

D5.8 – Hackathons and Users Community Workshops - Phase 3

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¹ **PU** = Public, **PP** = Restricted to other programme participants (including the Commission Services), **RE** = Restricted to a group specified by the consortium (including the Commission Services), **CO** = Confidential, only for members of the consortium (including the Commission Services).

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Abbreviations

EU	European Union
EC	European Commission
WP	Work Package

1 Introduction

This report focuses on the third phase of the yearly organized activities described in WP5, Task 5.1 in the EnTimeMent project. These activities include hackathon events and workshops actively involving users' communities, including the growing Qualisys users' community, and activities in collaboration with the third parties Global Disability Innovation Hub in London (<https://www.disabilityinnovation.com/>) and the WyLab incubator of sport technology startups in Genoa. The overall goals include the support of communities involving startups interested in movement sensing technology, designers and people with disabilities and academics from different universities and background interested in wearable sensing technology. The activities also investigate how EnTimeMent results can empower people's everyday life. In this third phase of the project, the main activities by the consortium are described in this document.

Due to the Covid19 pandemic part of the possibility to organize physical events was limited. For this reason, the originally anticipated events at the Paralympic Games in Tokyo and the Biennale Architettura in Venice could not take place. For other events, the situation was solved by organizing them fully or partly online.

Summary of plans for the last year of the project are presented in the final section.

The details of the events organized as part of the project are available at <https://entiment.dibris.unige.it/events>.

2 Activities in Phase 3

2.1 Spring workshop

The spring workshop was an online public event hosted by Qualisys and organized by the EU project EnTimeMent. The workshop mainly targeted researchers and other interested persons that are active in the areas related to the EnTimeMent project, including but not limited to cognitive neurosciences, human movement sciences, computational sciences, machine learning, HCI, social robotics, music, and dance research.

The main objectives of the workshop were to spread awareness about the foundations of and ongoing research within the EnTimeMent project, to inform about the latest developments in motion capture and machine learning technologies, and to exchange ideas with researchers in related areas.

Date

5, 19 May 2021

Location

Online, using Hopin.com conference platform.

Format

The workshop was organized as an interactive online event powered by Hopin.com, a platform for event management. This platform allowed for a rich interactive format with online presentations and discussions and gave the participants the opportunity to interact with each other via chat (public and private) and dedicated network spaces.

Summary of the program

The overarching theme of the workshop was “Capturing human time”. The workshop consisted of four sessions related to this theme.

In the first session, the goals and foundations of the EnTimeMent project were introduced. An overview of the project was presented by Prof. Antonio Camurri, followed by short, 5-minute pitch presentations of the project partners about ongoing research within the EnTimeMent project.

Sessions II and III were focused on the role of temporal scales in interaction design (Session II: “Designing time: Temporal scales in interaction design”) and the technology of capturing, understanding and modelling of temporal scales in human action and perception (Session III: “Grasping time – Capturing, understanding and modeling temporal scales in human perception and action”). Both middle sessions started with a keynote presentation, followed by invited presentations by distinguished researchers both within and external to the EnTimeMent project, and ended with a panel discussion to stimulate interaction between the presenters of the session and active participation of the audience members. These sessions covered a wide variety of topics (see lists of keynote speakers and invited speakers below).

Session IV was focused on markerless motion capture technology and machine learning, introducing novel markerless motion capture solutions by Qualisys and giving an overview of related machine learning technologies. This session included a demonstration and ended with an open discussion about the potential of this type of technologies for capturing human behavior.

Keynote speakers

Dr. Joseph Malloch (May 5, session II)

Assistant Professor with the Graphics and Experiential Media (GEM) lab and the HCI, Visualisation & Graphics research cluster in the Faculty of Computer Science at Dalhousie University.

Topic: “Media Interaction Design and Creativity Support.”

Prof. Danica Kragic Jensfelt (May 19, session III)

Professor of computer science from the Royal Institute of Technology, Stockholm.

Topic: “Robot systems that act, interact and collaborate.”

Invited speakers

Dr. Mehmet Aydin Baytas & Mafalda Gamboa (Chalmers University of Technology)

Topic: “Research through Design, Temporality, and Flying User Interfaces.”

Dr. Sofia Dahl (Aalborg University)

Topic: “Movement qualities in different time frames.”

Andrea Cera (University of Genoa)

Topic: “Sound, Fragility, Intrusiveness.”

