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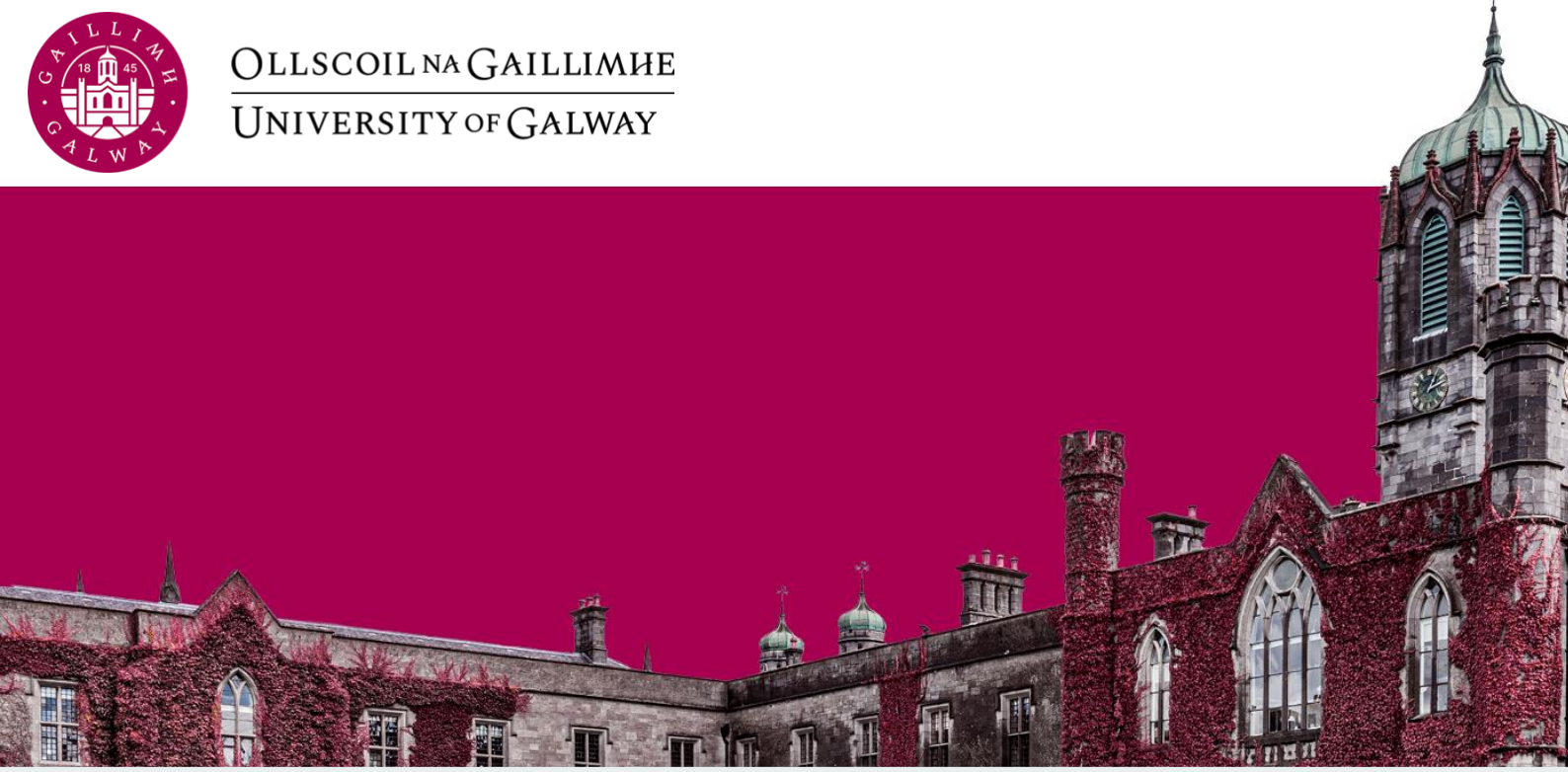

Sustainable Digital Health Innovation Conference

#SDHIConf22

October 14th, 2022

Galmont Hotel & Spa, Galway

In partnership with

Ollscoil na Gaillimhe University of Galway
Institiúid Whitaker don Nuálaíocht & don Athrú Sóisialta
Whitaker Institute for Innovation & Societal Change

Ollscoil na hÉireann
National University of Ireland

mHealth research group

LERO Software for a better world

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Welcome to the Sustainable Digital Health Innovation Conference

Dear Delegate,

We are delighted to welcome you all to the Sustainable Digital Health Innovation Conference 2022. This interdisciplinary event follows on from our successful mHealth conferences that we held in Galway between 2015 and 2018 and promises to be an equally exciting exploration of state-of-the-art digital health research through stimulating talks from expert Keynote Speakers as well as dedicated panel discussions. This event will provide a forum for health researchers, practitioners, policy makers and colleagues from industry to hear from leading international and national experts on the latest innovations in digital health. Delegates will have the opportunity to network with colleagues working in research, healthcare practice and industry. The conference is hosted by the School of Psychology at the University of Galway and is supported by the NUI Grant Scheme for Early Career Academics, the Whitaker Institute for Innovation and Societal Change and LERO, the Science Foundation Ireland Research Centre for Software. We look forward to your participation and hope that you will find it a rewarding and stimulating event!

The SDHI Conference Committee

SDHI Conference Committee Members

Eimear Morrissey

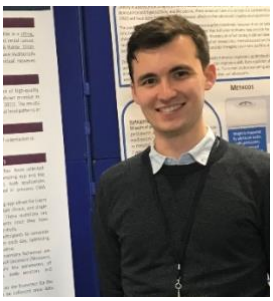
Jane Walsh

Gerry Molloy

Rory Coyne

Marcia Filipa Carvalho

Jenny Groarke



David Healy

Eanna Kenny

Leona Ryan

Nikolett Warner

Acknowledgements

We would like to thank the following most sincerely

PPI Contributors

Dr Ian McCabe, Dr Jennifer Doran, Mr Jack Pinder

Invited Speakers

Prof Keith Petrie, Dr Kathleen Ryan, Dr Eline Smith, Prof Derek O'Keeffe, Prof Elizabeth Broadbent, Prof Chris Nugent, Prof Cristiano Paggetti, Dr Michael White, Dr Rachel Carey, Dr Emma Carr, Dr John Dinsmore, Dr Martin Serrano, Mr Jim McGrane

Poster Presenters

A sincere thanks to all who submitted posters to the conference and to the poster judges

