WATCHING THE RISK FACTORS

WARIFA

ARTIFICIAL INTELLIGENCE AND THE PERSONALIZED
PREVENTION AND MANAGEMENT OF CHRONIC CONDITIONS

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FIRST YEAR PROJECT RESULTS

WARIFA - Watching the risk factors: Artificial Intelligence (AI) and the prevention of chronic conditions (GA 101017385) – celebrates its first year of implementation! In this second issue the consortium presents you the first results obtained in each Work Package during the first year of the project life.

WARIFA started on the 1st of January 2021 and will develop a prototype of a combined early risk assessment tool that will provide individual citizens with personalised recommendations for the management of noncommunicable diseases (NCDs) - such as cardiovascular diseases, cancer, chronic respiratory diseases and diabetes – which represent the leading causes of death for the citizens of the European Union. WARIFA has its main focus on the prevention of melanoma skin cancer and complications of diabetes and uses AI and the analysis of user-generated and big data to provide a personalized set of recommendations on lifestyle factors according to the risk score of each individual. WARIFA will inform citizens about the improvements on the management of a known disease while, simultaneously, raising awareness on the risk of developing another noncommunicable disease. In this way, WARIFA will contribute to health promotion and disease prevention actions which will help relieve the burden on health care systems and economies.

WARIFA first-class international consortium includes a total of 12 partners from 6 countries and represents expertise within AI technology, applied mathematics and statistics, e-health, preventive medicine, clinical medicine, epidemiology, sociology, psychology, biostatistics, communication and dissemination. The partners that will implement WARIFA in the next 4 years are: The Norwegian Centre for E-health Research (Norway) – coordinator, University of Medicine and Pharmacy "Carol Davila" Bucharest (Romania), UiT The Arctic University of Norway (Norway), University of Las Palmas de Gran Canaria (Spain), University of Oslo (Norway), Munster Technological University (Ireland), CiaoTech Srl (Italy), Netsun Software Srl (Romania), National Research Council of Italy (Italy), Rey Juan Carlos University (Spain), Sensotrend Oy (Finland), Norwegian Melanoma Association (Norway).

To reach the above-mentioned objectives, the WARIFA project is organised in 8 Work Packages (WPs) which are closely linked to each other. Despite the difficulties associated with the COVID-19 pandemic, all the partners have been working hard to carry out the project activities and several achievements have been reached. The results obtained so far in each WP are presented below.

Remember also to subscribe to the WARIFA newsletter and follow the main updates visiting the project website and on LinkedIn, Twitter and Facebook!

WP1 - PROJECT MANAGEMENT

The aim of this WP is to establish a project management structure capable of coordinating the technical and financial implementation of the project. During the fist year of the project activities, the team established all the necessary management procedures and bodies to successfully reach the project's goals. Furthermore, an online kickoff meeting was organized in January 2021 to officially start the project and plan the steps to be undertaken in mid and long term.

NSE, the coordinator, is playing a key role in overseeing the implementation of the activities, monitoring and managing the risks and ensuring the quality of the research. The SARS-COV2 pandemic is emerging as the main risk for the project execution, preventing travel and face-to-face meetings, including among partners. To overcome these difficulties, alternative approaches and tools are being identified and implemented.

WP Leader

Conceição Granja,
Project Coordinator
NSE

Norwegian Centre for E-health Research

WP2 - USER AND STAKEHOLDER NEEDS

For the development of the WARIFA tool, it is paramount to consider end-users' needs and expectations, which will influence the perception of the software, the engagement with it, as well as its clinical impact. To ensure these needs and expectations are taken into account, potential users and stakeholders should be involved from the first stages of software development. Thus, the partners involved in this Work Package have been working on identifying and mapping the needs of the stakeholders relevant for the project, as well as the risk factors linked to the conditions that will be included in the WARIFA tool.

During the first year of project, on one hand, the activities focussed on establishing the work procedures and protocols for mapping the relevant risk factors for the main chronic conditions. The Countries addressed for the studies are Norway, Spain, and Romania. Due to SARS-COV2 pandemic (and the related restrictions to travels and face-to-face meetings), the partners were obliged to change the approach and define a new strategy, especially for identifying and reaching the vulnerable and hard-to-reach groups.

WP Leader

Ana-Maria Forsea,
UMFCD

On the other hand, in collaboration with WP7 and WP8, the partners drafted a stakeholder analysis highlighting the categories of people/organisations/sectors that could be interested in using the WARIFA tool. These stakeholders will be reached out through online surveys with the aim to collect their attitudes and expectations regarding a mobile/smartphone-based preventive AI solution. The WP2 survey is focused on adult citizens.

Finally, the partners are elaborating a list of input and output variables involved in the AI tool for the risk calculation and prevention recommendations. To reach this specific goal, the partners performed a scientific literature review focusing on: the interaction between the health care systems and the use of preventive mobile apps by the individual citizen; existing digital tools for prevention of the main NCDs; and existing validated risk calculators for the main NCDs, at individual and community level.

WP3 - DATA ACQUISITION AND PREPARATION

Work Package 3 is dedicated to the data sources and implanting data acquisition functionalities of the WARIFA tool. The data sources include possible data from users (manually entered on the mobile app and collected from sensors) as well as from existing community datasets and other relevant data from registries and databases.

First of all, this implies assessing relevant data sources based on the output from WP2, i.e. the list of input and output variables to be included in the tool. Thus, partners involved in WP3 reviewed the proposed list of risk factors (variables) prepared in WP2 from the technical point of view.