Prof. Clemens Wöllner & Dr. Birgitta Burger (University of Hamburg)

Topic: “Temporal levels in music: investigating time dilations and performance synchrony.”

Prof. Alexander Refsum Jensenius (University of Oslo)

Topic: “The experience of time and space in human standstill.”

Marta Poyo Solanas & Giuseppe Marrasso (Maastricht University)

Topics: “The role of computational and subjective features in emotional body expression perception” and “Representation of perceived body pose in the brain”.

Dr. Nils Betzler, Sten Rimmelg & Dr. Vincent Fohanno (Qualisys)

Topics: “Qualisys markerless MoCap solutions,” “Machine learning in MoCap,” and “Markerless MoCap demonstration.”

Vincenzo Stefano D’Amato (University of Genoa)

Topic: “Multiple Temporal Scales in Motion Recognition: from Shallow to Deep Multi Scale Models.”

Event statistics

The event statistics from the Hopin platform of the two workshop days is summarized in the Table below. Registrations were managed separately for the two days, and the combined information of some key numbers is shown in the third column.

The number of unique registrations for the whole workshop was 161 from 22 countries all over the globe. The turnout was high with 100 participants per day and an average time spent per participant of more than 4 hours. The number of comments and network participation showed a high engagement of the participants, and the event was well rated (>8 on a scale of 1-10).

These figures also underline the main advantages of the online format of the workshop: we could host more participants than would have been possible for a physical event, and the threshold for participation was low (no costs and no need to travel).

	<i>May 5</i>	<i>May 19</i>	<i>Combined</i>
<i>Registrations</i>	125	133	161
<i>Turnout</i>	101	99	
<i>Number of Countries</i>	20	18	22
<i>Average Time Spent (mins)</i>	294	228	
<i>Total Comments/Questions</i>	143	161	
<i>Networking visitors</i>	48	28	
<i>Average Attendee Score</i>	8.7	8.3	
<i>Average Post-Event Survey Score</i>	9.0	9.0	

EnTimeMent workshop website

The full program of the workshop including recordings of the presentations can be found at: <https://www.qualisys.com/entiment-workshop/>

Organizing committee

Erwin Schoonderwaldt, Stephany Knuström, Helen Holmqvist-Rydén, Nils Betzler, Sten Rimmelg, Vincent Fohanno, Patrik Almström, Fredrik Müller (Qualisys)

Antonio Camurri, Roberto Sagoleo (University of Genoa)

Alice Tomassini, Alessandro D’Ausilio, Julien Laroche, Cristina Becchio (IIT)

Nadia Berthouze (UCL)

Mårten Björkman (KTH)
Benoît Bardy, Marta Bienkiewicz (EuroMov)
Martin Clayton, Jin Li (Durham University)
Peter Keller (Western Sydney University)

2.2 Affective Movement Recognition (AffectMove) Challenge and Workshop

A machine learning challenge and workshop focused on affective movement recognition was organized by UCL in collaboration with partners from UniGe, Maastricht University, Euromov, KTH, and Qualisys. The challenge (and workshop) was the first of its kind, and it was organized in conjunction with the Affective Computing and Intelligent Interaction (ACII) conference.

The challenge began in March 2021 and was based on three naturalistic datasets (from EnTimeMent partners: UCL, UniGe, and Maastricht University) built on deep understanding of the requirements of automatic detection technology for chronic pain physical rehabilitation, maths problem solving, and interactive dance contexts respectively. The challenge was made up of three machine learning tasks, and there were four teams that participated in two of the tasks. Each team submitted machine learning outputs of their modelling as well as papers describing their approach and results. The papers have been published in the companion proceedings of the ACII conference. An overview paper authored by the organizing team was also published there (full reference below). Further details on the AffectMove challenge can be found in this publication as well as on the challenge/workshop webpage (see link below).

The challenge ended with a half-day workshop during the ACII conference schedule, specifically on 28 September 2021. The workshop included paper presentations from the challenge participants as well as a panel discussion on the barriers that remain to the deployment of affective movement recognition technology in the real world. We published a blog article (link provided below) summarising the discussion of the workshop panel.

AffectMove challenge and workshop website:

http://www.casapaganini.it/entiment/workshops/2021/Workshop2021_Home.php

AffectMove challenge overview publication:

Olugbade, T., Sagoleo, R., Ghisio, S., Gold, N., Williams, A., de Gelder, B., Camurri, A., Volpe, G. and Berthouze, N., 2021, October.

