



RESEARCH - TECHNOLOGY - INNOVATION FOR SUSTAINABLE GROWTH

Parasurf: A valuable tool in Biomedical Research

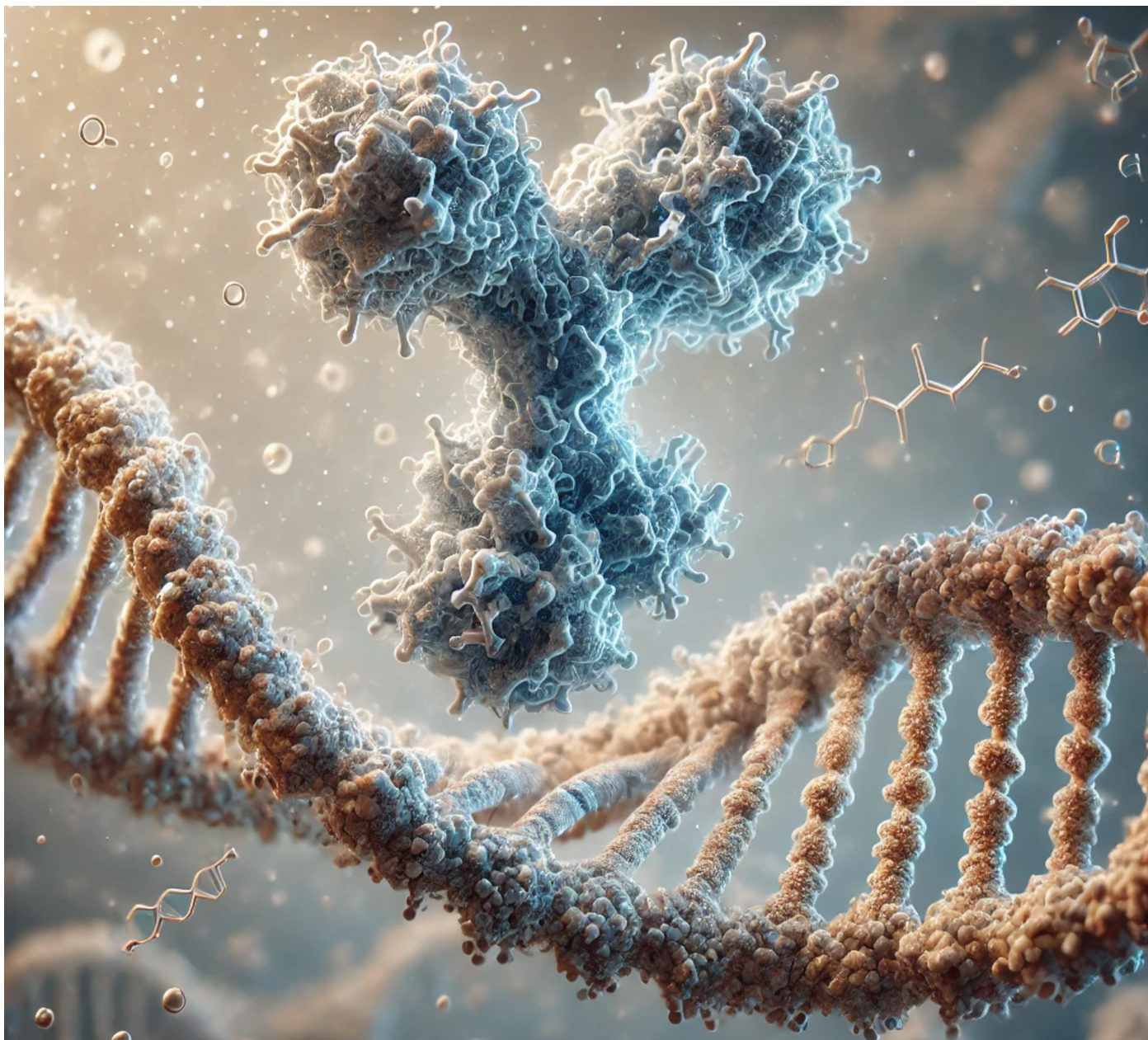
The ability of ParaSurf to accurately identify antibody binding sites makes it a valuable tool in biomedical research and the development of therapeutic antibodies



