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D4.1 Report on Events Organisation

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Abstract:

This deliverable presents the events carried out in WideHealth during the first year of the project, their rationale, and provides an overview of what was accomplished in each, detailing participants, activities and outcomes. It also outlines the plan for future events and insights on improvements to event organisation.

Keyword list: events, organisation, training, seminars, workshops, schools

Document History

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0.9	30.12.2021	Tiago Guerreiro (FC.ID)	First complete draft
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Abbreviations

FBK	Fondazione Bruno Kessler
FC.ID	FCiências.ID – Associação para a Investigação e Desenvolvimento de Ciências
HPI	Hasso Plattner Institut
JSI	Josef Stefan Institut
UKIM	Ss. Cyril and Methodius University in Skopje
KPI	Key Performance Indicator

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1 Introduction

This deliverable is focused on the events organised by the WideHealth consortium in the first year of the project. These events have two main objectives. First, they have the goal to promote a network of researchers within the fields of eHealth and pervasive healthcare. Particularly, it aims to provide events that create opportunities for the exchange of experiences between experienced researchers, early stage researchers and the international research community. Second, it aims to train the participants of this twinning on the organisation of research and training-oriented events such as thematic sessions, seminars, international workshops/conferences, and thematic schools.

Section 2 depicts the internal training events organised by WideHealth to promote sharing of knowledge among consortium partners in the topic of pervasive technologies for healthcare. Two types of events took place: 1) workshops (or thematic sessions), organised with a specific focus and/or theme, with the goals of promoting joint research activities (i.e. the matchmaking event) or to promote the understanding of current area challenges and current work (i.e. the Federated Machine Learning event); and 2) seminars, that involved experienced researchers to disseminate their research activity and share knowledge, and early-career researchers to train communicating their research proposals, presenting their research results, and receiving feedback (i.e. the WideHealth Seminar Series).

Section 3 presents the external events co-organized by WideHealth consortium members. Again, the organisation of these events has a two-fold objective. First, it aims to promote platforms for the presentation of research results to the external community, particularly to early-career researchers in the consortium. Second, it aims to involve researchers from the widening countries in the organisation of such events.

Section 4 presents the plan for the first school (winter, Feb 2022), on eHealth and Pervasive Technologies, organised by the WideHealth consortium, to take place at Faculty of Electrical Engineering and Information Technologies (FEEIT), Ss. Cyril and Methodius University in Skopje (UKIM), North Macedonia, and remotely. The school will be held from February 14 to February 17, 2022. This, and the other two planned schools, will foster the participation of top-level scientists in the field as lecturers either from the Consortium members or from external institutions, and focus on providing a broader and deeper training event on topics of eHealth and Pervasive Healthcare.

2 Workshops and Seminars

This section describes the internal events organised by WideHealth to promote sharing of knowledge and training. While some of the events are exclusively internal, others (i.e. seminars) were open to the external community. The consortium identifies the following sub objectives for the events described in this section:

- O1. Increase the awareness of expertise within the consortium and promote joint research activities;
- O2. Share knowledge from experienced researchers within the consortium (to train partners);
- O3. Provide a safe platform for early-career researchers to present their research, receive feedback, and train their presentation skills;
- O4. Increase the visibility of the consortium partners within the external eHealth and Pervasive Healthcare communities;
- O5. Provide opportunities for the presentation of outcomes from WideHealth research activities.
- O6. Create a network of research on eHealth and pervasive healthcare.

2.1 Matchmaking Event

The first noteworthy event to describe was the Matchmaking event that occurred in February 2021. As a follow-up to presentations by consortium partners and their researchers, we organised an event at *Gather.town* where each early-career researcher had a booth and welcomed partners to visit them to discuss their research and possible collaborations (and training) within WideHealth. This event was a pillar to bootstrap the hands-on training activities and collaborations that are currently taking place, and the ones that are planned. Both the event and the planned activities are described in detail in D2.2. This event was mostly focused on fulfilling objectives O1 and O3. It had the participation of all partners, with 3+ early-career researchers per widening partner.

2.2 WideHealth Seminar Series

One of the regular planned activities is offering seminars, both for internal and external consumption. Early in the planning of the seminars, we realised that these could be more than individual events, and could aim to provide a series of seminars with relevance for the external community. As such, we created the WideHealth Seminar Series, where regular seminars occur, are widely disseminated, open to everyone, and made available through the WideHealth YouTube channel and the WideHealth Seminar Series Podcast (e.g., on Spotify). We planned for different types of seminars: during the first year of the project, our goals were to continue to increase the awareness of what each partner does, both for the consortium (objectives O1, O2, and O3), and for the external community (objectives O4 and O6); for the remaining of the project, we intend to add seminars by external experts (objective O2, O4, and O6), have seminars by early-career researchers to present their WideHealth research activities and outcomes (O3, O4, and O5), and continue to promote seminars by researchers of the consortium.