Videographer and Photographer

Cormac Staunton and Angus McMahon

Conference Sponsors

The National University of Ireland, the Whitaker Institute for Innovation and Societal Change and, LERO, the Science Foundation Ireland Research Centre for Software

Conference Venue Host

The Galmont Hotel and Spa

SDHI Conference Programme

Sustainable Digital Health Innovation Conference 2022 Programme

Galmont Hotel & Spa, Galway, Ireland — Friday October 14th — #SDHIConf22

Registration and tea/coffee	09:00-09:15
Welcome and official opening	09.15-9:30
SESSION ONE: Person-Centred Design in Digital Transformation	
Professor Keith Petrie (University of Auckland) Using animations to improve patient health outcomes	09:30-9:50
Dr Kathleen Ryan (Stryker/DCU) Person-centred approaches to digital health behaviour change: a focus on healthcare practitioners	09:50-10:10
Dr. Eline Smit (University of Amsterdam) The use of digital health research in times of crises and how a group of digital health enthusiasts can help	10:10-10:30
Panel Discussion - Q&A	10:30-10:40
Embedding PPI in an island based virtual healthcare project: Experience of the Home Health team Jack Pinder, Dr Ian McCabe, Dr Jennifer Doran	10:40-11:00
COFFEE BREAK and poster presentations	**11:00-11:30**
SESSION TWO: Emerging Technologies and Healthcare	
Professor Derek O'Keeffe (LERO, UCHG, University of Galway) Clinical innovation: bedside to bench to bedside	11:30-11:50
Professor Elizabeth Broadbent (University of Auckland) Empathetic virtual humans for health	11:50-12:10
Professor Chris Nugent (Ulster University) What to expect from digital twins: a case study in activity recognition in smart environments	12:10-12:30
Panel Discussion - Q&A	12:30-13:00
LUNCH and poster presentations/judging	**13:00-14:00**
SESSION THREE: Industry, Innovation, Impact and Sustainability	
Professor Cristiano Paggetti (MEDEA, Italy) Adoption and deployment strategy to maximize the impact of emerging digital technologies	14:00 – 14:15
Dr Michael White (Louis Pasteur Institute, Paris) Development of a mobile-technology supported intervention for the surveillance and treatment of malaria	14:15-14:30
Dr Rachel Carey (Zinc, UK) The role of research and researchers in digital health ventures: what does 'good' look like?	14:30-14:45
Dr Emma Carr (Amara Therapeutics) Translating research into practice: report from a digital therapeutics start-up	14:45-15:00
Dr. John Dinsmore (TCD) Advancing the transferability of digital health solutions for multimorbidity self-management in Europe	15:00-15:15
Dr Martin Serrano (Insight, University of Galway) AI and the internet of robotic things in the fight for reducing health risks	15:15-15:30
Expert panel discussion on future directions	15:30-15:50
Poster prizes, twitter awards and conference closing	15:50-16:00

In partnership with Ollscoil na hÉireann National University of Ireland — LERO Software for a better world

Guest Speakers

PPI Panel & Discussion

The HOME HEALTH project is an SFI/Industry collaboration bringing remote healthcare to an Irish offshore island: Clare Island, Co Mayo. The project will combine remote monitoring, virtual consultations, illness prevention, drone delivery, home telepresence, robot triage, VR education, and AI monitoring techniques. PPI has been built into the framework of the project with active community participation from inception through to its current stage of implementation.

Dr Jennifer Doran is the research physician on the Home Health Project. A medical doctor by trade, Jennifer is passionate about improving healthcare outcomes for communities who experience barriers to access. With a background in law and politics, her career has spanned the Human Rights Law Network, European Parliament, BBC, RTE and the Simon Community. She has been awarded the UCD Academic Excellence Medal in Forensic and Legal Medicine and the Butterworths National prize in Media Law.

Dr. Ian Mc Cabe of the HIVE Lab at University of Galway's School of Medicine and previously of the National Centre for Laser Applications (NCLA), a part of the School of Physics is project Manager of the HOME HEALTH project. Ian has a background in Physics and Bioengineering having completed his PhD in Syracuse University in 2015. Ian has worked on capturing and managing innovation in healthcare startups using the Key Enabling Technologies through the Atlantic KET Med project targeting the next generation of healthcare innovation.

Jack Pinder of the HIVE Lab at University of Galway's School of Medicine. Jack graduated from National University of Ireland Galway in Applied Social Sciences and is now the PPI (Public Patient Involvement) for the Home Health Project. Representing the needs and wants of the island community in such an important project is paramount as a Clare Islander.

Professor Keith Petrie: Professor of Health Psychology at Auckland University Medical School

Using animations to improve patient health outcomes

Keith Petrie is Professor of Health Psychology at Auckland University Medical School. His research group does work on patients' perceptions of illness, treatment adherence, as well as the placebo and nocebo response. He has also been involved in developing technology solutions to improve adherence and coping with chronic illness. He was an investor and scientific advisor to Twine Health, an early MIT Media Lab spinoff platform that enabled patients to create and manage chronic disease treatment plans in conjunction with their doctors. Professor Petrie's awards include a Fulbright Scholarship, the Gluckman Medal and a Distinguished International Scholar Award from the American Psychological Association. He has been appointed as visiting Professor at Harvard University Medical School. He has been elected as a Fellow of the Association of Psychological Science and of the Royal Society. He is also a recipient of the Durie Medal, which is awarded to New Zealand's pre-eminent social scientist.

Dr Kathleen Ryan: Stryker, DCU

Person-centred approaches to digital health behaviour change: a focus on healthcare practitioners

Dr Kathleen Ryan is a senior behavioural scientist with Stryker at their European Operations Headquarters (R&D) in Cork. There, she leads research to understand the needs, values and behaviours of patients and healthcare providers, with a view to designing person-centred digital health tools. She currently works in a neurosurgical context, promoting optimal patient clinical outcomes, through supporting enhanced surgical performance and reducing cognitive overload during neurosurgery. Dr Ryan also lectures on the BSc 'Psychology and Disruptive Technologies' course in DCU, and co-ordinates a module on 'Behaviour Change and Technology'. She earned a PhD in Digital Health/Human-Computer Interaction (UCC) studying person-centred approaches to health behaviour change. She also holds a BA in Applied Psychology (UCC) and MSc in Health Psychology (NUIG). She works across a range of public and industry-based research projects worldwide. She firmly believes that taking a person-centred philosophy and evidence-based innovation can help solve key challenges in healthcare.