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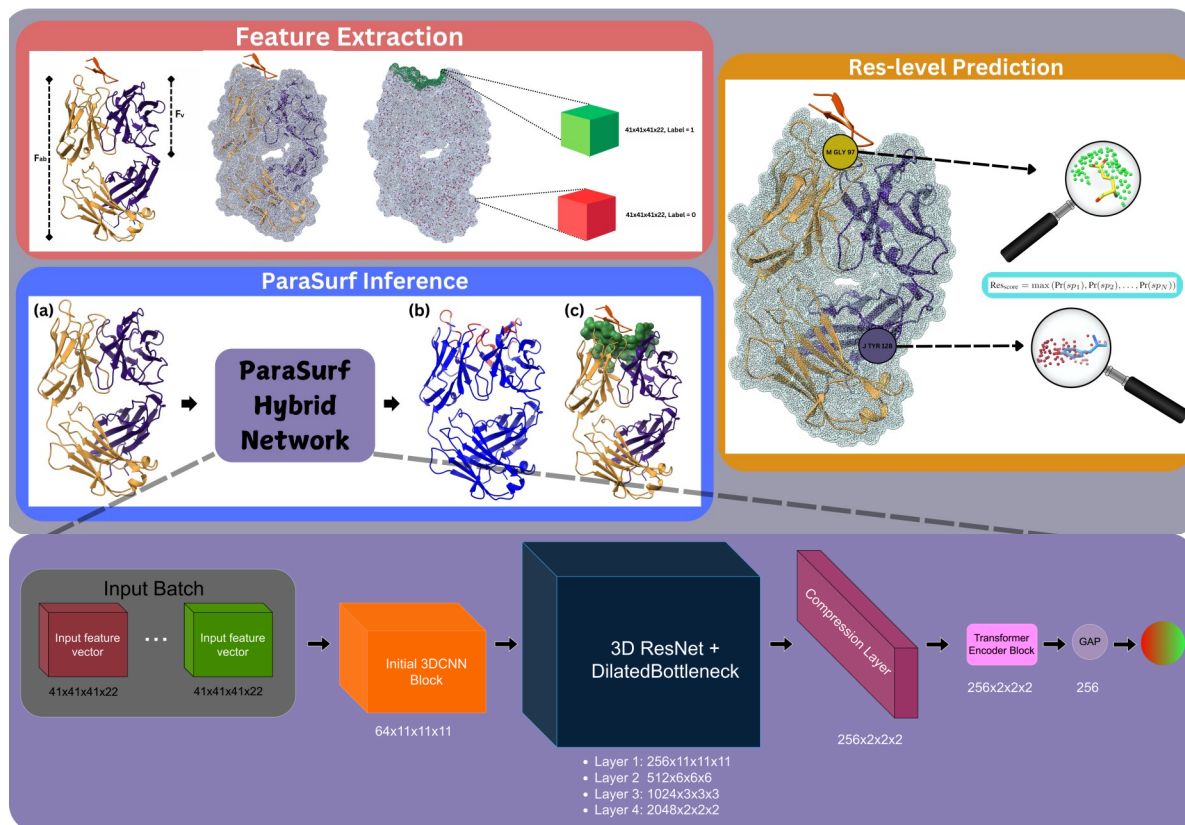
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PARASURF JOINS NEUROSAP AND SUPERBIO: AI DRIVEN ANTIBODY-ANTIGEN BINDING SITE PREDICTION NOW ACCESSIBLE TO ALL