Until now, we held 6 online seminars with an average of 40 registrants (sd=16, max=64, min=18) with 4 seminars by early-career researchers and 2 by experienced researchers, all members of the consortium (with all partners offering 1 seminar, except FC.ID that offered 2). Dissemination of the seminars was performed on the project's webpage, social media pages, and through mailing lists. Graphic materials were prepared to increase the visibility of the seminars. A GDPR-compliant registration form was prepared for each seminar (e.g., Diogo Branco's seminar registration form¹), and registrants gave permission for them to be added to the WideHealth mailing list, which is now used to promote WideHealth events. At the moment, the list of subscribers to the mailing list goes up to 170.

After the seminars, the video and audio were post-produced and made available on YouTube² and through Anchor on several Podcast platforms (e.g., Spotify³). The details of the past seminars are provided below and are available at the WideHealth webpage⁴.

1st WideHealth Seminar: Nina Reščič

Date: May 4th, 2021 – 16:00 CET

Speaker: Nina Reščič



Figure 1. Digital flyer of the first seminar (Nina Reščič)

Title: XPRIZE Pandemic Response Challenge

Short bio: Nina Reščič graduated in Applied Mathematics from the University of Ljubljana, Faculty of Mathematics and Physics in 2012. After working in the industry (Aviation and Aerospace Engineering) she began working at the Jožef Stefan Institute in 2017. She is working as a researcher and is a PhD student at the Jožef Stefan International Postgraduate School. Her research interests

¹ <https://bit.ly/3mGilx0> (Diogo Branco's Seminar Registration form)

² https://www.youtube.com/channel/UCaPIT67HZEcHnU4lhdsCx_Q (YouTube WideHealth channel)

³ <https://open.spotify.com/show/5Bo9oEVTROTj9P1pl4ZrR5> (Widehealth Podcast)

⁴ <https://widehealth.eu/seminars/> (WideHealth Seminars homepage)

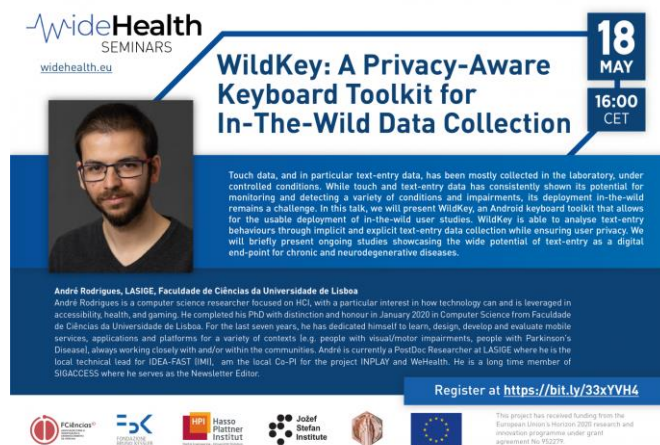
involve activity recognition, nutrition monitoring and mathematical modelling. She was a member of SHL Activity Recognition competition winning team in 2018, 2019 and 2020, member of the Cooking recognition challenge competition winning team and a member of the XPRIZE Response Challenge 2nd place winning team JSIvsCovid, where she was responsible for epidemiological modelling. She is a musician, receiving her BA in jazz flute at the Gustav Mahler Private Universität Klagenfurt in 2020.

Abstract: XPrize Foundation organizes high-profile competitions to develop technologies that solve the world's grand challenges. The competitors of the XPrize Pandemic Response Challenge were tasked with predicting how COVID-19 infections respond to various interventions (such as lockdowns and mask usage), and to propose effective plans of such interventions for different epidemiological situations. In this talk, we will describe the solution developed by the team from the Department of Intelligent Systems at Jožef Stefan Institute, which placed second in the competition. The solution combined a classical epidemiological model with machine learning to predict future infections. Then it used algorithms inspired by biological evolution to find intervention plans with optimal trade-offs between the impact on the infections and the socio-economic cost.

2nd WideHealth Seminar: André Rodrigues

Date: May 18th, 2021 – 16:00 CET

Speaker: André Rodrigues



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WildKey: A Privacy-Aware Keyboard Toolkit for In-The-Wild Data Collection

18 MAY
16:00 CET

Touch data, and in particular text-entry data, has been mostly collected in the laboratory, under controlled conditions. While touch and text-entry data has consistently shown its potential for monitoring and detecting a variety of conditions and impairments, its deployment in-the-wild remains a challenge. In this talk, we will present WildKey, an Android keyboard toolkit that allows for the usable deployment of in-the-wild user studies. WildKey is able to analyse text-entry behaviours through implicit and explicit text-entry data collection while ensuring user privacy. We will briefly present ongoing studies showcasing the wide potential of text-entry as a digital end-point for chronic and neurodegenerative diseases.

André Rodrigues, LASIGE, Faculdade de Ciências da Universidade de Lisboa
André Rodrigues is a computer science researcher focused on HCI, with a particular interest in how technology can and is leveraged in accessibility, health, and gaming. He completed his PhD with distinction and honour in January 2020 in Computer Science from Faculdade de Ciências da Universidade de Lisboa. For the last seven years, he has dedicated himself to learn, design, develop and evaluate mobile services, applications and platforms for a variety of contexts: e.g. people with visual/motor impairments, people with Parkinson's Disease, always working closely with and/or within the communities. André is currently a PostDoc Researcher at LASIGE where he is the local technical lead for IDEAS-FAST (IMI), and the local Co-PI for the project INPLAY and WeHealth. He is a long time member of SIGACCESS where he serves as the Newsletter Editor.

