DESTINI
Smart Data Processing and Systems of Deep Insight

JANUARY 24-28, 2022

Overview

Second School

Smart Data Processing and Systems of Deep Insight

eTwinning

European Commission

SAPIENZA Università di Roma

Cyprus University of Technology

Tilburg University

SEiIS

JADS Jheronimus Academy of Data Science

DESTINI

HORIZON 2020

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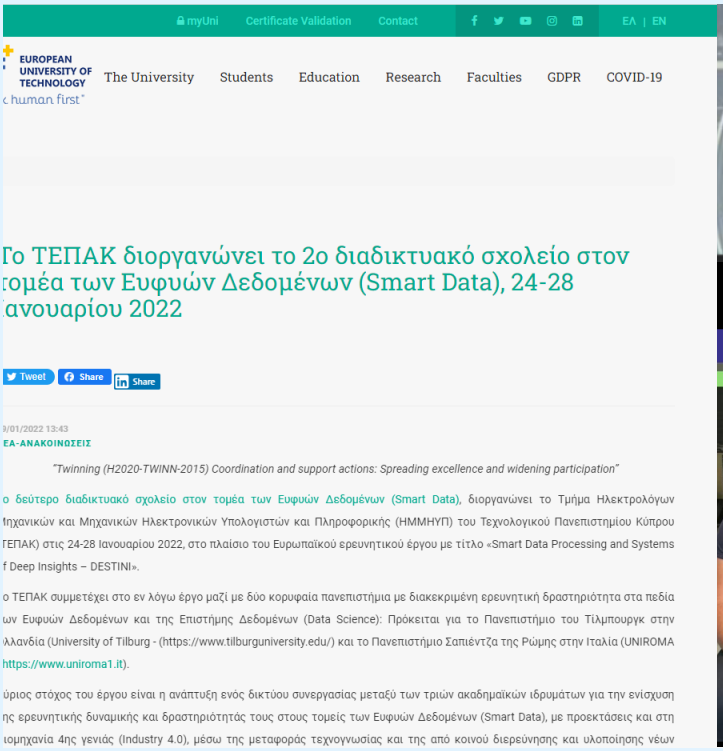
DESTINI
Smart Data Processing and Systems of Deep Insight

About School

This event is the second part of a series of schools and workshops organized by DESTINI on Smart Data and it is aligned with the project's dissemination and communication strategy. The latter has been organized and structured to present different scientific topics within the project's Joint Research Activities (JRAs) and demonstrate their benefits to real cases. This school aims to share knowledge developed in the project and to facilitate discussions, as well as exchange of expertise, between researchers, industrial and business stakeholders, governmental and decision-making bodies and the general public.

The duration of the school is five days. It comprises various talks and presentations that mainly target industrial and market stakeholders. During its sessions, the school covers a variety of topics and scientific areas which offer solutions to real-world problems and challenges, and demonstrate how applied research can benefit businesses, researchers, project stakeholders and the general public. The talks are delivered by DESTINI's partners and other project collaborators.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EUROPEAN UNIVERSITY OF TECHNOLOGY The University Students Education Research Faculties GDPR COVID-19

human first

Το ΤΕΠΑΚ διοργανώνει το 2ο διαδικτυακό σχολείο στον τομέα των Ευφυών Δεδομένων (Smart Data), 24-28 Ιανουαρίου 2022