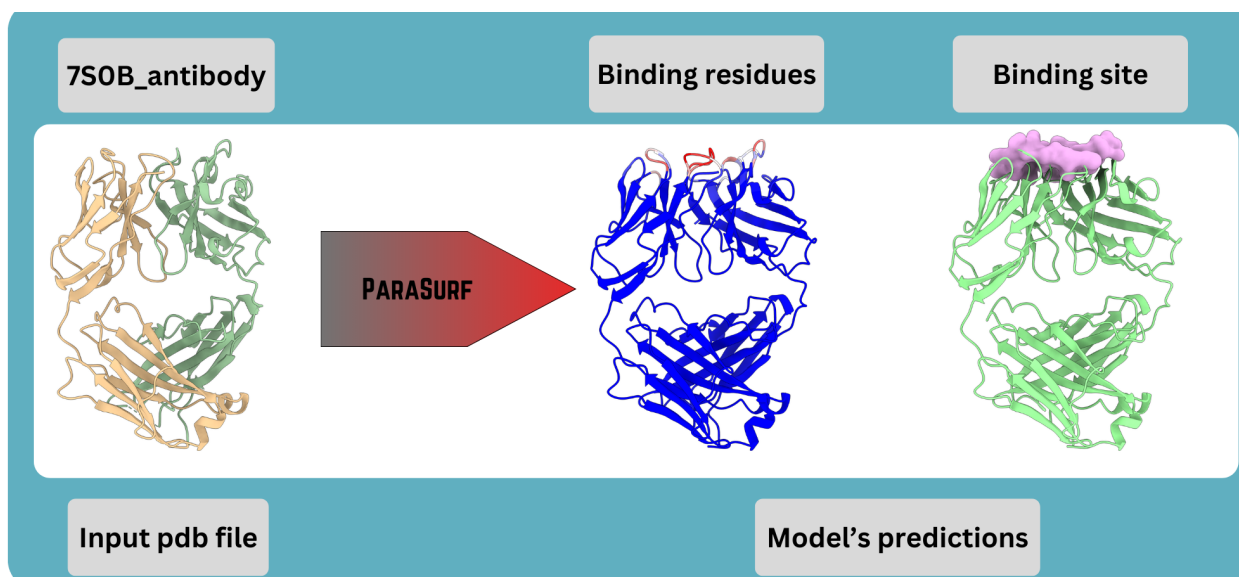
Researchers from the Centre for Research and Technology Hellas and the Technical University of Madrid developed ParaSurf, a state-of-the-art deep learning model for antibody-antigen interaction prediction.

ParaSurf, which is particularly useful in biomedical research and drug development, has now been integrated into both Neurosnap and Superbio. These two companies are startups based in Delaware and San Francisco, respectively, and they host two of the leading AI platforms for structural biology.



More specifically, ParaSurf predicts antibody binding sites by analyzing molecular surface features, including geometric, chemical, and electrostatic properties. These features are used to train a hybrid deep neural network that combines a 3D ResNet with a transformer module. Neurosnap hosts cutting-edge models such as

AlphaFold3, DiffDock, and now ParaSurf, making antibody-antigen binding site prediction more accessible than ever. Similarly, Superbio hosts models, making artificial intelligence in the life sciences universally accessible.





Η ομάδα ανάπτυξης του ParaSurf - From the top and left: Angelos-Michael Papadopoulos, Apostolos Axenopoulos, Anastasia Iatrou, from the bottom and left: Kostas Stamatopoulos, Federico Alvarez, Petros Daras

This integration allows researchers to easily analyze antibody binding sites without the need for extensive computational resources or local installations. By simply uploading an antibody structure, users can obtain high-confidence binding site predictions in less than a minute.

This marks a major milestone in making AI-powered antibody design and validation more efficient and accessible as ParaSurf can serve as a powerful tool for validating new protein binder designs in silico.