Register at <https://bit.ly/33xYVH4>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017721

Figure 2. Digital flyer of the second seminar (André Rodrigues)

Title: WildKey: A Privacy-Aware Keyboard Toolkit for In-The-Wild Data Collection

Abstract: Touch data, and in particular text-entry data, has been mostly collected in the laboratory, under controlled conditions. While touch and text-entry data has consistently shown its potential for monitoring and detecting a variety of conditions and impairments, its deployment in-the-wild remains a challenge. In this talk, we will present WildKey, an Android keyboard toolkit that allows for the usable deployment of in-the-wild user studies. WildKey is able to analyse text-entry behaviours through implicit and explicit text-entry data collection while ensuring user privacy. We

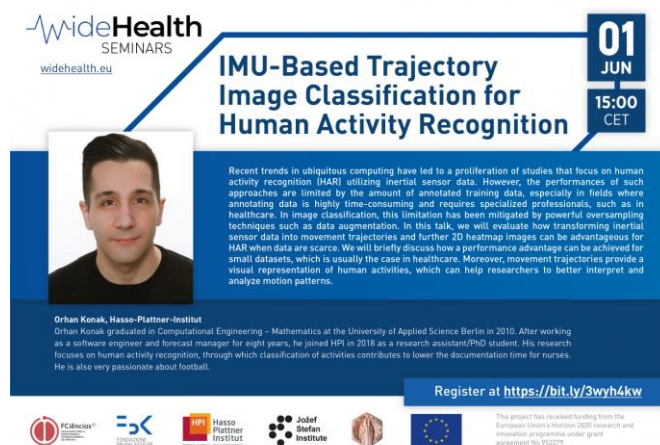
will briefly present ongoing studies showcasing the wide potential of text-entry as a digital end-point for chronic and neurodegenerative diseases.

Short bio: André Rodrigues is a computer science researcher focused on HCI, with a particular interest in how technology can and is leveraged in accessibility, health, and gaming. He completed his PhD with distinction and honour in January 2020 in Computer Science from Faculdade de Ciências da Universidade de Lisboa. For the last seven years, he has dedicated himself to learn, design, develop and evaluate mobile services, applications and platforms for a variety of contexts (e.g. people with visual/motor impairments, people with Parkinson’s Disease), always working closely with and/or within the communities. André is currently a PostDoc Researcher at LASIGE where he is the local technical lead for IDEA-FAST (IMI), is the local Co-PI for the projects INPLAY and WideHealth. He is a long time member of SIGACCESS where he serves as the Newsletter Editor.

3rd WideHealth Seminar: Orhan Konak

Date: June 1st, 2021 – 15:00 CET

Speaker: Orhan Konak



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widehealth.eu

IMU-Based Trajectory Image Classification for Human Activity Recognition

01 JUN 15:00 CET

Recent trends in ubiquitous computing have led to a proliferation of studies that focus on human activity recognition (HAR) utilizing inertial sensor data. However, the performances of such approaches are limited by the amount of annotated training data, especially in fields where annotating data is highly time-consuming and requires specialized professionals, such as in healthcare. In image classification, this limitation has been mitigated by powerful oversampling techniques such as data augmentation. In this talk, we will evaluate how transforming inertial sensor data into movement trajectories and further 2D heatmap images can be advantageous for HAR when data are scarce. We will briefly discuss how a performance advantage can be achieved for small datasets, which is usually the case in healthcare. Moreover, movement trajectories provide a visual representation of human activities, which can help researchers to better interpret and analyze motion patterns.

Orhan Konak, Hasso-Plattner-Institut
Orhan Konak graduated in Computational Engineering – Mathematics at the University of Applied Science Berlin in 2010. After working as a software engineer and forecast manager for eight years, he joined HPI in 2018 as a research assistant/PhD student. His research focuses on human activity recognition, through which classification of activities contributes to lower the documentation time for nurses. He is also very passionate about football.

Register at <https://bit.ly/3wyh4kw>

Logos: FCiências, HPI Hasso Plattner Institut, Josef Stefan Institute, European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101019722

Figure 3. Digital flyer of the third seminar (Orhan Konak)

Title: IMU-Based Trajectory Image Classification for Human Activity Recognition

Abstract: Recent trends in ubiquitous computing have led to a proliferation of studies that focus on human activity recognition (HAR) utilizing inertial sensor data. However, the performances of such approaches are limited by the amount of annotated training data, especially in fields where annotating data is highly time-consuming and requires specialized professionals, such as in healthcare. In image classification, this limitation has been mitigated by powerful oversampling techniques such as data augmentation. In this talk, we will evaluate how transforming inertial sensor data into movement trajectories and further 2D heatmap images can be advantageous for HAR when data are scarce. We will briefly discuss how a performance advantage can be achieved for small datasets, which is usually the case in healthcare. Moreover, movement trajectories provide a visual representation of human activities, which can help researchers to better interpret and analyze motion patterns.