Dr Eline Smit: Associate Professor in Health Communication at the University of Amsterdam

The use of digital health research in times of crises and how a group of digital health enthusiasts can help

Eline Suzanne Smit, PhD is an Associate Professor in Health Communication at the Amsterdam School of Communication Research/ASCoR, University of Amsterdam. Her main research interest concerns digital health communication. Specifically, her research focuses on the integration of innovative digital health communication strategies – such as eHealth and mHealth interventions – into the healthcare setting and the exploration of novel computer-tailoring strategies, like mode and message frame tailoring. Dr Smit has an extensive track record of peer-reviewed articles and has successfully obtained multiple grants for research projects in the digital health communication field. She is the chair of the EHPS special interest group on Digital Health and Computer-Tailoring and serves as the vice-director and secretary of the Amsterdam Center for Health Communication (www.healthcommunication.nl). Her list of publications can be found here.

Professor Derek O Keeffe: LERO affiliate

Clinical Innovation: Bedside to Bench to Bedside

Prof Derek O'Keeffe (Twitter @Physicianeer) holds dual first-class honours degrees in Engineering (Gold Letter) and Medicine (Gold Medal). In addition, he holds a Medical Doctorate and a Masters & PhD in Biomedical Engineering from the University of Limerick and the University of Galway. He was a Fulbright Scholar at Harvard, a Green Templeton Scholar at Oxford and is a graduate of the Endocrinology Clinical Fellowship at the Mayo Clinic, USA. As well as multiple academic publications, he holds biomedical patents and several international research prizes. He was awarded The Outstanding Young Person of the World by Junior Chamber International. He is a Black Belt Taekwondo Instructor, Qualified Pilot, Advanced Scuba Diver & Triathlete. He has previously worked with NASA placing a sleep experiment onboard the International Space Station. In addition, he has acted as Flight Surgeon for a NASA Extreme Environment Mission Operation (NEEMO) where they used digital health data to monitor crew health and make mission decisions. He recently completed the world's first bi-directional care of a patient living in a remote community with drone technology. He currently works as a Consultant Endocrinologist at University Hospital Galway (UHG) and is the Professor of Medical Device Technology at the University of Galway.

Professor Elizabeth Broadbent: Professor of Health Psychology at the University of Auckland

Empathetic virtual humans for health

Elizabeth Broadbent is a Professor of Health Psychology at the University of Auckland, and a fellow of the Royal Society of New Zealand. She initially trained as an electrical and electronic engineer at Canterbury University to pursue her interest in robotics. After becoming interested in the psychological aspects of robotics and in psychoneuroimmunology, she retrained in health psychology. Elizabeth was a visiting academic at the school of psychology at Harvard University and in the Program in Science, Technology, and Society at Massachusetts Institute of Technology in Boston, USA. She obtained a Fulbright award to study companion robots. Her research interests include the use of companion robots and virtual humans in health contexts. She is particularly interested in the emotional connections we form with robots and virtual agents, and how we can build emotional intelligence and empathy skills into technology, to improve health outcomes.

Professor Chris Nugent: Ulster University

What to expect from Digital Twins: A case study in activity recognition in smart environments

Chris is currently the Head of the School of Computing at Ulster University, director of the Pervasive Computing Research Centre and co-Principal Investigator of the Connected Health Innovation Centre. He was awarded a first class honours in BEng Electronic Systems and a PhD in Biomedical Engineering, both from the University of Ulster. His research interests include the development and evaluation of technologies to support pervasive healthcare within smart environments. Specifically, this has involved research in the topics of mobile based reminding solutions, activity recognition and behaviour modelling and more recently technology adoption modelling. He currently serves as the outgoing Program Chair for the Technology Professional Interest Area of the Alzheimer's Association and is one of the Associate Editors for the Editorial Board of the IEEE Engineering Medicine and Biology Conference, Healthcare Information Systems Theme.

Professor Cristiana Paggetti: (MEDEA, Italy)

Adoption and deployment strategy to maximize the impact of emerging digital technologies

Cristiano Paggetti: PHD in Biomedical Engineering, Marie Curie – Post Doc Fellowship. High qualified experience in innovation management, technology development and assessment. High qualified experience in system analysis and user requirements identification at interdisciplinary level in order to identify the proper trade-off among technological solutions and user's needs, usability and ethical issues. Since 1998 he is an expert for the European Commission and European Parliament in the area of e-Health and e-Inclusion and Market Deployment. He participated in several international and regional initiatives related to Ambient Assisted Living and ICT for Ageing, related to policies and strategies to promote the adoption and start-up of ICT for aging services to support active ageing approach.

Dr Michael White: (Louis Pasteur Institute, Paris)

Development of a mobile technology supported intervention for the surveillance and treatment of malaria

Dr Michael White leads the Infectious Disease Epidemiology and Analytics Unit at Institut Pasteur in Paris. His team uses inter-disciplinary research tools spanning mathematical models, epidemiological cohort studies, clinical trials, and multiplex assays to investigate the epidemiology of infectious diseases. A key goal is the development of diagnostics and statistical tools for integrated surveillance of multiple pathogens. Despite this multi-pathogen focus, he has a special fondness for malaria and neglected tropical diseases, and his favourite parasite is definitely *Plasmodium vivax*. Like many other researchers, he has developed a recent interest in coronaviruses, and has made some small contributions in serological assay development. He directs projects supported by the European Research Council, The Bill and Melinda Gates Foundation, and the Fondation pour la Recherche Médicale. He has recently started coordinating PvSTATEM, a Horizon Europe funded clinical trials program to evaluate a novel diagnostic test for *P. vivax* malaria that he co-invented.

Dr Rachel Carey: Chief Scientist, Zinc.

The role of research and researchers in digital health ventures: What does 'good' look like?

Dr Rachel Carey is a behavioural scientist with a background in health psychology. Following completion of her PhD at NUI Galway, Rachel took up a post at University College London in 2014, where she led the Theories and Techniques of Behaviour Change Project. In 2016, she joined Bupa's UK clinical team as Senior Behaviour Change Research Advisor, where she led a collaborative programme of work with UCL. Over the last five years, as Zinc's Chief Scientist, Rachel has built a growing, interdisciplinary R&D team who work with entrepreneurs to create scalable, impact-driven start-ups from scratch. In 2020, Rachel was awarded a UKRI Future Leaders Fellowship, supporting her work to scale-up Zinc's R&D activities. The ambition, with this work, is to create a connected R&D system for the social and behavioural sciences, mobilising talent and knowledge across sectors to accelerate impact on important problems. Rachel also has an honorary role at UCL and is an Associate of the UCL Centre for Behaviour Change.