ParaSurf's Contribution to Biomedical Research

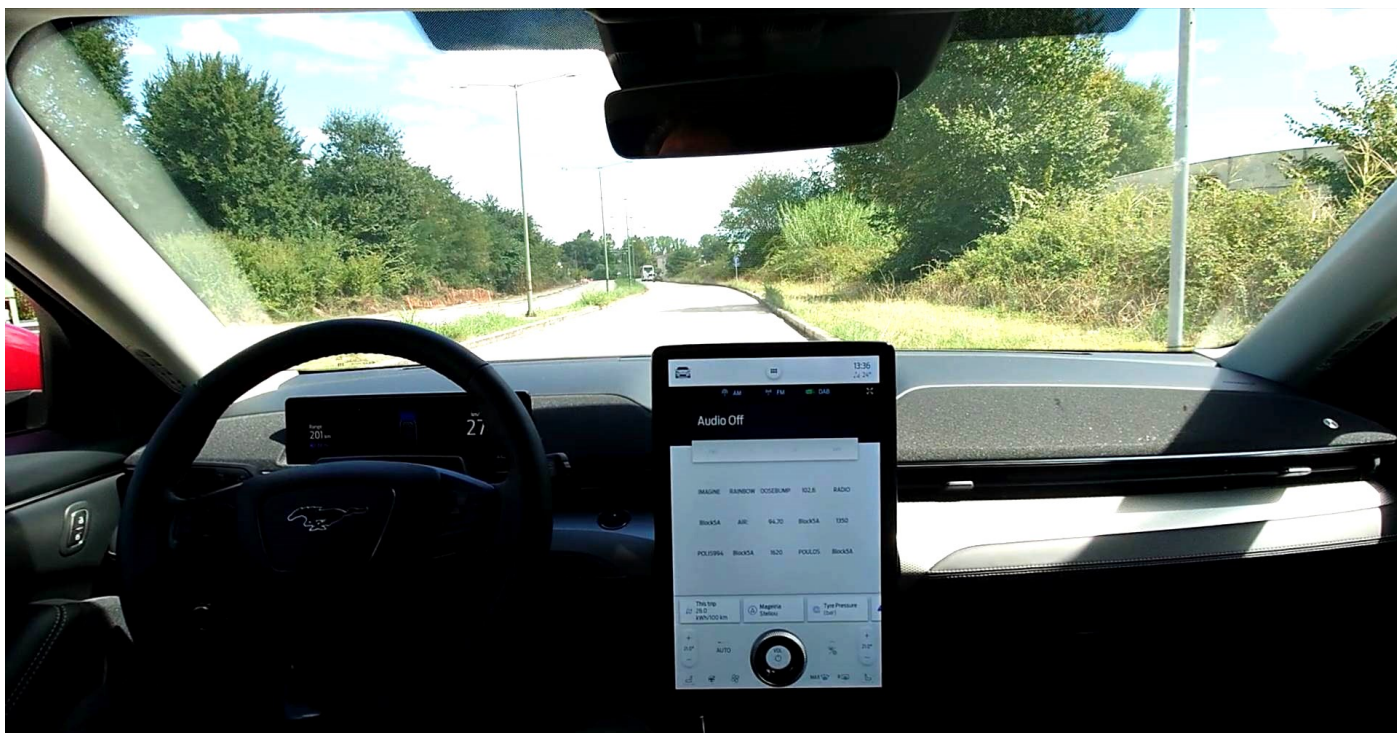
The ability of **ParaSurf** to accurately identify antibody binding sites makes it a **valuable tool in biomedical research and the development of therapeutic antibodies**. Some of its key applications include:

- Advancement of Therapeutic Antibodies:** Pharmaceutical companies can use **ParaSurf** for faster and more accurate se-

lection of antibodies with **strong binding affinity to pathogens**, leading to more effective treatments.

- Analysis of Immune Responses:** Researchers can study how different antibodies interact with antigens, contributing to a **better understanding of immune mechanisms** and the **development of new vaccines**.