Short bio: Orhan Konak graduated in Computational Engineering – Mathematics at the University of Applied Science Berlin in 2010. After working as a software engineer and forecast manager for eight years, he joined HPI in 2018 as a research assistant/PhD student. His research focuses on human activity recognition, through which classification of activities contributes to lower the documentation time for nurses. He is also very passionate about football.

4th WideHealth Seminar: Venet Osmani

Date: June 22nd, 2021 – 16:00 CET

Speaker: Venet Osmani



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22 JUN 16:00 CET

Predicting deterioration of critically ill patients

Intensive care units generate large quantities of data from various patient monitoring and intervention systems. Limited ability of humans to process and act on complex information also extends to intensive care clinicians, at times resulting in information overload, and consequently hindering recognition of early signs of patient deterioration. Machine learning has been touted as a possible approach to address this problem. However, enormous challenges remain despite the significant work carried out in this domain.

In this talk I will provide an overview of the challenges of applying machine learning in medicine in general, and in critical care in particular, especially in comparison to traditional applications such as computer vision. Then, I will present our approach in tackling the challenge of prediction of deterioration of critically ill patients, starting from the definition of the problem, up to the methodology we employed and the results we obtained. Finally, I will also discuss this work in the context of the specific challenges identified in applying machine learning in medicine.

Venet Osmani, PhD is a senior researcher at **Fondazione Bruno Kessler Research Institute**. Previously, he was a lecturer at the department of Psychology and Cognitive Science at University of Trento, Italy and a visiting researcher at Georgia Institute of Technology, USA. His earlier research focused primarily on monitoring and analysing human behaviour. Specifically, using personal and environmental sensing applied to healthcare, including predicting depressive and manic episodes of bipolar patients and detecting occupational stress from smartphone sensors. Currently, the focus of his research is on analysis of clinical data (EHR) using machine learning methods to model disease and patient trajectories both for chronic conditions as well as in critical care. In this work he collaborates with some of the leading healthcare institutions in the US, including Cleveland Clinic, Mayo Clinic, MIT, as well as several leading European research institutions. He is an Expert Evaluator for European Commission (Horizon 2020 Programme), UK Medical Research Council (MRC), Swiss National Science Foundation (SNSF) and several other scientific funding institutions. Further information can be found in: <http://venetosmani.com>

Register at <https://bit.ly/3vIASGC>

Logos: ICInnovator, HPI, Hansa Plattner Institut, Josef Stefan Institute, European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952279

Figure 4. Digital flyer of the fourth seminar (Venet Osmani)

Title: Predicting deterioration of critically ill patients

Abstract: Intensive care units generate large quantities of data from various patient monitoring and intervention systems. Limited ability of humans to process and act on complex information also extends to intensive care clinicians, at times resulting in information overload, and consequently hindering recognition of early signs of patient deterioration. Machine learning has been touted as a possible approach to address this problem. However, enormous challenges remain despite the significant work carried out in this domain.

In this talk I will provide an overview of the challenges of applying machine learning in medicine in general, and in critical care in particular, especially in comparison to traditional applications such as computer vision. Then, I will present our approach in tackling the challenge of prediction of deterioration of critically ill patients, starting from the definition of the problem, up to the methodology we employed and the results we obtained. Finally, I will also discuss this work in the context of the specific challenges identified in applying machine learning in medicine.

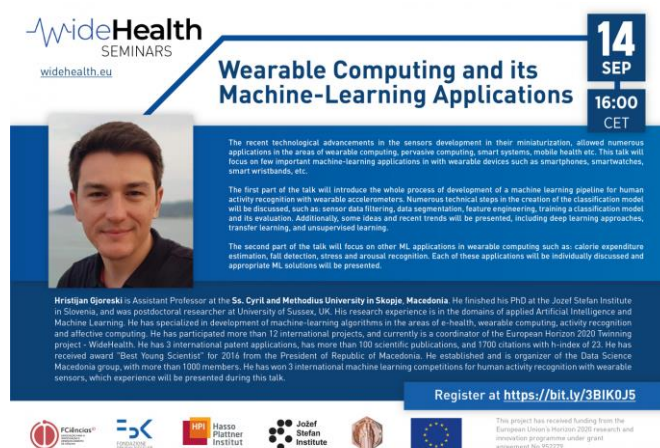
Short bio: Venet Osmani, PhD is a senior researcher at Fondazione Bruno Kessler Research Institute. Previously, he was a lecturer at the department of Psychology and Cognitive Science at University of Trento, Italy and a visiting researcher at Georgia Institute of Technology, USA. His earlier research focused primarily on monitoring and analysing human behaviour. Specifically, using personal and environmental sensing applied to healthcare, including predicting depressive and manic episodes of

bipolar patients and detecting occupational stress from smartphone sensors. Currently, the focus of his research is on analysis of clinical data (EHR) using machine learning methods to model disease and patient trajectories both for chronic conditions as well as in critical care. In this work he collaborates with some of the leading healthcare institutions in the US, including Cleveland Clinic, Mayo Clinic, MIT, as well as several leading European research institutions. He is an Expert Evaluator for the European Commission (Horizon 2020 Programme), UK Medical Research Council (MRC), Swiss National Science Foundation (SNSF) and several other scientific funding institutions. Further information can be found in: <http://venetosmani.com>

5th WideHealth Seminar: Hristijan Gjoreski

Date: September 14th, 2021 – 16:00 CET

Speaker: Hristijan Gjoreski



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Wearable Computing and its Machine-Learning Applications

14 SEP
16:00 CET

The recent technological advancements in the sensors development in their miniaturization, allowed numerous applications in the areas of wearable computing, pervasive computing, smart systems, mobile health etc. This talk will focus on few important machine-learning applications in with wearable devices such as smartphones, smartwatches, smart wristbands, etc.