Dr Emma Carr: Chief Scientific Officer, Amara Therapeutics

Translating research into practice: report from a digital Therapeutics start-up

Emma Carr is co-founder and Chief Scientific Officer of Amara Therapeutics. Emma is a chartered health psychologist, experienced in developing and executing digital health interventions and clinical trials for both industry and national research institutions. Emma is passionate about creating patient-centred, meaningful interventions using high quality research methods to support the digital transformation of healthcare. Her PhD research, for which she was awarded the Psychological Society of Ireland, DHP Ruth Curtis Postgraduate Excellence in Research Award, focused on the science of person-based intervention development in digital health. Emma has lectured on multiple programs including the MSc in Digital Health Transformation at University of Limerick and the MSc in Health Psychology at the University of Galway. She has been an invited speaker on the role of psychology in digital health for organisations such as EIT Health and Science Foundation Ireland.

Dr John Dinsmore: Trinity College Dublin

Advancing the transferability of digital Health solutions for multimorbidity self-management in Europe.

Dr Dinsmore is an Associate Prof. of Digital Health and Integrated Care and Deputy Director of the Trinity Centre for Practice and Healthcare Innovation (TCPHI) at the School of Nursing and Midwifery, Trinity College Dublin. He is also on the UK/Ireland Board of Directors for the European Institute of Innovation and Technology Health. Dr Dinsmore's research primarily focuses on the application of health psychology and behavioural science to the design, development, implementation and evaluation of digital health interventions for individuals self-managing chronic diseases and multimorbidity. Dr Dinsmore has secured significant competitive research funding totalling over €13 million from a variety of international and national award bodies and is coordinator of two H2020 projects; ProACT (http://www.proact2020.eu) and SEURO (http://seuro2020.eu). His talk will explore the research conducted through these two H2020 projects to advance the implementation and transferability of digital health solutions for multimorbidity self-management.

Dr Martin Serrano: Insight, University of Galway

AI and the internet of robotic things in the fight for reducing health risks

Martin Serrano is an ICT expert with more than 20 years of experience in industry and applied research within a wide range of successful European (FP5-FP7/H2020) collaborative software projects, Irish National Projects (HEA PRTLI, SFI) and also Enterprise Ireland (EI) innovation projects. Dr. Serrano is a recognised Scientist on Semantic Interoperability and Distributed Intelligent Systems, and with strong background on end-to-end Solutions, he is a full-stack Solutions Architect with a strong background on Applied Semantic and Information Systems interoperability, Smart Technology, Services and Network Management and Federated Systems. Dr. Serrano has Large trajectory working on research and innovation health-related challenges like scientifically leading the interoperability layer in the largest health related project in Europe i.e. ACTIVAGE project and building solutions on digital health (i.e. e-Health, p-Health systems, etc.).

Poster Presentation Abstracts

An Intelligent Empowering Agent (IEA) for Person Empowerment on Health and Wellbeing

Alfano M, Kellett J, Lenzitti B & Helfert M

Innovation Value Institute, Maynooth University; Department of Emergency Medicine, Hospital of South West Jutland, Denmark; Dipartimento di Matematica e Informatica, Università di Palermo, Italy

Innovation Value Institute, Maynooth University

Lero - the Science Foundation Ireland Research Centre for Software

Empowerment is a process through which people acquire the necessary knowledge and self-awareness to understand their health conditions and treatment options, self-manage them, and make informed choices with healthcare professionals. Empowerment enables patients to communicate better with medical professionals and ensures care is provided that is compatible with their needs, values, and best interests. Currently, few stand-alone applications for patient empowerment exist and people/patients often go on the Web to search for health information. Such information is mainly obtained through generic search engines and it is often overwhelming, too generic, and of poor quality. Intelligent Empowering Agents (IEA) can filter such an information and assist the user in the understanding of health information about specific complaints or health in general. This work presents the basic principles and first implementation of an IEA. It dialogues with the user in natural language, collects health information from the Web, and provides tailored, easily understood, and trusted information, which empowers users to create their own comprehensive and objective opinion on health matters that concern them.

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Disruptive Digital Transformation with SENSIBLE

Kshirsagar Meghana, Vaidya Gauri & Ryan Conor
Biocomputing and Developmental Systems Research Group, Department of Computer Science and Information Systems, University of Limerick

Implementing disruptive digital transformation in the healthcare ecosystem empowers the shift towards creation of large scale patient-centric digital models. This can revolutionize the healthcare industry, and holds the potential of radically impacting societies with improved patient care in the future. One of such disruptive digital transformations is seamless integration and secured interoperability of the patient's data across the healthcare network. Seamless integration of fragmented health data sources and secured data sharing frameworks equipping clinicians with the power of real time access to a single view of the current patient data is vital in the context of delivering precise personalized healthcare. Our ongoing research harnesses the power of blockchains as a backbone for secure sensitive data sharing whereas knowledge graphs facilitate integrating disparate data sources to visualize and create an information rich single patient view. We present "SENSIBLE", Sequestered and Synergistic Blockchain Ecosystem for safe sharing of patient data. SENSIBLE facilitates patient-privacy preserving principle where any of the entities in the patient data requires the data owner's consent before sharing it to the healthcare providers. This holds the promise of delivering precision medicine through design of patient-centric models leading to greater operational ease.

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Learning by doing: Extended reality for improving hand hygiene in care home staff

Gasteiger N., van der Veer SN, Wilson P & Dowding D
School of Health Sciences, University of Manchester, UK

Emerging technologies like virtual reality (VR) and augmented reality (AR) have been developed to upskill healthcare workers in hand hygiene. However, they have not been used in care homes. This 4-step realist evaluation focuses on upskilling care home workers in hand hygiene, exploring how, for whom and in what circumstances AR/VR might 'work.' A systematic review of 90 hand hygiene apps found that 4 used AR/VR, of which 3 rated among the best, when considering quality and functionality. A realist review of 80 papers, including 46 empirical studies, developed a programme theory on how AR/VR might be used to train health and care workers. This theory was refined by 25 care home staff, uncovering mechanisms which may make AR/VR effective in improving hand hygiene technique, knowledge, and practice. Participants considered repeated practice, interactive learning, feedback and reminding and perceived task realism as important for hand hygiene training, which could be trigged by AR/VR. More effective learning, learner satisfaction, enhanced hand hygiene skills and infection control were expected from AR/VR training. These mechanisms and the feasibility of the technology are currently being tested in care homes, with the aim of introducing an innovative and fun way to improve hand hygiene.