- Personalized Medicine:** By analyzing interactions between **patients and molecular targets**, **ParaSurf** can support **personalized therapeutic approaches**, providing **predictions tailored to the genetic profile of each patient**.



TRANSITION TO SUSTAINABLE URBAN MOBILITY: THE CONTRIBUTION OF THE RESEARCH PROJECT SHOW

The successful implementation of SHOW, under the technical supervision of the Hellenic Institute of Transport of CERTH, contributed to connected and automated mobility, paving the way for smarter, more secure and sustainable mobility solutions.

The SHOW project aimed to support the transition towards sustainable urban mobility through technical solutions, business models, and priority scenarios, by deploying shared, connected, and electric fleets of automated vehicles in public transport services, demand-responsive transport, that use mobility and freight transport as a service.

SHOW transported approximately 200,000 passengers and 5,500 parcels across 20 open and mixed traffic environments and 4 controlled environments with 72 demonstration SAE L3+/L4 automated vehicles of all types (buses, minibuses, trucks, robotaxis, delivery robots, and articulated vehicles), while conducting large-scale tests in urban and peri-urban areas.



Επίδειξη της υπηρεσίας μεταφοράς επιβατών που λειτουργεί στο Monheim με Easymile Gen 3 αυτοματοποιημένα οχήματα, παρουσία της CINEA και του αξιολογητή του έργου.

SHOW TRANSPORTED APPROXIMATELY 200000 PASSENGERS AND 5500 PARCELS IN 20 OPEN AND MIXED TRAFFIC ENVIRONMENTS ENVIRONMENTS AND 4 CONTROLLED ENVIRONMENTS WITH 72 DEMONSTRATION SAE L3+/L4 AUTOMATED VEHICLES OF ALL TYPES

The Hellenic Institute of Transport (HIT) of CERTH was the Technical Coordinator and Innovation Leader of the project. Among other tasks, it led the work related to identifying the needs and priorities of the ecosystem, developing the use scenarios for the project, collecting, processing, and analyzing big data, developing Artificial Intelligence services and personalized services, as well as collaborative services (V2X) for vulnerable road users.

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The SHOW research project was funded by the European Commission in the framework of Horizon 2020 program and its duration was 57 months.



THE RESEARCH PROJECT WQeMS FEATURED IN COPERNICUS OBSERVER

WQeMS project has been highlighted in the latest issue of the Copernicus Observer, the communication platform associated with the EU's Copernicus Programme. It is demonstrated among ten research initiatives that prepare the future of Earth observation through the Copernicus pro-

