

**i-PROGNOSIS:
Intelligent Parkinson's
early detection guiding
novel supportive
interventions**

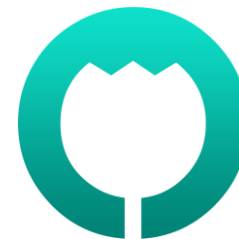


José Alves Diniz
Sofia Balula Dias

**PROTEIN:
Personalized
nutrition for healthy
living**



i-PROGNOSIS: Intelligent Parkinson's early detection guiding novel supportive interventions



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant agreement No 690494.

Project overview & technology

WHAT IS i-PROGNOSIS?



EU-funded Horizon 2020 Research Project

11 EU Clinical, technical & policy-making partners

Coordinated by Aristotle University of Thessaloniki, Greece

> 3,500 stakeholders involved

in design, data collection and system validation

4 years

Project ended March 2020

~ 4,000,000 €

EU funding

OBJECTIVES

1 Early Parkinson's Disease screening

Develop ICT-based tools for the early screening of Parkinson's disease (PD)

2 Novel Supportive Interventions

Develop ICT-based interventions for sustaining the quality of life of persons with Parkinson's (PwP)



José Mourinho
i-PROGNOSIS Ambassador

1 Parkinson's disease screening

THE i-PROGNOSIS APPROACH

Extraction of Digital Biomarkers

1 Focus on everyday tech

Smartphones and wearables

2 Collect data passively

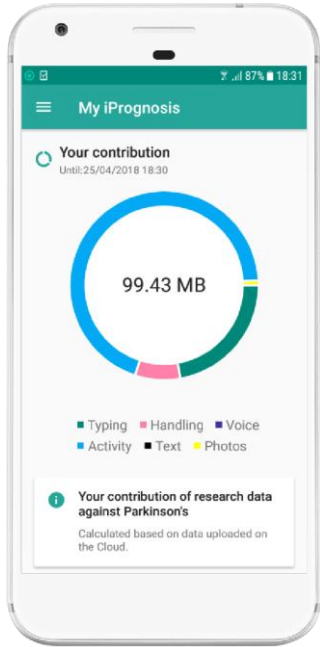
Minimize user engagement - boost adherence

3 Target motor and non-motor symptoms

Prodromal + clinical phase

4 Employ AI

Including cutting-edge machine learning



iPrognosis app

The main data collection vehicle for Android devices



iPrognosis Wear app

Companion data collection app for Wear OS wearables



iPrognosis Smart Belt

Prototype device developed during the project

2 Supportive interventions



iPrognosis games

A suite of serious games for
Android devices

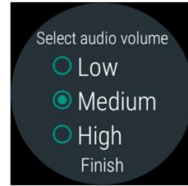


Skeleton-tracking sensor

For interfacing with Exercise games



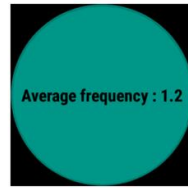
(a)



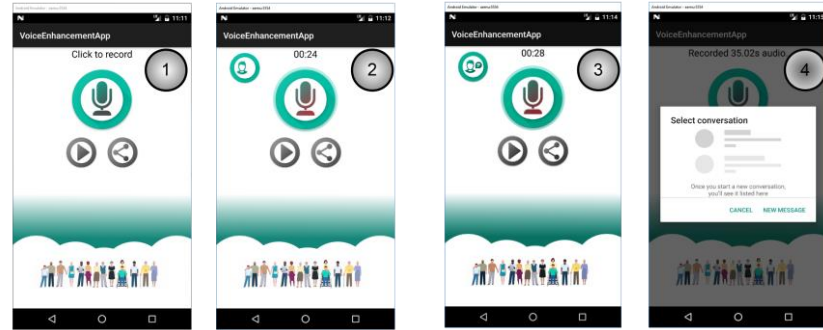
(b)



(c)



(d)



Walking assistant

Early prototype for a smartwatch app that assists PwP with gait based on adaptive rhythmic acoustic and/or vibration cues.

Voice enhancement

A smartphone app targeted for PwP that allows them to record voice messages that are enhanced in terms of voice quality and can be shared to compatible apps, e.g. WhatsApp

Datasets

DATA COLLECTION (ETHICS + GDPR COMPLIANT)

GData study

Remote data crowdsourcing from smartphones via the iPrognosis application for Android (available on Play Store).