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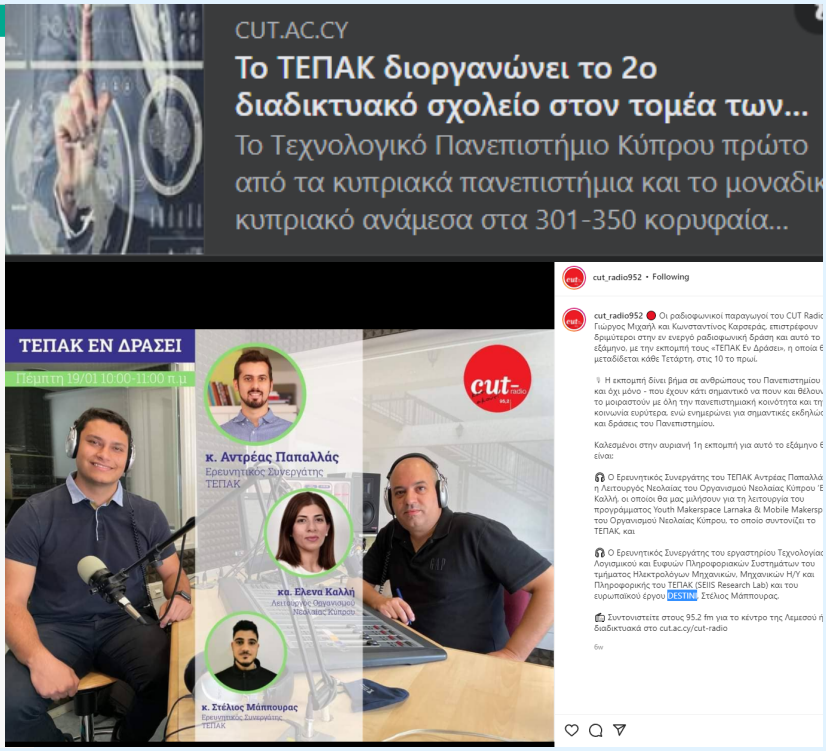
ΕΑ-ΑΝΑΚΟΙΝΩΣΕΙΣ

"Twinning (H2020-TWINN-2015) Coordination and support actions: Spreading excellence and widening participation"

ο δεύτερο διαδικτυακό σχολείο στον τομέα των Ευφυών Δεδομένων (Smart Data), διοργανώνει το Τμήμα Ηλεκτρολόγων ηχανικών και Μηχανικών Ηλεκτρονικών Υπολογιστών και Πληροφορικής (ΗΜΜΗΥΠ) του Τεχνολογικού Πανεπιστημίου Κύπρου ΤΕΠΑΚ) στις 24-28 Ιανουαρίου 2022, στο πλαίσιο του Ευρωπαϊκού ερευνητικού έργου με τίτλο «Smart Data Processing and Systems f Deep Insights – DESTINI».

ο ΤΕΠΑΚ συμμετέχει στο εν λόγω έργο μαζί με δύο κορυφαία πανεπιστήμια με διακεκριμένη ερευνητική δραστηριότητα στα πεδία ων Ευφυών Δεδομένων και της Επιστήμης Δεδομένων (Data Science): Πρόκειται για το Πανεπιστήμιο του Τίλμπουργκ στην λλανδία (University of Tilburg - (https://www.tilburguniversity.edu/) και το Πανεπιστήμιο Σαπιέντζα της Ρώμης στην Ιταλία (UNIROMA https://www.uniroma1.it).

ύριος στόχος του έργου είναι η ανάπτυξη ενός δικτύου συνεργασίας μεταξύ των τριών ακαδημαϊκών ιδρυμάτων για την ενίσχυση ης ερευνητικής δυναμικής και δραστηριοτήτάς τους στους τομείς των Ευφυών Δεδομένων (Smart Data), με προεκτάσεις και στη ιομηχανία 4ης γενιάς (Industry 4.0), μέσω της μεταφοράς τεχνογνωσίας και της από κοινού διερεύνησης και υλοποίησης νέων



DESTINI
Smart Data Processing and Systems of Deep Insight

About DESTINI

TWINNING PROJECT - HORIZON2020

Smart Data ProcESsing and SysTems of Deep INsIght (DESTINI) is a H2020 Twinning Project that proposes a series of coordination and support actions for promoting research in the area of Smart Data. The Cyprus University of Technology (CUT) joins forces with two internationally recognized scientific groups from the Netherlands (Tilburg University and Jheronimous Academy of Data Science) and Italy (Sapienza Universita di Roma), aiming to strengthen its research and scientific profile in the relevant area. Specifically, DESTINI's activities revolve around exchanging scientific knowledge and transferring best research practices amongst its partners in the field of Smart Data Processing and Systems of Deep Insight.