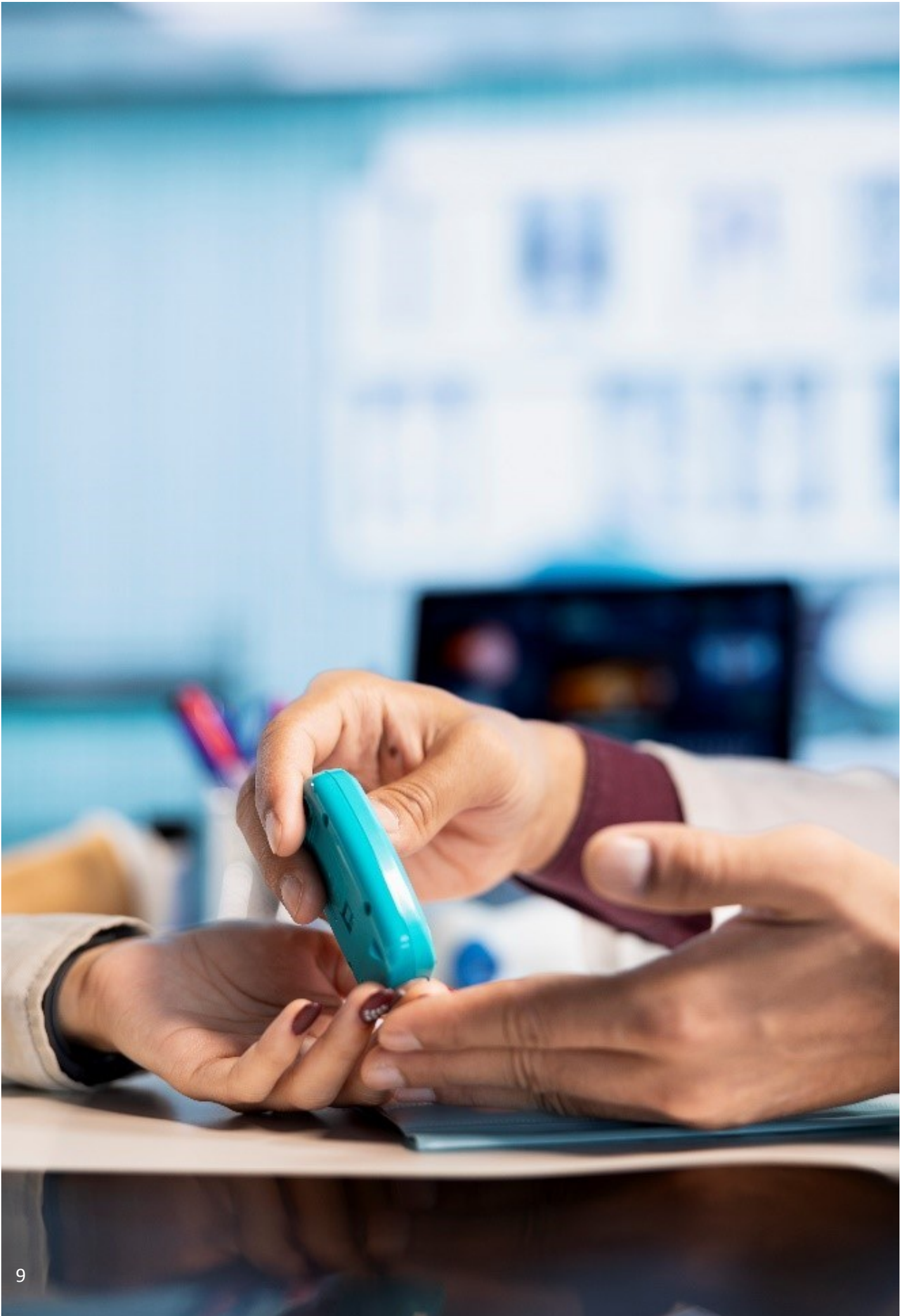
gramme. The inclusion of WQeMS in this exclusive list is an acknowledgement of its offer for reliable, accessible, and actionable insights into water quality towards the scientific community, policymakers, industry, and the public.



Aligned with the goals of Copernicus, WQeMS leveraged data from Sentinel satellites and other sources to improve water quality monitoring and manage risks such as floods and droughts.

This recognition underscores the project's innovative approach to leveraging satellite data for water quality monitoring and management. Moreover, it is an official identification by Copernicus for WQeMS's vital role in supporting

sustainable water resource management and addressing global environmental challenges. For more details on the Copernicus Observer article, please visit [Copernicus Observer](#).



