Press Release

For Immediate Release

Waterford tech experts bid to predict depression earlier in patients who've undergone cancer treatment

TSSG global coordinator in €5 million FAITH project

IRISH scientists are leading the way in a ground-breaking research project which they hope will predict depression earlier in cancer patients via their smartphones and trusted medical markers and ultimately improve survivors' quality of life and treatment aftercare.

As many as one in five cancer sufferers experience depression and mood change post diagnosis. Researchers in Waterford have now teamed up with globally-renowned cancer hospitals and consultants and research colleagues in Portugal, Spain, Italy and Cyprus for the early intervention FAITH project, an initiative which may also have wider application outside of cancer care.

The €5 million, EU-funded initiative is designed to care for the mental health of patients post treatment and help them on their road to recovery, the research team headquartered at the Telecommunications, Software and Systems Group (TSSG) at Waterford Institute of Technology say.

Together, they will apply the latest, secure artificial intelligence (AI) and machine learning techniques to an interactive app on patients' phones. FAITH will help to better model and predict disease and treatment pathways and intervene early if mental health supports are required.

Data sources such as a patient's activity, outlook, sleep, appetite and voice tone are monitored, with additional data is gleaned through a series of questions asked through the FAITH monitoring system daily.

FAITH's 'AI Angel' remotely analyses depression markers, predicting negative trends in their disease path, giving their healthcare providers advanced warnings and ultimately allowing for timely intervention. These markers are assessed in accordance with the traditional, tried and trusted 3M strategy for population health – Monitor, Measure and Manage.

To protect privacy of the individual, but still gain insights that are beneficial to the broader population, FAITH is based on federated machine learning, which makes it possible to build machine learning systems without direct access to personal treatment data.

Project Co-ordinator, Gary McManus of the Telecommunications, Software and Systems Group (TSSG) at Waterford Institute of Technology, says it's the most exciting healthcare project he has ever undertaken at the edge of city research hub.

"Central to the vision of the FAITH project is to measure population health deeply. We will monitor individuals on a continuous basis to cast a wide net over their health data. A key strength of FAITH is the involvement of eminent cancer hospitals and specialists in the consortium.

"We will work together to produce relevant, applicable cancer care related findings that can effectively leverage a big data framework using computational intelligence approaches and methodologies that can be used for long term cancer care health risk and symptom minimisation for patients.

"FAITH has trial sites in Madrid, Waterford and Lisbon. This isn't research for the sake of research. FAITH is potentially life-changing," he said.

The project will include invaluable input from two breast cancer hubs and one lung cancer specialist centre in Portugal, Philip O'Brien, Technical Co-ordinator, explained.

"The hospitals are very eager to get this project underway. They are very interested in AI and how to apply it in a myriad of health settings. Our key role in TSSG will be in technical coordination of the project. We will be responsible for driving the development of the AI models, as well as the deployment of the federated learning framework.

"FAITH will be an early warning system for doctors and allow them to be proactive instead of reactive. As soon as there is a negative shift in a patient's mental wellbeing it triggers an alert." he said.

Commenting on the significance of FAITH, Dr. Sasitharan Balasubramaniam, Director of Research at TSSG says: "Cancer and post cancer care will affect all of us during our lifetime. FAITH is a passion project for the team and one TSSG are delighted to be co-ordinating as we aim to work on more projects that will benefit the society of the future."

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Photo Caption – also in file info:

The FAITH team at TSSG in WIT. From left: Yahya Almardeny, Junior Software Systems & Machine Learning Engineer, Gary McManus, Research Project Manager, Philip O'Brien, Technical Lead, Christine O'Meara, Commercialisation Specialist. Their ground-breaking research project aims to predict depression earlier in cancer patients via their smartphones and trusted medical markers and ultimately improve survivors' quality of life and treatment aftercare.

Editor's Note:

Within FAITH, we will pursue its realisation through 5 concrete objectives:

- Specify the scope of the of the **FAITH** framework through elicitation of use-cases; leading to the development of functional and non-functional requirements, user stories to cover these, and a reference architecture.
- Successfully integrate the appropriate middleware, software components, tools and libraries in order to deliver a federated learning framework for secure experimentation, composition, exploration, and ultimately deployment in line with requirements.

- Deploy Federated AI models across a broad population base to deliver distinct personalised models.
- Implement a voice/NLP interface to gauge a user's mental outlook.
- Demonstrate the applicability, usability effectiveness and value of the FAITH concepts, models, mechanisms, and techniques in real-world scenario under pragmatic conditions against a pre-defined set of use-cases.

About TSSG

Waterford Institute of Technology's (WIT) ICT research wing Telecommunications Software and Systems Group (TSSG) is a major driver in the emergence of a telecommunications industry in the South East of Ireland. In the last five years alone, TSSG has secured funding in excess of €120 million under EU Programmes, making it one of the most successful ICT research centres in Ireland.

TSSG has a proven track record in translating world class research into market-ready products and services and has enabled the establishment of an eco-system of mobile service companies in the South East of Ireland and beyond, creating several hundred jobs directly and indirectly in the last ten years.

Established 20 years ago, TSSG currently consists of over 80 research scientists and engineers; they have graduated over 20 PhD Students and manage an active international network in excess of 700 partners from industry, academic and research institutes spread across 35 countries worldwide.

Through collaboration with industry, TSSG leverages funding to create real job opportunities in strategically important industries such as ICT, agriculture, pharmaceutical and healthcare and energy. The aim of TSSG is to work closely with industry to create new jobs through the development of core research, strong connectivity with indigenous industry as well as large multinationals, supporting high potential start-ups and partnerships with other institutes.

TSSG has expertise in the area of communications technologies, creative development, Artificial Intelligence and IoT systems, and so, can bring this expertise to bear across multiple industry verticals.

TSSG has over 20 years' experience in large scale platform specification (architecturally) and development (e.g. www.ict-societies.eu) of enabling technologies to ensure inter-system communication. It has years of experience in development of solutions from scenario to use case to implementation. Additionally, through its security research work in TSSG, it has completed projects which require implementation of regulatory-compliant, secure, technologies. Note technology solutions developed by TSSG cover all aspects of the research lifecycle, from Basic Research through to Commercial Development.

In addition, TSSG has a dedicated software verification and validation group which can manage large scale integration and test from initial requirements through to final deployment.