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Attitude among Bangladeshi University Students to Use Mobile Technologies for Mental Health Well-Being Support

Ahmed A

European Master of Psychology in Global Mobility, Inclusion and Diversity in the Society (Global MINDS), University of Limerick; Green University Center for Research, Innovation and Transformation (CRIT), Green University of Bangladesh

To get an overview regarding mental health wellbeing of Bangladeshi university students during post-pandemic time and their attitude towards seeking wellbeing support by using mobile technology, a quantitative research was conducted through self-administered Bengali translated questionnaires. Data were collected from 572 Bangladeshi students both in person and online where 42% participants were from public universities and 58% were from public universities. Analysis showed that 75% students were highly stressed, and 50% students have poor wellbeing but nearly 62% students have no information regarding the counselling services in Bangladesh. On the contrary, 75% of the students possess moderately positive attitudes toward seeking professional counselling services and they often seek online resources. Students showed positive attitude regarding online support group and 92% students agreed that wellbeing programmes using mobile technology will be beneficial for them. The implication of this research finding will help to create more effective wellbeing support programs for students at third-level educational institutes in post-pandemic era such as creating more awareness and sharing online psycho-educational resources. These findings can serve as the baseline data for the need assessment of mobile technology for mental health wellbeing support for Bangladeshi university students.

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Stress, Coping and Wellbeing of Postgraduate Student in Ireland during Covid 19

Ahmed A, Greenwood RM

Global MINDS, Department of Psychology, University of Limerick

This project aimed at identifying how postgraduate students in Ireland were coping with stress and the relationship of coping strategies to wellbeing during covid 19 pandemic. The purpose of this study was to determine the extent to which postgraduate students experience a range of stressors, how they cope with them, and their relationship to well-being. It was a correlational study where measures of covid related stressors, coping strategies and psychological well-being along with key demographics were set as a questionnaire. Data were collected via Qualtrics by inviting postgraduate students from the University of Limerick (UL). A total of 109 postgraduates of UL participated where data were analyzed by using SPSS. Findings demonstrated that covid related stressors undermine the well-being of postgraduate students and informal coping strategies moderate the relationship between stress and wellbeing. Also, 87% postgraduates shared that digital well-being support services will be beneficial for them. This study shed light as a first effort to emphasize the diverse wellbeing need of divergent postgraduate students in Ireland that have practical and policy implications in the post-pandemic era to design wellbeing services for students at third-level educational institutions. Consequently, this study indicates a future direction for further exploration of the psychological well-being of the diverse postgraduate student population in Ireland.

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Machine learning methods improve specificity in newborn screening for isovaleric aciduria

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Division of Child Neurology and Metabolic Medicine, Center for Child and Adolescent Medicine, Heidelberg University Hospital

Isovaleric aciduria (IVA) is a rare disorder of leucine metabolism and part of new-born screening (NBS) programs. The number of false positive screening results for IVA in Germany has heavily increased since 2016, and additionally, the birth prevalence has increased by identification of an attenuated, possibly asymptomatic, disease variant ("mild" IVA). Recently, data mining and artificial intelligence methods such as machine learning (ML) techniques have shown great achievement in digital healthcare and also for analysing NBS conditions. In our research, we investigate the application of ML methods to improve IVA classification learning from an NBS data set containing 2,106,090 screened new-borns. Our results show that the IVA specificity can be improved and hence, the false positives can be reduced by almost 70% using different ML learning methods compared to tradition screening. Further, we show that ML methods can classify mild and classic IVA from normal patients solely based on the NBS data. Overall, applying ML methods to improve the specificity for IVA could have a major impact on new-borns, as it may facilitate early precise detection of true positives, and reduce the harm and psychological stress on new-borns and their families due to a reduction of false positives.

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Enhancing COPD management in a GP setting using a bespoke digital identification & stratification tool

Hughes T, Healy P, O'Reilly M, Daly E
IQVIA

Chronic obstructive pulmonary disease (COPD) represents an important public health challenge that is both preventable and treatable [1] COPD accounts for more hospitalisations in Ireland than that for cardiovascular & non-lung cancer cases combined [3]. Ireland has the highest hospitalisation rate for COPD among selected OECD countries with 15,979 inpatient hospitalisations using 124,847 inpatient bed days in 2016. Our death rate from respiratory diseases is the fourth highest in the EU-28 and 38.2% higher than the EU average [3]. Whilst COPD is not curable, it is treatable and early diagnosis and treatment can help slow the decline in lung function and improve patient outcomes [4]. Most people with respiratory disease are cared for in the community by their GP and primary care team [3]. IQVIA are supporting GP practices with the management of patients diagnosed with COPD via a non-promotional therapy review service funded by GSK Ireland. IQVIA have developed a bespoke digital platform which enables efficient & accurate identification & stratification of COPD patients based on clinical markers – ensuring those identified with the greatest clinical need are prioritised for review. Patients are then consulted in face-to-face nurse-led clinics with recommendations for optimised clinical management (of their condition) presented to their usual clinician following clinical assessment in a COPD clinic.

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IoT Sensors in the Homes of Older Adults to Detect Activities of Daily Living at Scale

Timon CM, Hussey P, Lee H, Murphy C, Vardan Rai H, Smeaton AF
Centre for eIntegrated Care (CeIC) and Insight Centre for Data Analytics, Dublin City University, Dublin 9

The use of ambient sensors to detect activities in the homes of older or more vulnerable people has grown in recent years. The typical use of data gathered in this way has been to visualise actual sensor usage as an indicator of activities in the home. This work combines data representing individual sensor usage to detect higher level Activity of Daily Living (ADLs) which are much more informative and insightful into the behaviours of the older adults living alone. To achieve this we use association rule mining combined with ground truth behaviour indicators from data-informed briefings with 23 older adult participants in a user trial. We used sensor data gathered over several weeks from each participant to develop a set of association rules for detection of ADLs which are applied across all participants. Thus, the main contribution of the work is the ability to incorporate additional participants without having to re-train the algorithms used for recognition of ADLs.