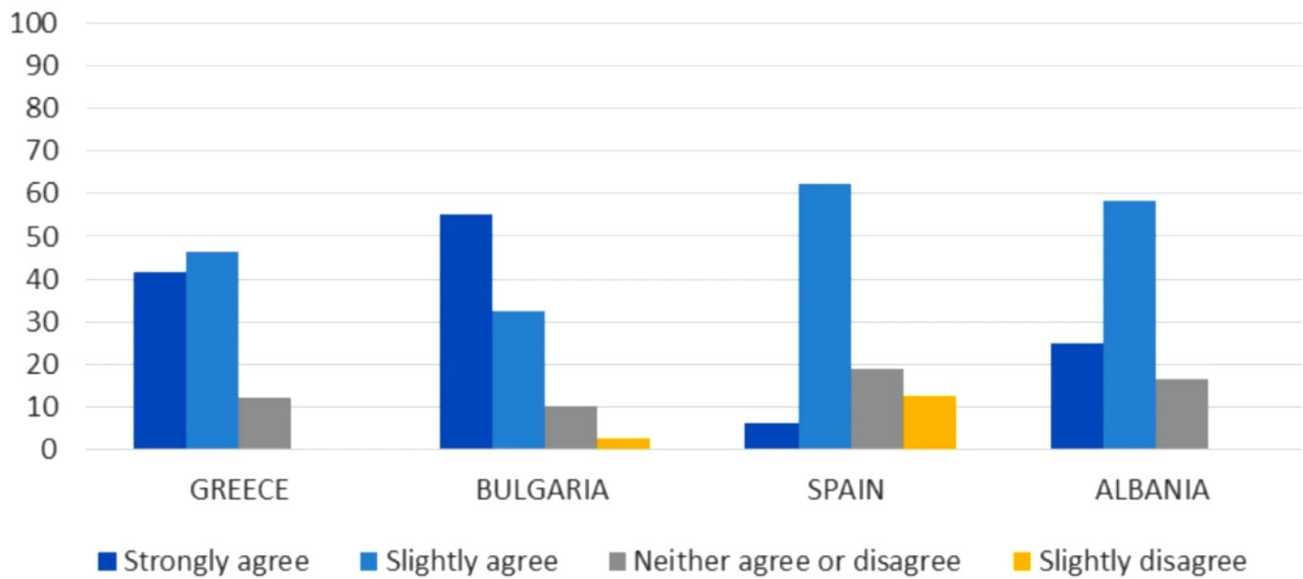
EARLY DETECTION OF DIABETES IN THE COMMUNITY THROUGH THE ADOPTION OF DIGITAL TOOLS

Diabetes is a prevalent and significant health issue worldwide, affecting millions of individuals and posing substantial challenges to healthcare systems. As the prevalence of diabetes continues to rise, it becomes increasingly crucial to focus on preventive measures to curb its impact. Early identification may delay or prevent disease progression allowing also the introduction of preventive strategies in time.

Digital screening programs offer a convenient, scalable and accessible (24/7) approach to reaching a broader population through the use of digital tools such as web platforms or smartphone apps, making identification of people at risk for diabetes and its complications possible. By embracing digital solutions, healthcare professionals can augment their current diagnostic practices and expand their

reach to high-risk populations. Additionally, patients can benefit from a more proactive approach to their health, with the possibility of early intervention leading to better health outcomes and improved overall well-being. However, digital screening programs for diabetes in the general population are still in their infancy presenting research gaps, opportunities and challenges.

