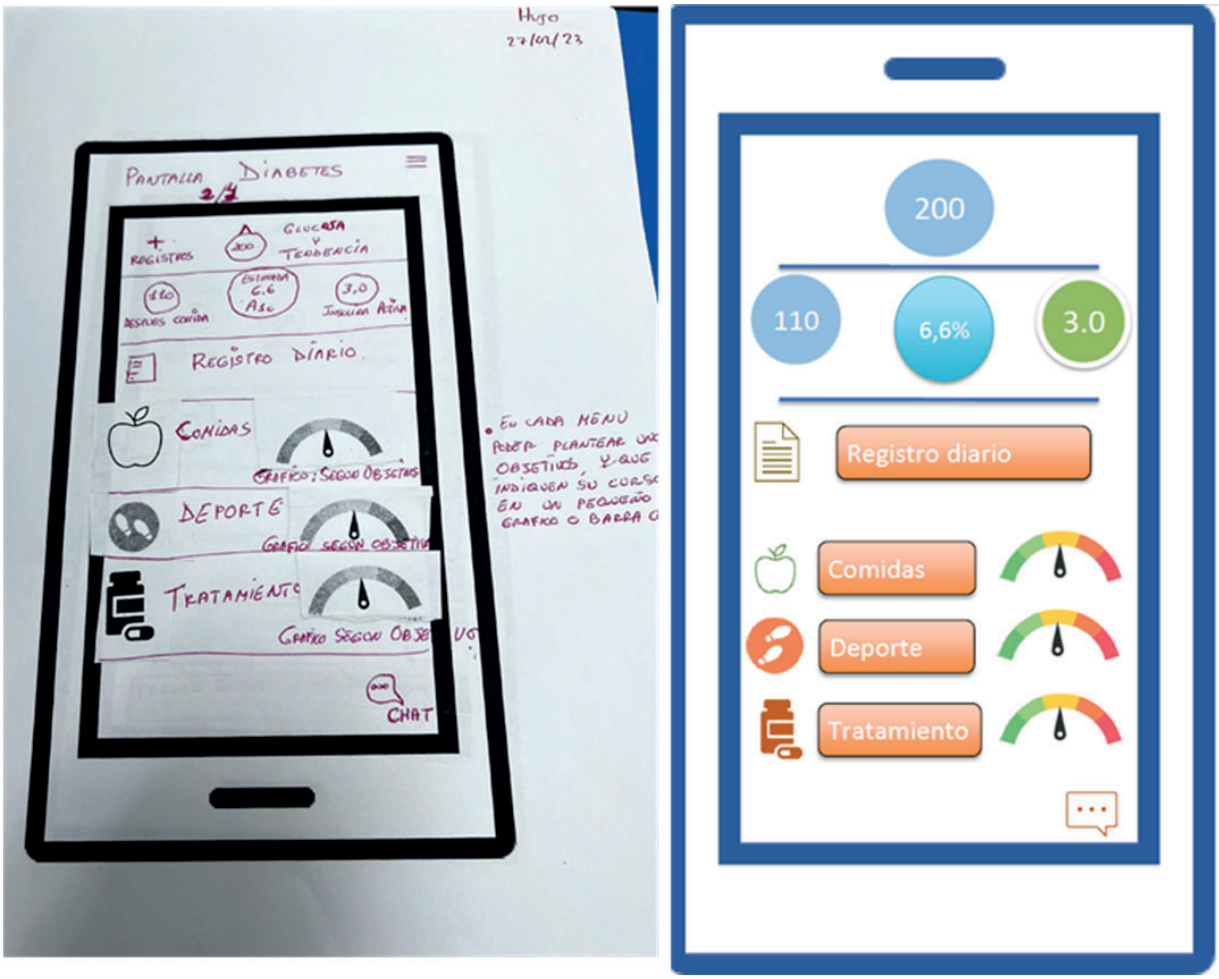

Figure 2: Ideas from users in focus groups

COMMUNICATION, DISSEMINATION AND EXPLOITATION INCLUDING POLICY RECOMMENDATIONS

CiaoTech – PNO Group performed various activities based on the exploitation plan in close collaboration with the relevant partners such as the identification of the key exploitable results, the characterization of the WARIFA tool and app, the definition of preliminary business scenarios as well as the preparation of different Lean Canvases focused on general public, healthcare professionals and providers. Discussions on the canvases are currently ongoing and happening in parallel to the technical development of other WPs. CiaoTech has also joined the Meet in Italy for Life Sciences event, where the WARIFA project and its impacts were highlighted in front of experts and stakeholders of the Italian Health care system, including professionals, researchers, investors, and public institutions.

THE FOCUS GROUP INTERVIEWS CONDUCTED IN NORWAY AND ROMANIA

The third year of the WARIFA project was characterized by strong involvement from WARIFA's end users in the development of the application. In this context, three diabetes patients were invited to the first plenary meeting in Gran Canaria in March of this year (as described in WARIFA Newsletter #5) to share their experiences with and expectations of an application for managing chronic conditions. But WARIFA did not stop there! Several additional interviews were conducted with potential end users in Norway and Romania. While some of these interviews were already mentioned in our 5th newsletter, as well as in the contribution of ULPGC, two more interviews were conducted during the second half of the year.

The second Norwegian Focus Group Meeting was held at the end of September in Tromsø with a total of 5 participants. The interview aimed to explore users' expectations and preferences regarding WARIFA's functions on skin cancer risk, as well as healthy sun exposure habits and sun protection recommendations. Furthermore, the participants were asked to comment on different display modes and the phrasing of recommendations.

The first Romanian Focus Group Meeting was held at the end of June in Bucharest with a total of 24 participants. It involved discussing the WARIFA application in its current status, receiving feedback, and discussing and sharing experiences and expectations regarding health applications in general. Furthermore, the participants discussed their thoughts on the topic and role of artificial intelligence in the present time.

PARTNERS

Norwegian Centre for E-health Research

Servicio Canario de la Salud

UiT The Arctic University of Norway

ULPGC Universidad de Las Palmas de Gran Canaria

UiO : University of Oslo

MTU Ollscoil Teicneolaíochta na Mumhan Munster Technological University

Italian National Research Council

Universidad Rey Juan Carlos

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