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Adoption and Use of ICD-11 to Sustain Global Public Health

Bolling, T & Lennon R
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Fulbright

Tracking vital health information has been a top priority of the World Health Organization (WHO) since its development. Comprised of 194 Member States, collecting and analyzing data is at the fore front of keeping a mobile society informed and safe. Data is collected from a refined data code set, the International Classification of Diseases (ICD). As of January 2022, WHO member states adopted a new ICD code set, ICD-11, which was presented and approved by the WHO assembly in May 2019. The implementation of ICD-11 is however not consistent across countries. Sustaining the quality of health information data is at the center of ensuring ongoing emphasizes in all aspects of healthcare. The collection of Information must be exact, readily available, secure and understandable at various levels of the Global health community. The expanding role of analytics, machine learning, DevOps, and artificial intelligence requires correct and prompt data to meet its full potential in improving health outcomes and access to care, whilst reducing costs. Issues surrounding Global Healthcare information Governance Policies that support the management of data requirements across all elements of the system is discussed in this paper.

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Harnessing digital health to optimise the delivery of guideline based Cardiac Rehabilitation during COVID 19

Gibson I, Dunne D, Harris A, McCrudden Z, Hynes L, Murphy A, Byrne M, McEvoy JW.
School of Medicine, University of Galway

The COVID 19 pandemic accelerated the uptake and acceptance of digital health interventions (DHIs) for the delivery of CR. In response to the need to evaluate these interventions we examined the impact of an evidence based digital CR programme "Croí MySláinte" on medical, lifestyle and psychosocial outcomes. The core components of this professional interdisciplinary 12-week programme included lifestyle modification, medical risk factor management, psychosocial and behavioural change support. Patients received access to a bespoke web-based platform and attended weekly, group-based supervised exercise and educational sessions via Zoom™. Outcomes were assessed at baseline, end of programme, and at 6-month follow-up. Programme uptake and retention rates were high at 73% and 85% respectively. Significant improvements in the proportion of patients meeting recommended targets for physical activity (+68%, $p<0.001$), blood pressure (+44%, $p<0.001$) and LDL cholesterol (+27%, $p<0.001$) were observed. There were significant reductions in mean weight (-2kg, $p<0.001$) and anxiety and depression levels which reduced by more than 50% ($p<0.001$). The majority of these improvements were sustained at 6-month follow-up. Outcomes from Croí MySláinte confirm that multi component digital CR programmes can be successfully implemented and achieve guideline recommended targets associated with reduced cardiovascular events and improved health outcomes.

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Older Adults' Experiences and Perceptions of Immersive Virtual Reality: A Systematic Review and Thematic Synthesis

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Immersive virtual reality (IVR) can assist older adults in their everyday lives – providing opportunities in health promotion and tackling social isolation and loneliness. There has been a surge in the number of qualitative studies exploring older adults' experiences and perceptions of IVR. The aim of this review was to synthesise these experiences and perceptions. Two reviewers completed title and abstract screening, full-text screening, data extraction and quality appraisal. A thematic synthesis was then conducted. Thirteen studies were included in the final synthesis. Four descriptive themes were generated: (1) facilitating IVR interactions, (2) experiencing unique features of IVR, (3) perceptions of IVR and (4) accounts of agency in IVR. Three analytical themes were then generated: (1) tolerating the bad to experience the good, (2) buying in to IVR: don't judge a book by its cover and (3) "it proves to me I can do it". This review highlights the need to overcome initial negative views of IVR and perceived barriers to use by emphasizing its unique ability to increase older adults' agency through features such as presence, immersion, and embodiment, which in turn offer new opportunities to take part in meaningful activities tailored to their needs and preferences.

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A virtual reality education and training tool to reduce weight stigma in primary practice

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Weight-stigma (WS) is pervasive in primary care settings where it is associated with poor health outcomes. There is a lack of evidence-based education and training on weight-stigma for primary care practitioners (PCPs). Virtual Reality (VR) offers a sophisticated medium to deliver a multicomponent behavioural intervention that could address this training need. This research aims to develop the evidence-base necessary to design, optimize and assess the acceptability of a VR weight-stigma education and training tool for PCPs using the person-based approach (PBA) to intervention design. The PBA will inform the key features and theoretical components essential to achieve the intervention objectives over two stages of Intervention planning: (i) Evidence about user context and experience: synthesis of the literature; exploration of lived experience; user needs studies (ii) Programme theory and intervention development: theory of change; intervention planning table; guiding principles. PPI and stakeholder co-production from conception. Data will be collected through qualitative evidence synthesis (QES), semi-structured interviews with patients living with obesity and PCPs. Data will be analysed using thematic analysis. The current research will combine health psychology principles with cutting-edge technology to develop the evidence-base for an innovative education and training tool targeting WS in primary practice.

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Behaviour change techniques and intervention characteristics in digital cardiac rehabilitation: A systematic review and meta-analysis

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Evidence suggests that digitally delivered cardiac rehabilitation (CR) is likely to be an effective alternative to centre-based CR. However, there is a limited understanding of the behaviour change techniques (BCTs) and intervention characteristics included in digital CR programmes. This systematic review aimed to identify the BCTs and intervention characteristics that have been used in digital CR programmes, and to study those associated with effective programmes. Twenty-five randomised controlled trials were included in the review. Digital CR was associated with significant improvements in daily steps, light physical activity, medication adherence, functional capacity, and low-density lipoprotein-cholesterol when compared to usual care, and produced effects on these outcomes comparable to centre-based CR. The evidence for improved quality of life was mixed. Interventions that were effective at improving behavioural outcomes frequently employed BCTs relating to feedback and monitoring, goals and planning, natural consequences, and social support. Completeness of reporting on the TIDieR checklist across studies ranged from 42% to 92%, with intervention material descriptions being the most poorly reported item. Digital CR appears effective at improving outcomes for patients with cardiovascular disease. The integration of certain BCTs and intervention characteristics may lead to more effective interventions, however better intervention reporting is required.

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Internet of Medical Things: Deployment and Cybersecurity in Ireland

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Primary, secondary and tertiary care facilities have seen a growth in the use of Internet-of-Things (IoT) in clinical settings. Hospital networks use Internet-of-Medical-Things (IoMT) to remotely control devices and communicate medical telemetries. Tertiary care has increased the use of devices to remotely monitor patients in stepdown community facilities. 82% of healthcare organisations globally have experienced a cyberattack on their IoMT devices [1]. Parallel to this, and in recognition of the potential role digital offerings can play in healthcare and disease management and prevention, NICE has developed guidelines in 2021 to develop standards that ensure innovative technologies are clinically effective and offer economic value [2]. This proposed research will capture IoMT usage in primary, secondary and tertiary care settings in Ireland. It will also detail healthcare specific IoT technologies and protocols and the associated security measures. It will research existing healthcare specific IoT frameworks and determine if the current implementations are robust against evolving cybersecurity threats.