Potential to bring major changes in clinical practice

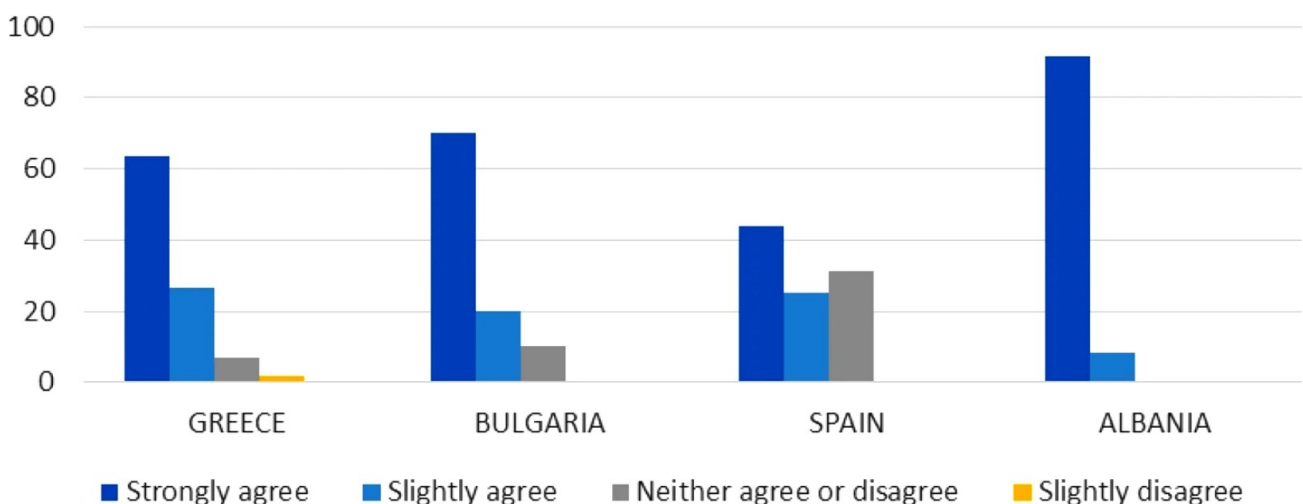


In alignment with this need, a large-scale study has been conducted in the context of the EU project **DigiCare4You**, taking place in several European countries. The present study has been implemented by different stakeholders, health professionals and citizens, including patients, with the ultimate goal to thoroughly evaluate the usability and acceptance of a digital screening tool for Type 2 Diabetes Mellitus, enabling to

collect and display demographic, anthropometric, medical, as well as lifestyle information.

In terms of this study, 109 health professionals and 71 citizens from four (4) European countries—Bulgaria, Albania, Spain, and Greece—contributed towards the collection of survey data. Participants were invited to implement and evaluate the digital diagnostic tool developed within DigiCare4You.

Intention to use a tool like this when it becomes available in my healthcare center





The authors of CERTH: Andreas Triantafyllidis, Sofia Segkouli, Konstantinos Votis

Among the main considerations of **Digi-Care4You** researchers, was to evaluate users' interaction with the digital diagnostic tool. In order to ensure users' convenience, questionnaires were administered to collect their opinions, perceptions, and overall experience during the testing process of the digital tool.

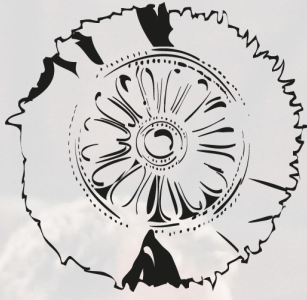
The main purpose of the study was to assess usability (ease of use) issues of the screening tool. To this end, the reliable instrument of System Usability Scale (SUS) was used which yielded satisfactory results for health professionals (SUS score = 73.9) and citizens (SUS score = 68.06). The majority of participants found the digital tool useful and easy to learn.

Overall, the results indicated the acceptance and usability of the tool by health professionals and citizens from different European countries with different types of health systems.

The present research paves the way for the successful implementation and wider adoption of digital tools' use for the early detection of chronic diseases such as Diabetes Mellitus, promising enormous benefits for citizens' healthcare and the clinical practice.

Related links: <https://link.springer.com/article/10.1007/s10209-024-01181-4>

<https://digicare4you.eu>



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CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

The **Centre for Research and Technology-Hellas (CERTH)** founded in 2000 is one of the leading research centres in Greece and listed among the TOP-15 E.U. institutions with the highest participation in competitive research grants.

Today CERTH includes the following five institutes with indicated major fields of research:

- **Chemical Process and Energy Resources Institute (CPERI)** Sustainable & Clean Energy, Environmental Technologies, Chemical & Biochemical Processes, New Functional Materials
- **Information Technologies Institute (ITI)** Informatics, Telematics and Telecommunication Technologies, Safety and Security
- **Hellenic Institute of Transport (HIT)** Smart Sustainable Mobility, Transport Safety
- **Institute of Applied Biosciences (INAB)** Agri-biotechnology, Health Translational Research, Informatics for big bio-data
- **Institute for Bio-Economy and Agri-Technology (IBO)** Bio-economy, Agri-technology