The first part of the talk will introduce the whole process of development of a machine learning pipeline for human activity recognition with wearable accelerometers. Numerous technical steps in the creation of the classification model will be discussed, such as: sensor data filtering, data segmentation, feature engineering, training a classification model and its evaluation. Additionally, some ideas and recent trends will be presented, including deep learning approaches, transfer learning, and unsupervised learning.

The second part of the talk will focus on other ML applications in wearable computing such as: calorie expenditure estimation, fall detection, stress and arousal recognition. Each of these applications will be individually discussed and appropriate ML solutions will be presented.

Hristijan Gjoreski is Assistant Professor at the **Ss. Cyril and Methodius University in Skopje, Macedonia**. He finished his PhD at the **Jozef Stefan Institute** in Slovenia, and was postdoctoral researcher at **University of Sussex, UK**. His research experience is in the domains of applied Artificial Intelligence and Machine Learning. He has specialized in development of machine-learning algorithms in the areas of e-health, wearable computing, activity recognition and affective computing. He has participated more than 12 international projects, and currently is a coordinator of the European Horizon 2020 Twinning project - **WideHealth**. He has 3 international patent applications, has more than 100 scientific publications, and 1700 citations with h-index of 23. He has received award "Best Young Scientist" for 2014 from the President of Republic of Macedonia. He established and is organizer of the **Data Science Macedonia** group, with more than 1000 members. He has won 3 international machine learning competitions for human activity recognition with wearable sensors, which experience will be presented during this talk.

Register at <https://bit.ly/3BIK0J5>

Sponsors: EC Horizon, Hasso Plattner Institut, Jozef Stefan Institute, European Union.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952279.

Figure 5. Digital flyer of the fifth seminar (Hristijan Gjoreski)

Title: Wearable Computing and its Machine-Learning Applications

Abstract: The recent technological advancements in the sensors development in their miniaturization, allowed numerous applications in the areas of wearable computing, pervasive computing, smart systems, mobile health etc. This talk will focus on few important machine-learning applications in with wearable devices such as smartphones, smartwatches, smart wristbands, etc.

The first part of the talk will introduce the whole process of development of a machine learning pipeline for human activity recognition with wearable accelerometers. Numerous technical steps in the creation of the classification model will be discussed, such as: sensor data filtering, data segmentation, feature engineering, training a classification model and its evaluation. Additionally, some ideas and recent trends will be presented, including deep learning approaches, transfer learning, and unsupervised learning.

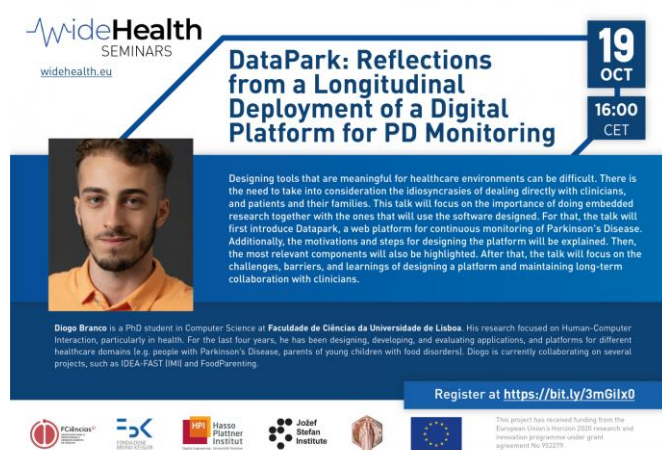
The second part of the talk will focus on other ML applications in wearable computing such as: calorie expenditure estimation, fall detection, stress and arousal recognition. Each of these applications will be individually discussed and appropriate ML solutions will be presented.

Short bio: Hristijan Gjoreski is Assistant Professor at the Ss. Cyril and Methodius University in Skopje, Macedonia. He finished his PhD at the Jozef Stefan Institute in Slovenia, and was postdoctoral researcher at University of Sussex, UK. His research experience is in the domains of applied Artificial Intelligence and Machine Learning. He has specialized in development of machine-learning algorithms in the areas of e-health, wearable computing, activity recognition and affective computing. He has participated more than 12 international projects, and currently is a coordinator of the European Horizon 2020 Twinning project – WideHealth. He has 3 international patent applications, has more than 100 scientific publications, and 1700 citations with h-index of 23. He has received award “Best Young Scientist” for 2016 from the President of Republic of Macedonia. He established and is organizer of the Data Science Macedonia group, with more than 1000 members. He has won 3 international machine learning competitions for human activity recognition with wearable sensors, which experience will be presented during this talk.