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Assessing Usability of an App to enable Remote Monitoring of Patients with Malignant Pleural Effusions (MPE)

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A malignant pleural effusion (MPE) is the build-up of fluid on the lung causing significant shortness of breath and chest pain & affects 50% of people with metastatic cancer. MPE is associated with a short life expectancy & most patients' clinical needs will be addressed through palliative care. The main goals of MPE management are to ensure patients' symptoms are managed effectively & that they spend as little time as possible in primary healthcare settings. The objective of this research was to assess end-user experiences of an app which enables remote patient monitoring of patients with indwelling pleural catheters (IPCs) for the management of MPE. A qualitative approach involved analysing survey data (based on the mHealth App Usability Questionnaire) and responses to think aloud interviews to assess experiences of using the app. Recruitment of patients with MPE to assess the app took place in MD Anderson Cancer Centre (Texas, US). Sixteen participants were enrolled to the study, with nine completing the study assessments. 90% of survey participants found the app to be very user-friendly. Feedback suggests the app is a feasible means to provide high quality telehealth for patients with MPE.

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Online psychological intervention to promote healthy adjustment and reduce the risk of chronic postoperative pain following major surgery: iCanCope PostOp

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Introduction: 20% of adolescents undergoing surgery will develop chronic postoperative pain, which can lead to delayed re-mobilization and reduced health-related quality of life. Psychological variables have been highlighted as risk factors for reporting acute postoperative pain and interventions that address these variables have shown to be successful in assisting acute postoperative pain management. Smartphone devices with internet capabilities may improve pain self-management for adolescents with postoperative pain by improving health self-monitoring in everyday environments (e.g., home, school), promoting self-care (e.g., pain coping strategies) and minimizing barriers to optimal pain treatment (e.g., lack of transportation, access to health care providers). A recent scoping review found that existing pain self-management apps for patients undergoing surgery lacked (i) goal-setting/social support functions; (ii) pain self-management content; (iii) scientific evaluation; and (iv) consultation with end-users in app design. No apps reviewed were designed for paediatric patients.

Aims: To evaluate the effectiveness of the newly developed iCanCope PostOp smartphone app for improving postoperative pain self-management, reducing the impact of acute postoperative pain and delivering improved physical and psychological outcomes for adolescents undergoing surgery for Scoliosis or Limb Reconstruction. A single-centre, parallel groups pilot RCT design will be conducted with 120 adolescents – 60 Scoliosis patients, 60 Limb Reconstruction patients. This RCT is currently underway.

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Development of a Digital Health Intervention for an Island Community

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The HOME HEALTH project is delivering a new type of remote digital healthcare in Ireland through a partnership between CISCO Ireland, SFI, and the community of Clare Island Co. Mayo. The project aims to provide digital health and wellbeing resources to patients in a very remote environment. HOME HEALTH brings together, University of Galway, Cisco, the HSE, island residents, local healthcare, and government agencies to identify the techniques, mechanisms, and care pathways that can be used in the smart and remote treatment of chronic conditions in this isolated community. HOME HEALTH has been founded on a solid platform of informed community consent and involvement. Through frequent community engagement, dialogue with local healthcare practitioners and patients, and the involvement of a multitude of academic experts, the HOME HEALTH project has developed a dynamic range of activities that will deliver a Digital Health Intervention for an island community. There are 8 work packages that will be rolled out over the course of the project. These include Virtual Consults, Remote Monitoring, Health Promotion, Drone Delivery, Robot Triage, Home Telepresence, VR Education, and AI Appointments. Community engagement will continue throughout, and the work package contents will adapt and respond to the expressed needs of the community.

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Optimising well-being and promoting wound healing in DFU: Psychological perspectives and patient informed intervention strategies

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Objective: To examine the impact emotional and psychosocial factors have on wound healing and investigate if: 1) A psychological intervention is suitable, acceptable, and beneficial for individuals with diabetic foot ulcer (DFU); 2) A psychological intervention can help individuals with DFU to achieve wound healing and/or prevent reoccurrence. Methods: A scoping review is being undertaken in accordance with JBI methodology and PRISMA-ScR. Semi-structured interviews will be conducted with individuals with DFU and a 'collective intelligence' workshop will be carried out with relevant stakeholders. Findings will be analysed using reflexive thematic analysis. A psychological intervention will subsequently be co-developed with individuals with DFU. A mixed-methods process evaluation will assess design suitability. Results: This study will evaluate the feasibility of delivering an online intervention, the impact on emotional, social and physical outcomes, and if a fully powered RCT is warranted. Conclusion: The proposed project will be informed by participatory research methods. Understanding the complexity of how emotional and psychosocial factors impact DFU development/reoccurrence is key to addressing the issue and any intervention designed to improve outcomes should be designed with the voice of the user in mind.

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Patient and provider perspectives of the implementation of remote mental health consultations: a systematic review

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Remote consultations became a necessary form of mental healthcare provision during the COVID-19 pandemic. As the demand for mental health services rises, it is important to take stock of the factors that affect their acceptable and sustained use. We aimed to review the literature on patient and provider perspectives on factors influencing the implementation of remote consultations for community-dwelling people with mental health conditions. We searched five electronic databases for empirical research up to July 2022. Only studies of synchronous remote consultations conducted via video, phone, or live-messaging between patients and providers were included. Two reviewers independently screened titles, abstracts, and full-texts. The quality of included studies were independently assessed by two reviewers using the Mixed Methods Appraisal Tool. We integrated qualitative and quantitative data from 39 studies into a single thematic synthesis. We identified seven themes pertaining to factors influencing the implementation of remote mental health consultations. These were 1) acceptability, 2) quality of care, 3) the therapeutic relationship, 4) accessibility, 5) patient comfort and competence, 6) provider workload and wellbeing, and 7) regulation and reimbursement. This review highlights the importance of patient preferences and provider buy-in to the future of remote mental health consultations.

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Accommodating Virtual Reality Design for Older Adults with and without Dementia

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Dementia is a mental condition that leads to the gradual degradation of cognitive function over time. While there currently is no cure for the condition, there has been much research into reducing the psychological, physical and emotion impact of dementia using non-pharmacological treatments such as reminiscence therapy or engaging in creative activities. Virtual Reality (VR) is an increasingly popular experimentation tool that has been used to recreate non-pharmacological dementia treatments in a computer generated environment. The use of VR allows for more freedom in designing activities for people with dementia as the designer is not constrained by the real world. VR also provides opportunities for participants to visit new or familiar environments. Despite the many advantages of VR within this application space, there is a lack of research on suitable technical design choices (e.g. locomotion or interaction methods) when developing VR applications for people with dementia. This poster presents the design of a VR sample experience which was designed with the goal of providing older adults with and without dementia a brief introductory experience to VR. The design decisions and feedback from this sample will be presented for consideration in future VR projects for people with dementia.