- >2,500 participants
- 10 countries (EU, UAE & Australia)
- ~ 200 GB of data

IData study

Feasibility study for the iPrognosis games by i-PROGNOSIS clinical partners in UK, Germany and Greece.

- >30 participants
- Game metrics + Skeleton data
- User feedback

SData study

In-the-wild data collection + clinical assessment study by i-PROGNOSIS clinical partners in UK, Germany and Greece.

- >100 participants
- GData + data from wearables
- Clinical assessment (x2) of participants

Small-scale data collections

Small-scale data collections in lab conditions and under stricter protocols for early proof of concept and algorithm development.

- 6 different experiments
- Data collection related to G/SData
- Clinical assessment of participants

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FEB 2016 – JAN 2017

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FEB 2017 – JAN 2018

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[13] M. Tanuadi, et al., "Automatic estimation of the triangular vowel space area from I Parkinson's Disease", *ITG Fachtagung Sprachkommunikation/Speech Communication, OI 2018*.

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Current state and future

OFF TO A GOOD START



Rated as 'Excellent' by the EC

The i-PROGNOSIS project was rated as "Excellent" after the final review by the European Commission and independent monitors



Most Innovative Project award

AgeingFit 2020: The i-PROGNOSIS project was voted as the most innovative project among 200 contenders

FUTURE

ai·prognosis

From i-PROGNOSIS to AI-PROGNOSIS: a new funding proposal will be submitted in June 2022 to EU for a follow-up project and continuation / expansion of R&D.

Real world experience: The proposal foresees that mature i-PROGNOSIS technologies and new ones will be tested with users and healthcare professionals.

PROTEIN: Personalized nutrition for healthy living



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant agreement No 817732.

WHAT IS PROTEIN?



EU-funded Horizon 2020 Research Project

**20 expert, technical &
policy-making partners**

Coordinated by Center for Research &
Technology (CERTH), Greece

~ 25,000 users involved

25000 users for all 20 pilots for the
duration of the pilots

3,5 years

From Jan 2019 to June 2022

~ 7,000,000 €

EU funding

OVERALL OBJECTIVE

The overall objective of the PROTEIN research project is to promote healthy lifestyles, in order to improve the general state of health of the European population, using the latest technologies to offer advanced personalization tools for nutrition and physical activity plans.



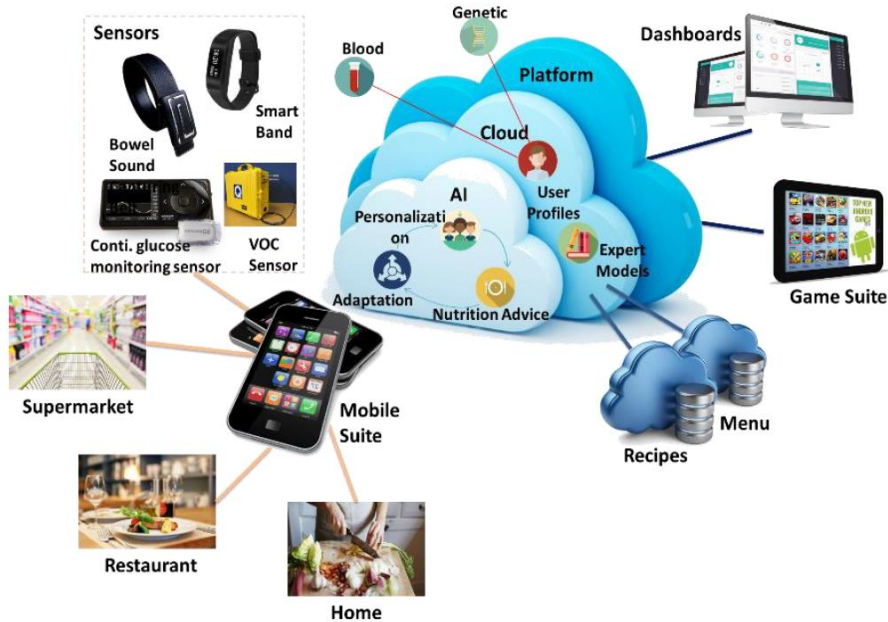


PROTEFI

PERSONAL



THE PROTEIN APPROACH



1 Multimodal sensing technologies

Smartphone, smart band, smart belt, smart scale, volatile organic compounds sensor (VOC)

2 Mobile technologies

Mobile app suite in various environments (supermarket, restaurant, home)

3 Artificial Intelligence

User modelling, personalization and system adaptation

4 Web technologies

Dashboards for users, nutritionists and medical experts

5 Gamification and games

Dietary games

FOR WHOM IS THE PROTEIN PROJECT?