The AffectMove 2021 Challenge - Affect Recognition from Naturalistic Movement Data.

International Conference on Affective Computing and Intelligent Interaction Workshops and Demos.

Blog article summarising the AffectMove panel discussion:

<https://ucl.ac.uk/research/affective-computing/entiment/where-are-movement-sensing-emotion-inferring-technologies-in-the-real-world>

2.3 Festival della Scienza

EnTimeMent project presented during "S+T+ARTS TALKS IN GENOVA 2020", a two-days streaming event for the Festival of Science held in Genova from October 22nd to November the 1st.

Date

27-28 October 2020

Location

Casa Paganini - InfoMus, DIBRIS, University of Genoa

Description

"S+T+ARTS TALKS IN GENOVA 2020" has been a workshop focusing on some research results on the interaction between contemporary art, science and technology. International experiences by research institutes, artists and pathfinder projects carried out within the European S+T+ARTS and FET initiatives under Horizon2020 programme has been presented. Particularly, EnTimeMent project has been presented the 28th of October in a panel titled "HUMAN: Motion sensing and sonification" by Prof. Antonio Camurri, project coordinator for University of Genova.

For a detailed program of the event, see: <https://www.startstalksingenova.eu>

2.4 Markerless mocap campaign

Two-week hands-on workshop and data collection with markerless mocap technology.

Date

8-19 November 2021

Location

Casa Paganini - InfoMus, DIBRIS, University of Genoa

Description

The EnTimeMent Markerless Motion Capture Campaign consisted of a 2-week series of feasibility studies and experiments investigating the recent innovative mocap technology by Qualisys and the novel techniques for movement analysis and prediction developed by the EnTimeMent Consortium. During the two-week campaign data was collected as part of the evaluation studies for the three scenarios of WP 4. Furthermore, other partners of the EnTimeMent project had the opportunity to explore the potential of markerless motion capture for their research projects.

A major advantage of markerless motion capture over traditional, marker-based motion capture is that there is no need to prepare the subjects to be measured with markers. For markerless motion capture, no special preparations of the subject are required. Except for saving time, this allows for the use of this technology in cases that can be very challenging or impossible with traditional motion capture technologies, for example with young children or patients suffering from chronic pain.

The markerless mocap campaign included six measurement projects, representing a wide range of measurement scenarios. The main goals of the markerless campaign were:

- For the involved researchers to familiarize with markerless motion capture and explore its potential,
- For Qualisys to gain insight into the challenges and requirements of potential application areas, and to collect data for development purposes.

The markerless mocap system was made available by Qualisys at Casa Paganini in Genova. The system consisted of 12 Qualisys video cameras and a high-performance PC. The data was collected using the Qualisys PAF markerless workflow, integrating markerless processing and analysis with Theia3D software.

List of projects

- Measurement of typical situations for healing and life support for disabled children, UniGe/Gaslini Children hospital (WP 4, scenario 1)
- Measurement of movements under influence of chronic pain, UCL (WP 4, scenario 2)
- Leading and following in a group exercise with three persons, Euromov/UniGe (WP 4, scenario 3)
- Measurements of grasping movements for studies of action prediction, IIT
- Measurement of short actions with single and two actors for perception studies (Maastricht University)
- Indian solo singer performance (Durham University)

Organizers and technical staff:

Antonio Camurri, Corrado Canepa, Eleonora Ceccaldi, Simone Ghisio, Sanket Sabharwal, Roberto Sagoleo (University of Genoa)
Erwin Schoonderwaldt, Sten Rimmelg (Qualisys)
Daniel Bassett (Qualisys/Totum Motum)

2.5 Wylab event

MMC Campaign Showcase Event
19 November 2021, 3:00-6:00pm

Summary

Showcase event presenting the results from this 2-week *Markerless Motion Capture Campaign* (MMC). The potential of the technologies developed and employed by the EnTimeMent consortium were discussed in a round table discussion.

Location:

The event was organized in hybrid form with part of the attendance present on location as well as online attendance.

Physical location: Casa Paganini, UniGe, Genova

Online participation: Zoom conference for active participant and live stream broadcast via Youtube for audience.