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Bed Management System Implementation

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Over the past few decades, hospital bed numbers are falling, the global population is rising and life expectancy is increasing. Thus, more people will attend hospital more times. This puts an increasing emphasis on making more efficient use of the available hospital bed stock. Bed management and patient tracking are key elements in maintaining efficiency of patient throughput in hospitals. The literature suggests that technology and shared information allow for shared views to model and predict usage to better manage finite resources. Paper-based systems, still common, work against this. Electronic systems are required for data capture and checkpoint recording on the patient pathway thus allowing that data to be analysed. This can help with improving efficiency and prediction. Visual indications of ward occupancy allows for better decision making across the hospital as a whole. Working with a local hospital collaboratively to acquire a knowledge of the patient pathways, design considerations for a bed management system were developed to provide a hospital-wide view of patient and bed status. The suggested system can capture data electronically such that the data can be used for analysing patient presentation and bed moves with a view to improve bed management and patient throughput.

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Multimodal Catheter Feasibility Evaluation for Intravascular Imaging - Preliminary Data on the Impedance Probe

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Cardiovascular disease is the number one killer worldwide, accounting for 32% of global (17.9 million) deaths in 2019 alone. Previous studies have shown that the composition and morphology of atherosclerotic plaque in the blood vessels is the most accurate predictor of acute coronary events. The current gold standard imaging modalities for atherosclerosis, namely X-ray angiography, optical coherence tomography (OCT) or intravascular ultrasound (IVUS), excel in classification of the degree of stenosis, but provide limited information about plaque morphology and fail to identify non-stenotic vulnerable plaques. Promising research results have now shown that electrical impedance spectroscopy (EIS) is able to provide valuable information on plaque composition, which could aid in plaque classification and the detection of non-stenotic vulnerable plaques. Here we propose that an EIS probe can be integrated into a standard intravascular imaging catheter (OCT or IVUS) to provide a multimodal intravascular catheter for improved non-contact EIS data co-registration in the cardiovascular system. In this study, we successfully constructed EIS probes at the scale of a human coronary artery and performed impedance measurements on different bovine heart tissue samples. We have demonstrated a statistically significant difference between the mean conductivities of ex-vivo examined heart fat, muscle, artery, and vein tissue in the presence of blood mimicking conductive medium. This shows the multimodal intravascular catheter

can be used to distinguish different tissue types, and has major potential for use in plaque detection and classification to enable early identification of patients with increased risk of cardiovascular events.

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Cough Detection and Analyser using AI

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Cough sounds have helped identify various respiratory diseases, and the recent outbreak of COVID-19 has changed how the world was supposed to work. Cough is one of the significant symptoms of the SARS-CoV-2 virus and also of other major diseases. We present an experimental investigation into the effectiveness of cough sounds based on artificial intelligence to identify if the audio samples are COVID-19 positive or negative, which can also be used for various other respiratory conditions. We use a deep neural network, i.e., a convolutional neural network (CCN). We have compared convolutional neural networks (CNN) against transfer learning-based models (i.e., VGG, Resnet, and Inception). The best model from those two will be converted to the TensorFlow Lite model for Edge Devices. We also amalgamated different public and private datasets to detect COVID-19 from cough patterns using standard acoustic feature sets, wavelet scattering features, and deep audio embeddings extracted from low-level feature representations. In this paper, we propose a novel model that can recognize COVID-19 cough based on different attributes.

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Artificial Intelligence and the Internet of Robotics Things in the fight for Reducing Health Risks

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Artificial Intelligence (AI) is every day gaining more acceptance in society, more and more people believe that AI is the most suitable solution for almost every complex problem, particularly where large amounts of data (i.e. Big Data) need to be processed and decisions based on data need to be obtained in minimal record times with high-level of accuracy. In the other hand Robotics has advanced using Big Data and AI for improving interactions with humans in a more natural way, in the Internet of Robotics Things (IoRT) robots are not anymore considered an external entity, instead it is considered a human-centric paradigm where humans are at the centre of the robotic systems for better interactive services. AI-powered solutions can help to identify early patterns related to mental disorders and/or illness conditions before any symptoms are identified or early symptoms detection. The development of dementia and other related diseases associated with loneliness and social isolation is gradual and it has a period of “incubation” where small changes in health condition are present but most of the times ignored simply because they are not significantly relevant. In other scenarios symptoms are not so evident because people has always the neglection to accept there is a problem in their minds/memories. There are also medical-related condition that are associated to dementia and thus the intervention of external agents to fight against them i.e. vaccines and drugs makes people carriers but with no symptoms. However nothing in AI systems is that simple, in order to guarantee some level of high accuracy, AI-powered solutions has many costly (technology-speaking) requirements i.e. High Performance Computing (HPC), Big Data Management Systems, Edge Computing, alike the design of complex methodologies which most of them are yet under development i.e. Machine and Deep learning methods for real time data processing and also algorithms that help in solving the complex analytical and decision-making problems.

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ISCycle: Planning for an intervention to promote inclusive and sustainable ebike uptake and use

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Funded by the Sustainable Energy Authority of Ireland, the ISCycle project will develop and test interventions centred on ebikes, an active travel mode, enabling replacement of the private car for families/individuals commuting short to medium distances. The intervention group will be loaned e-bikes, family-friendly accessories (bike-buggies, seats etc.), safety-gear, cycle training, along with further tailored interventions identified through preliminary work. This work-in-progress poster will present a description. We will use mixed-methods, including qualitative interviews with current ebike users to gain a rich understanding of how ebikes work in participants lives. We will also interview 'potential' users, people who currently travel mostly by car, and seek to understand what prevents them from considering active travel, particularly ebikes. Quantitative data gathering will include analysis of existing data, and further surveys to better understand our target population. Sustainability aspects will be addressed through the assessment of environmental impacts, life cycle analysis and the circular economy implications of ebike uptake. Modal shift will be assessed through analysis of GPS-based Google timeline data. Ebikes will also have real-time GPS tracking which will enable targeted interventions based on movement. In an existing survey (n=1923) members of our target community reported on factors influencing their mode of transport to and from the university. 'Distance' was a main barrier to actively commuting, amongst others. This will be complemented by further qualitative and quantitative results. Background data collection is underway. Modal shift from cars to ebikes has benefits for health, well-being and the environment.

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