SAPIENZA UNIVERSITÀ DI ROMA · Cyprus University of Technology · TILBURG UNIVERSITY · SEiIS · JADS Jheronimus Academy of Data Science

24, January, 2022

Day 1

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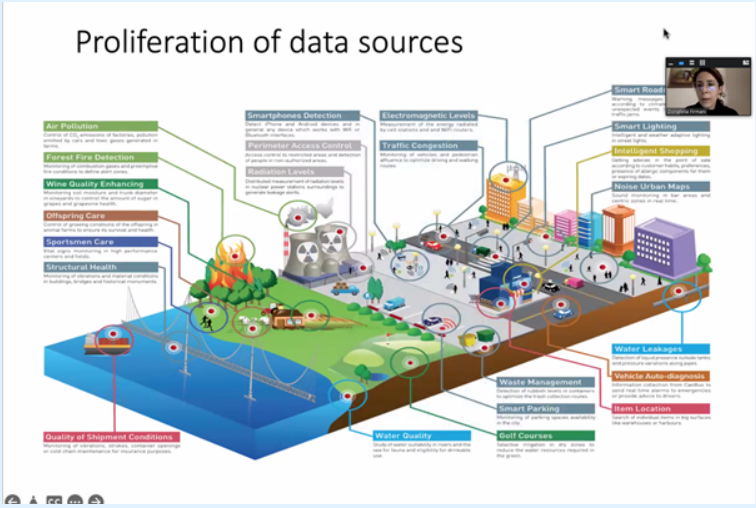
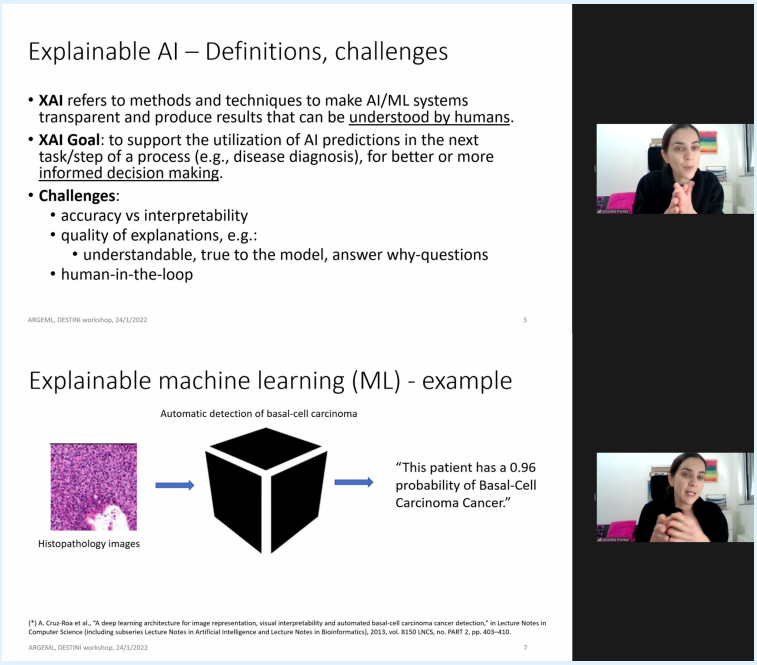


Professor Donatella Firmani from Sapienza University of Rome presented **Big Data: Methods and Technologies.** Prof. Firmani illustrated methods and technologies for the management of big data. The presentation included the challenges and solutions of the aforesaid methods, through examples and discussion with the audience.

Mrs Nicoletta Prentzas, PhD candidate from the University of Cyprus presented the topic: **Argumentation-based framework for Explainable Machine Learning (ARGEML).** ARGEML is a framework built to support and offer a novel approach towards the XAI (Explainable AI), by combining the interpretability of symbolic AI with the high efficiency and accuracy of the Machine Learning models.