6th WideHealth Seminar: Diogo Branco

Date: October 19th, 2021 – 16:00 CET

Speaker: Diogo Branco



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DataPark: Reflections from a Longitudinal Deployment of a Digital Platform for PD Monitoring

19 OCT
16:00 CET

Designing tools that are meaningful for healthcare environments can be difficult. There is the need to take into consideration the idiosyncrasies of dealing directly with clinicians, and patients and their families. This talk will focus on the importance of doing embedded research together with the ones that will use the software designed. For that, the talk will first introduce DataPark, a web platform for continuous monitoring of Parkinson's Disease. Additionally, the motivations and steps for designing the platform will be explained. Then, the most relevant components will also be highlighted. After that, the talk will focus on the challenges, barriers, and learnings of designing a platform and maintaining long-term collaboration with clinicians.

Diogo Branco is a PhD student in Computer Science at Faculdade de Ciências da Universidade de Lisboa. His research focused on Human-Computer Interaction, particularly in health. For the last four years, he has been designing, developing, and evaluating applications, and platforms for different healthcare domains (e.g. people with Parkinson's Disease, parents of young children with food disorders). Diogo is currently collaborating on several projects, such as IDEA-FAST (IMI) and FoodParenting.

Register at <https://bit.ly/3mGlx0>

Logos: FCI, F3X, Hasso Plattner Institut, Jozef Stefan Institute, European Union, and Horizon 2020.

Figure 6. Digital flyer of the sixth seminar (Diogo Branco)

Title: DataPark: Reflections from a Longitudinal Deployment of a Digital Platform for PD Monitoring

Abstract: Designing tools that are meaningful for healthcare environments can be difficult. There is the need to take into consideration the idiosyncrasies of dealing directly with clinicians, and patients and their families. This talk will focus on the importance of doing embedded research together with the ones that will use the software designed. For that, the talk will first introduce DataPark, a web platform for continuous monitoring of Parkinson's Disease. Additionally, the motivations and steps for designing the platform will be explained. Then, the most relevant components will also be highlighted. After that, the talk will focus on the challenges, barriers, and learnings of designing a platform and maintaining long-term collaboration with clinicians.

Short bio: Diogo Branco is a PhD student in Computer Science at Faculdade de Ciências da Universidade de Lisboa. His research focused on Human-Computer Interaction, particularly in

health. For the last four years, he has been designing, developing, and evaluating applications, and platforms for different healthcare domains (e.g. people with Parkinson's Disease, parents of young children with food disorders). Diogo is currently collaborating on several projects, such as IDEA-FAST (IMI) and FoodParenting.

2.3 Federated Machine Learning Workshop

During the consortium monthly meetings, we made efforts to identify research areas or topics where internal workshops or short courses could be organised. One of such topics was Federated Learning, an area of expertise of HPI and an area of interest, albeit lacking expertise, to all partners. Despite the fact that our plan includes a summer course dedicated to machine learning, and particularly covering federated learning, that event is only planned for the last 6 months of the project. Given the interest of all partners, HPI agreed and made efforts to successfully organise an internal workshop that could introduce the topic of Federated Learning, spark discussions, and eventually fuel collaborations on the topic.

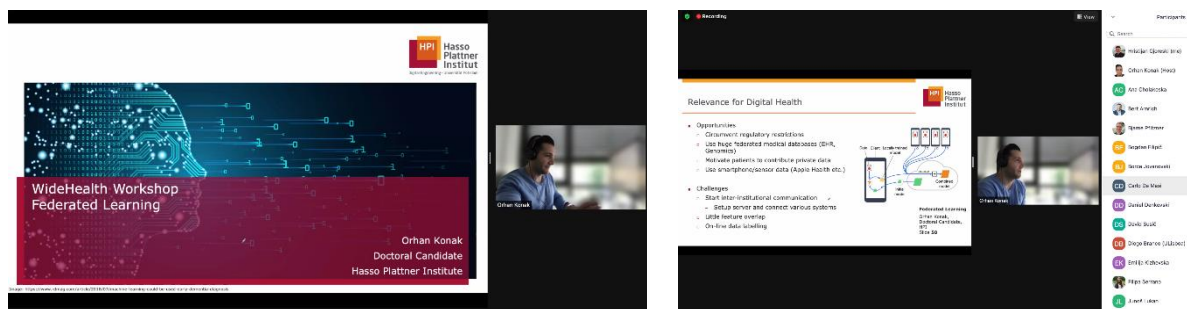


Figure 7. Screenshots of the Federated Learning Internal Workshop

The event took place on the 2nd of November, over Zoom, and lasted for approximately 3 hours. It covered an introduction to Federated Learning (Preliminary: Deep Learning and Stochastic Gradient Descent (SGD) Federated Learning, Federated Learning Topics) by Orhan Konak (HPI), Federated Learning Security (Attacks on Federated Learning, Possible Defence Measures) by Bjarne Pfitzner (HPI), and an overview of example projects, specifically Differentially Private Federated Learning for Anomaly Detection in eHealth Networks by Anna Cholakoska (UKIM, project developed within the WideHealth training activities), and Sensor-Based OCD Detection With Personalised Federated Learning by Lando Löper (HPI). The event included presentations, sharing and live discussion of Jupyter notebooks, and informal discussions. It counted with the participation of over 25 people, from all consortium institutions.