CITIZENS OF THE EUROPEAN UNION

The general public, including youth and seniors, who are motivated to improve their health through healthy eating and physical activity.



PEOPLE WITH SPECIFIC NUTRITIONAL NEEDS

Individuals living with chronic diseases who are under medical or nutritionist supervision.



HEALTHCARE PROFESSIONALS

Clinicians who provide care for individuals living with chronic diseases or people who special nutrition and physical activity care plans.



DISTRIBUTORS AND FOOD SUPPLIERS

Business leaders in the food retail and restaurant industry who want to offer personalized experiences and services to their clients.



INTERDISCIPLINARY RESEARCHERS

Scientists in areas of nutrition, physical activity, chronic disease, social sciences, and Information and Communications Technologies (ICT).



DECISION MAKERS

Individuals who are working on nutrition, physical activity and chronic disease policies across Europe.

PROTEIN CONSORTIUM

(20 partners from a total of 11 European countries)



HOW DOES THE PROTEIN PROJECT WORKS?

EXPERT KNOWLEDGE

Collection of real life and scientific evidence that will inform the PROTEIN ecosystem in terms of user needs, preferences, and personalized goals.

DATA EXTRACTION

Analysis of data collected through mobile and intelligent devices and deep learning techniques that will inform personalized plans, metrics, and outcomes.

USER PROFILES

Creation of end user profiles leveraging artificial intelligence algorithms that will provide individualized health device through the PROTEIN Game Suite.

PUBLICATIONS

NOISE-ASSISTED MULTIVARIATE VARIATIONAL MODE DECOMPOSITION

INFO@PROTEIN-H2020.EU ▣ February 16, 2021

Charilaos A. Zisou, Georgios K. Apostolidis, Leontios J. Hadjileontiadis The variational mode decomposition (VMD) is a widely applied optimization-based method, which analyzes nonstationary signals concurrently. Correspondingly, its recently proposed multivariate extension, i.e., MVMD, has shown great potentials in analyzing multichannel signals. ...

A DEEP NETWORK FOR AUTOMATIC VIDEO-BASED FOOD BITE DETECTION

INFO@PROTEIN-H2020.EU ▣ January 20, 2021

Dimitrios Konstantinidis, Kosmas Dimitropoulos, Ioannis Ioakimidis, Billy Lang-Le, Petros Daras Past research has now provided compelling evidence pointing towards correlations among individual eating styles and the development of (un)healthy eating patterns, obesity and other medical conditions. In this setting, an automatic, ...

A CROSS-MODAL VARIATIONAL FRAMEWORK FOR FOOD IMAGE ANALYSIS

INFO@PROTEIN-H2020.EU ▣ November 13, 2020

T. Theodoridis, V. Solachidis, K. Dimitropoulou, and P. Daras Food analysis resides at the core of modern nutrition recommender systems, providing the foundation for a high-level understanding of users' eating habits. This paper focuses on the sub-task of ingredient recognition from ...

SINGLE IMAGE-BASED FOOD VOLUME ESTIMATION USING MONOCULAR DEPTH-PREDICTION NETWORKS

INFO@PROTEIN-H2020.EU ▣ September 18, 2020

Graikos A., Charisis V., Iakovakis D., Hadjilimitriou S., Hadjileontiadis L. (2020) Single Image-Based Food Volume Estimation Using Monocular Depth-Prediction Networks. In: Antona M., Stephanidis C. In this work, we present a system that can estimate food volume from a single input ...

A SURVEY ON AI NUTRITION RECOMMENDER SYSTEMS

INFO@PROTEIN-H2020.EU ▣ September 18, 2019

Thomas Theodoridis, Vassilios Solachidis, Kosmas Dimitropoulos, Lazaros Gyrnopoulos, and Petros Daras The goal of this work is to provide an overview of existing approaches regarding AI nutrition recommender systems. A breakdown of such systems into task-specific components is presented, as well ...

Obrigada pela vossa atenção

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