Programme:

- 15:00-15:10 EnTimeMent: challenges and perspectives (Antonio Camurri, EnTimeMent Coordinator)
15:10-15:20 Qualisys novel markerless technology (Erwin Schoonderwaldt, Qualisys)

Movement experiments and feasibility studies:

- 15:20-15:30 Participation and interaction in childhood disability (Gaslini Children Hospital, UniGe)
15:30-15:40 Intentions and Emotions (Maastricht University)
15:40-15:50 The kinematics of intentions in reach-to-grasp actions (IIT)
15:50-16:00 Leadership and entrainment in small groups (UniGe, EuroMov)
16:00-16:10 Expressive music performance in Indian music (Durham University)
16:10-16:20 Supporting musculoskeletal chronic pain management (UCL)

16:20-18:00 Round table - Chair: Federico Smanio (Wylab)

Participants and stakeholders:

Maryam Bandukda (GDI Hub, London), Adriano Bacconi (Math & Sport), Georgia Cesarone (CTI Liguria), Daniel Bassett (Totum Motum), Paolo Moretti (Gaslini Children Hospital, Genoa), EnTimeMent partners: Benoit Bardy and Marta Bienkiewicz (EuroMov, University of Montpellier), Nadia Berthouze (UCL, London), Mårten Björkman (KTH, Stockholm), Antonio Camurri (University of Genoa), Beatrice de Gelder (University of Maastricht), Cristina Becchio and Luciano Fadiga (IIT), Dimitrios Karadimas (VBC, Athens), Erwin Schoonderwaldt (Qualisys).

Link to the recording of the event:

<https://youtu.be/15XI7UbF7PI>

Organizing committee:

Antonio Camurri, Corrado Canepa, Eleonora Ceccaldi, Andrea Cera, Paolo Coletta, Vincenzo D'Amato, Cora Gasparotti, Simone Ghisio, Sanket Sabharwal, Roberto Sagoleo, Gualtiero Volpe (University of Genoa)
Erwin Schoonderwaldt, Sten Rimmelg, Daniel Basset (Qualisys)
Nadia Berthouze, Nicholas Gold, Temitayo Olugbade, Amanda CdC Williams (UCL)
Benoit Bardy, Marta Bienkiewicz (University of Montpellier)
Beatrice de Gelder, Marta Poyo Solanas, Giuseppe Marrazzo (Maastricht University)
Cristina Becchio, Luciano Fadiga, Mariacarla Memeo (IIT)
Cristina Becchio, Luciano Fadiga, Andrea Cavallo, Nathan Foster, Kiri Pullar, Eugenio Scaliti, James Strachan, Luca Sbröllini (IIT)
Martin Clayton, (Durham University)
Federico Smanio, Francesca Picasso (Wylab)
Maryam Bandukta, Giulia Barbareschi (GDI Hub)

3 Plan of events in year 4

The pandemic Covid19 at the moment does not allow to define plans involving physical presence and participation with the target user communities and stakeholders.

We explored a feasibility study on the possibility to organize a final event around presentations of project demos and experiments in a public scenario including the Living Architectures project of Philip Beesley (University of Waterloo), following his interactive installation presented at the Biennale Architettura in Venice in 2021.

The current plan includes a joint workshop of EnTimeMent with two other FET PROACTIVE projects: VIRTUALTIMES (<https://virtualtimes-h2020.eu/>) and EXPERIENCE (<https://experience-project.eu/>). The objective is to join the three consortia, to come together for a joint event and learn from each other experiences, approaches, insights, findings etc.

The joint workshop will be on 2nd March 2022. In this workshop, besides exchanges among the partners of the three consortia, we will explore possible future joint initiatives.

Further, EnTimeMent is working at the organization of a final event at the Festival of Science of Genoa (October/November 2022), and at possible other dissemination and exploitation initiatives.

UCL with the GDI-Hub is planning to organize a public engagement event, in collaboration with other consortium partners, aiming to attract people with chronic pain and related stakeholders (clinicians, researcher, industry). We will demonstrate work done in this area within EnTimeMent across the various areas of HCI, Machine Learning, behavioural classification, and Sonification. We are exploring different formats and a suitable venue (e.g., UCL, UCL-East, Pain groups or hospital). We plan to hold the event around November 2022. If restrictions for in person events still apply, we will run the event virtually.

UNIGE in collaboration with the Galliera Hospital and other stakeholders will organize a series of public events on emotional wellness technologies, to support treatment of older people at risk of fragility. EnTimeMent results will be applied to the realization of The DanzArTe protocol and a technology for the cognitive and physical treatment, with the partial support of Fondazione Compagnia di San Paolo (<https://www.lavanderiavapore.eu/2021/03/23/danzarte-welfare-territoriale/>).