2.4 Summary and Outlook

Besides monthly consortium meetings, and several (in some cases, weekly or more) 1-to-1 and subgroup meetings in the context of research training activities, we have organised two consortium internal events, and six research seminars. These events have played an important role in sharing knowledge and training the researchers, but also in strengthening the awareness of each partner's strengths and expertise, which is fueling further collaborations and opportunities.

We have complied and surpassed the plans we had in the project proposal and expect to continue to overachieve, given the foundational role these events are having in the consortium's dynamic. To improve the outcomes, we plan to increase the scope of our seminars, giving the floor to renowned researchers in the areas of data-driven healthcare, human factors in healthcare, and machine learning in healthcare, both benefiting from their knowledge and also making the project and its members more visible to those researchers and the outer audience.

3 International Conferences and Other External Events

This section describes the external events where WideHealth had a participation, and particularly where WideHealth early-career and/or widening researchers had the opportunity to participate in the organisation of scientific events, and in the presentation of their research in those fora. Three events were organised and an extra participation in a conference was promoted.

3.1 Workshop on Designing Ubiquitous Health Monitoring Technologies for Challenging Environments at UBICOMP'21

Upon discussion and planning at a consortium meeting, FC.ID led a submission of a workshop proposal for UbiComp 2021 (ACM international joint conference on pervasive and ubiquitous computing), a top-tier conference in the field of ubiquitous computing, well known for work in the area of pervasive health [1]. The proposal was accepted and the workshop, WildBy Design on Designing Ubiquitous Health Monitoring Technologies for Challenging Environments (<https://techandpeople.github.io/wildbydesign/>), took place on September 26th, over Zoom.

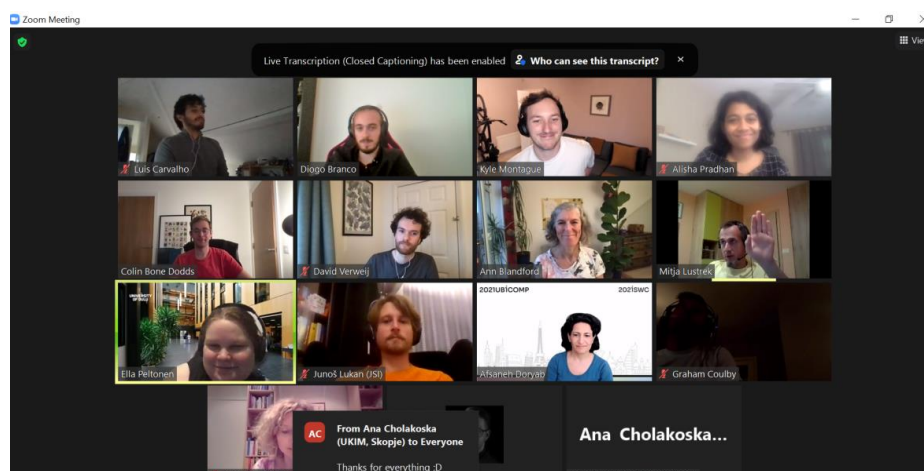


Figure 8. Screenshot of the closing of the WildByDesign'21 workshop

The main goal of this workshop was to bridge cross-disciplinary relationships between researchers and practitioners interested in the design, development, and deployment of ubiquitous technologies for health monitoring. Which major challenges arise in in-the-wild deployments of ubiquitous technology? How can the streams of data be manageable for end-users and health professionals? What are the best practices for engaging and sustainable participation in longitudinal

deployments? Which are socio-economic, cultural and individual factors of influence? These were questions discussed at the workshop and that motivated the submission of papers by participants.

The workshop schedule included a keynote speech by Prof. Ann Blanford (UCL) on *Understanding engagement with health tech when it goes wild*, three panels with lightning presentations and discussions with authors, and a group activity (design fiction). Eight papers were accepted to be presented at the workshop.

The workshop was organised by researchers at FC.ID (Diogo Branco, André Rodrigues, Tiago Guerreiro) and UKIM (Hristijan Gjoreski) together with researchers from Northumbria University, Carnegie Mellon University, Newcastle University, University of Virginia, Monash University, University of Pittsburgh, and University of Maryland. Additionally, 5 out of the 8 presented papers were authored by members of the WideHealth consortium, and 2 of them were resultant from collaborations within WideHealth (UKIM and HPI [2], JSI and FBK [3]).

3.2 Special Session on eHealth and Pervasive Health at ETAI'21

The WideHealth consortium promoted a special session at ETAI (Emerging Topics in Artificial Intelligence) on the topic of eHealth, under the leadership of UKIM. This session hosted the conference papers on relevant eHealth topics, including: a) data driven eHealth and pervasive health; b) machine learning for eHealth; c) statistical approaches for eHealth; and, d) data visualizations for eHealth.

Besides the organisation of the session, it also featured two papers which resulted from collaborations within WideHealth research and training activities, between UKIM and FBK [4], and UKIM and HPI [5].