Secondly, the partner started working on the definition of the requirements on how to prepare the data sources, on establishing a procedure to acquire possible data sources to be used in the WARIFA tool, as well as possible experimental data acquisition systems for data collection.

WP Leader

Eirik Årsand,
UiT

UiT The Arctic
University of Norway

WP4 - DATA PROCESSING AND MACHINE LEARNING ALGORITHMS

The scope of Work Package 4 is to develop the data processing and machine learning algorithms on which the WARIFA tool will be built. To reach the goal several steps should be undertaken: 1) define the input and output variables of AI algorithms, after data pre-processing and feature extraction stages; 2) Identify which existing risk calculators are best suited to process individual risk for the identified areas involved in the WARIFA system; 3) setup a model based on machine learning (ML) techniques which includes all relevant input and output variables and utilizes the risk calculators; and 4) Integrate the developed model in the WARIFA tool and system testing.

WP Leader

Cristina Soguero Ruiz,
URJC

During the first year of the project activities, the partners involved in WP4 started working on the development of preliminary data preprocessing algorithms and of preliminary feature extraction algorithms based on feature selection methods for the subsequent risk factors analysis. On the other hand, the also initiate the process for the development of a methodology based on feature extraction/selection and machine learning techniques to develop predictive models that could help clinicians to determine whether a subject has done physical activity.

Furthermore, they started analyzing the different already existing risk calculator implementations identified in WP2.

Finally, they are collaborating on a preliminary data analysis of an available dataset of different glucose sensors to monitor type 1 diabetes, as well as on developing a methodology to evaluate the performance of different glucose measuring technologies by comparing them to reference values (capillary glucose measurements) in different time intervals.

WP5 - CONTEXT AWARENESS AND SIMULATION OF BIG DATA

WP5 will start in the second year of project life. In the framework of WP5, the consortium will identify how information from WP4 can be used to describe usage patterns to extract context data. The contextualized information, based on pre-defined rules, will then be fed to the simulation algorithm to generate the optimum set of context data for WP6 - Bayesian belief networks and output of recommendations.

WP Leader

Terje Solvoll,
NSE

WP6 - BAYESIAN BELIEF NETWORKS

WP6 will start in January 2022 and is devoted to developing a subject personalized Bayesian belief hierarchical network of factors-variables, possibly dynamic, defined by means of local probabilities modelling causal effect between pairs of variables. The network can be used to identify some alternative action patterns to be suggested to the subject using the WARIFA app in order to minimize the overall risk of the different pathologic conditions considered. During the current year, this group contributed to the discussion for the identification of the input variables.

WP Leader

Giovanni Sebastiani, CNR

Italian National Research Council

WP7 - USABILITY, PERSONALISATION AND VALIDATION

In WP7 - Usability, personalisation and validation, the partners will ensure that the work performed within other WPs is translated to relevant, comprehensible, evidence-based recommendations and adapted to the needs and preferences of the end-users. End-users and other key stakeholders will be invited to participate with individual input and feedback and with group discussion (focus groups) and the results will be shared with the AI teams (WP2-6), to be taken into consideration in the design of the WARIFA solutions and the WP8 team to better steer dissemination, communication and exploitation activities.

During the first year of project life, the partners conducted several reviews of the literature to identify health-relevant, evidence-based risk factors and to summarize the evidence about the quality, usability, use and engagement, and behaviour change related to health apps, to set the foundations for the development of the WARIFA solution. In addition, methods for personalisation and validation of health apps were reviewed.

Besides, an analysis of European and national projects was conducted and discussions involving most consortium partners were organised. Based on all this, personalisation and validation protocols were developed. Personalisation will be achieved through co-creation of the WARIFA app with end-users and validation will involve both end-users and health-care professionals.

WP Leader

Ana M. Wagner, ULPGC

ULPGC
Universidad de
Las Palmas de
Gran Canaria

In addition, a concept for the App interface has already been designed and shared among the partners and the involvement of gamification, to enhance personalisation of and engagement with the App has been proposed.

WP8 - COMMUNICATION, DISSEMINATION AND EXPLOITATION INCLUDING POLICY RECOMMENDATIONS

The WP8 aims to assess the expected impacts of the project at European level in relation to the emerging trends of personalised early risk prediction, prevention and intervention sector, setting up an exploitation process of the project results in line with the specificity of the consortium members. To this end, WP8 Leader CTECH, worked in close collaboration with WP2 and WP7 partners for the identification the most important stakeholders of the WARIFA results. The networks of contacts of the partners were the starting point, then the map of the stakeholders has been enlarged to other networks or specific groups at EU level, including similar EU-funded projects.

WP Leader

Luigi Ranza,
CIAOTECH

The second aim of the WP8 is to communicate and disseminate the project outcomes in Europe. A Plan for the Dissemination and Exploitation of results has been drafted and it includes a description of the communication channels and tools adopted to communicate and disseminate the WARIFA project objectives and future results, as well as a description of the strategies to reach the different stakeholders.

Therefore, during the first year of the project, the main activities of communication and dissemination have been focused on:
- Definition of the logo and the visual identity of the project
- Set up of the social media accounts: Follow us on LinkedIn, Twitter and Facebook!
- Launch of the project website: go to https://www.warifa.eu
- Design of the brochure, roll-up and poster: download them at the following link: https://www.warifa.eu/media-kit
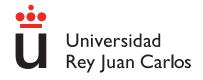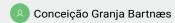
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