3.3 Round Table on e-Health and Pervasive Health Technologies at ETAI'21

In the context of ETAI'21 and the special session on eHealth and Pervasive Healthcare, we also had the opportunity to organise a round table on the topic of challenges and opportunities in e-Health and Pervasive Technologies. This event gathered at the same table members from three partners of the consortium, and representatives from industry, government and policy (Figure 9).



Figure 9. Digital flyer of the Round table at ETAI'21

3.4 Keynote speech at MexIHC 2021

The WideHealth twinning project has also enabled the partners to be aware of the work of others, which has created several opportunities for the co-authorship of new proposals, discussions of possible collaborations, and participation in events. In this context, we also outline the organisation of MexIHC'21, Eighth Mexican Conference on Human-Computer Interaction, by Oscar Mayora (General Chair) from FBK (non-widening) and the invitation to Tiago Guerreiro (FC.ID, widening) to be a keynote speaker at the conference. This participation gave visibility of the work performed at FC.ID to the international community and is an example of how widening partners can promote non-widening ones.

3.5 Summary and Outlook

During the first year of the project, WideHealth organised one international workshop, a special session and a round table. Besides the organisational aspects of these events, where widening partners were involved, these events were platforms for the dissemination of work of the partners, and particularly of the work in progress within the research activities of WideHealth. While we surpassed our planned number of events for this year, we also see lightweight opportunities for collaborations that can further provide visibility to widening researchers (e.g., participation in program committees, organisation committees, invitations as speaker).

4 Summer/Winter Schools

WideHealth will organise three schools: eHealth and Pervasive Technologies, Human Factors in Pervasive Healthcare, and Machine Learning in Healthcare. The first school is scheduled for the

Winter (North Macedonia, February 2022), the second for the Summer 2022 (Portugal, September 2022), and the third for the Spring 2023 (Germany, tbd).

4.1 WideHealth Winter School on e-Health & Pervasive Technologies

The first school will be a Winter school and will take place at the Faculty of Electrical Engineering and Information Technologies (FEEIT), Ss. Cyril and Methodius University in Skopje (UKIM), North Macedonia. The school will be held from February 14 to February 17, 2022 and is aimed at undergraduate and graduate students interested in the topics of Pervasive technologies, Machine Learning, e-Health. While this school was initially planned for the Summer of 2021, we decided to postpone it briefly to understand if the pandemic situation would become more favourable to an onsite event. Given the perceived instability, we decided to perform a hybrid event that will accommodate international participants remotely, and a limited number of local students onsite.

For the preparation of this school (and the following ones), the consortium established a process whereas a working group is selected to organise the school. This group is led by the organising partner and should include other partners, both experienced and early-career researchers. Reporting of the ongoing process is done at the consortium monthly meetings as well as collection of feedback from partners (topics, speakers, dates). The school program and materials are planned to be made available as a structured training material, after post-processing.

The WideHealth Winter School on e-Health & Pervasive Technologies⁵ will be composed of four days of lectures, hands-on exercises, student presentations, and competitions. This school is organised mostly by UKIM and JSI, and features lectures by researchers of UKIM, JSI, FC.ID, and FBK. Besides research topics, there will also be lectures on managing studies. As part of the school, there will be a Machine Learning Challenge for Human Activity Recognition with wearables. Ph.D. students are also encouraged to send an extended abstract (1-2 pages) of their Ph.D. topic, which will be presented in a separate Doctoral Colloquium session on the last day of the school. The call for participation has been

4.2 Summary and Outlook

The consortium decided early on to define what would be the last possible date for the plan of having three schools to be fulfilled, and at the same time hoping to have confidence to plan for an onsite school. It was decided that it had to occur before March, and seeking for a date that could maximise student participation. Upon realising that a fully onsite school would not be responsible, the consortium converged with February, aiming at a time between semesters. Registrations for the school are currently open and we expect to have higher adhesion, given that it will also happen remotely. For future schools, we hope to be confident enough to promote an international onsite school, even if hybrid participation is also explored.

⁵ <https://widehealth.eu/winter-school-pervasive-technologies/> (WideHealth Winter School webpage)

5 Conclusion

This deliverable presented the events promoted by the WideHealth consortium to promote collaboration within the consortium, train early-career researchers in the organisation of events and presentation of their research, promote knowledge among the consortium partners, increase visibility of the research done by consortium partners, particularly by widening partners, and extend these efforts to the outer community towards a network of research in eHealth and Pervasive Healthcare.

The number of events that occurred during this first year surpassed what was planned. Looking at the KPIs in the project proposal, where there was a plan for one workshop, the consortium organised one international workshop and one internal workshop; additionally, we created the WideHealth Seminar Series, counting 6 seminars, that was open to the community, and is now available through video and audio online repositories; organised a special session at a conference and a round table with several stakeholders; and performed a matching event to spark the collaborations that are now taking place in the project. The exception to this positive outcome is that we did not have the first school yet; nonetheless, it is launched and will happen in February, and all three planned schools are still viable.

Regarding events, it is important to note that there was a pandemic happening. While this fact has impacted the way in which some of the events took place, it also increased the reach of some. We are expectant for some of the future events to happen onsite but are also aware that there was a higher participation in the past events due to being held remotely, a quality that we will seek to maintain, whenever possible, in future events (eventually hybrid).

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