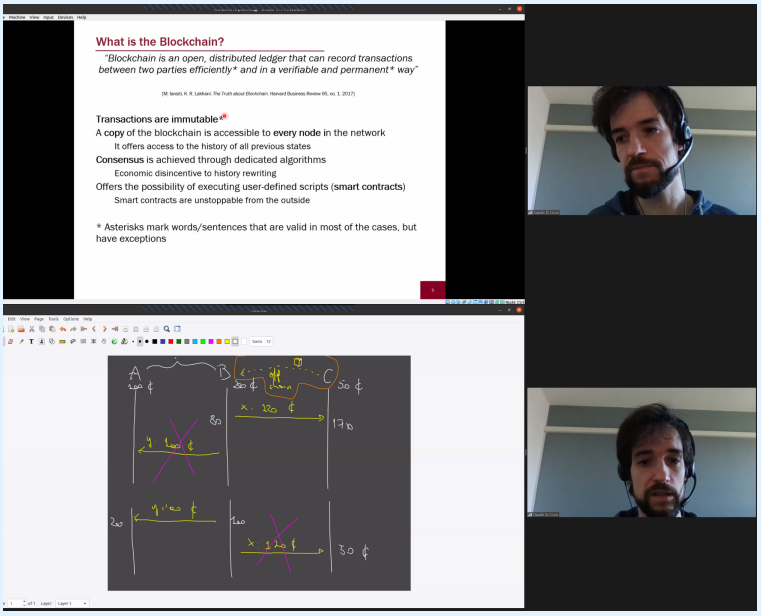
24, January, 2022

Day 1

Second School of DESTINI

Mr Marios Hadjiaros, PhD candidate from the University of Cyprus and researcher at CYENS, has given a talk on **Preliminary Findings on the Virtual Reality Cognitive Gaming Based on Brain Computer interfacing.** The presentation discusses a way of integrating Brain Computer Interfacing with Virtual Reality, in order to develop interactive applications for cognitive tasks.

Professor Claudio Di Ciccio from Sapienza Università di Roma presented the topic: **Blockchain Applications**. Throughout the presentation, Prof. Di Ciccio explained the foundations of blockchain, such as how the transactions are happening and how the security is accomplished. Furthermore, the evolution of the web from web 1 to web 3 was discussed, as well as some research-oriented directions of blockchain, with the most relevant topics.



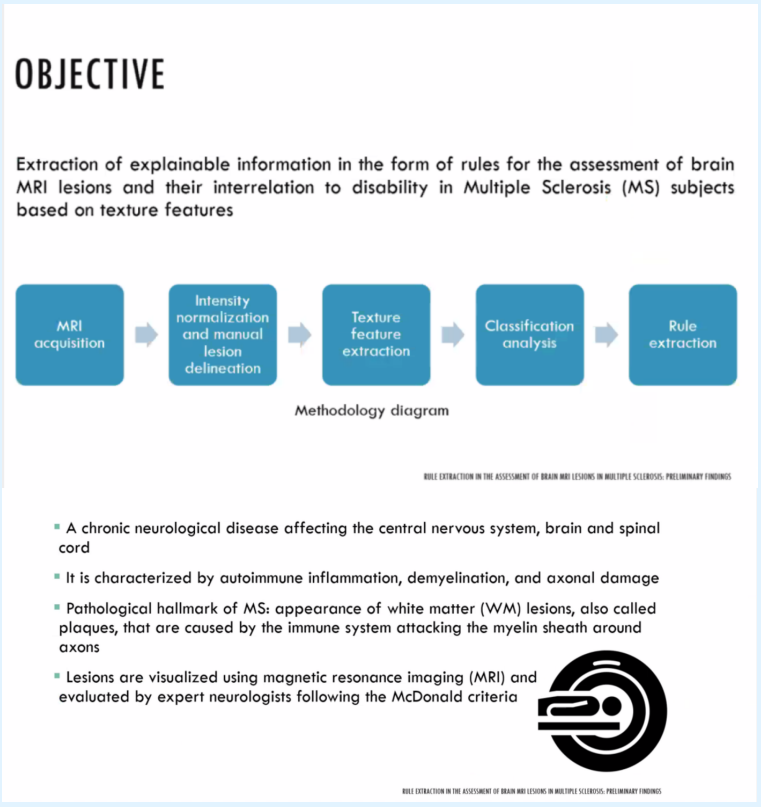
25, January, 2022

Day 2

Second School of DESTINI

Professor Lauren Ferro and Dr. Francesco Sapio from Sapienza University of Rome presented a talk on **Virtual Reality and Gamification.** The purpose of the presentation was to introduce the concept of gamification, and how it can be used to solve real world problems, followed by case studies and examples.

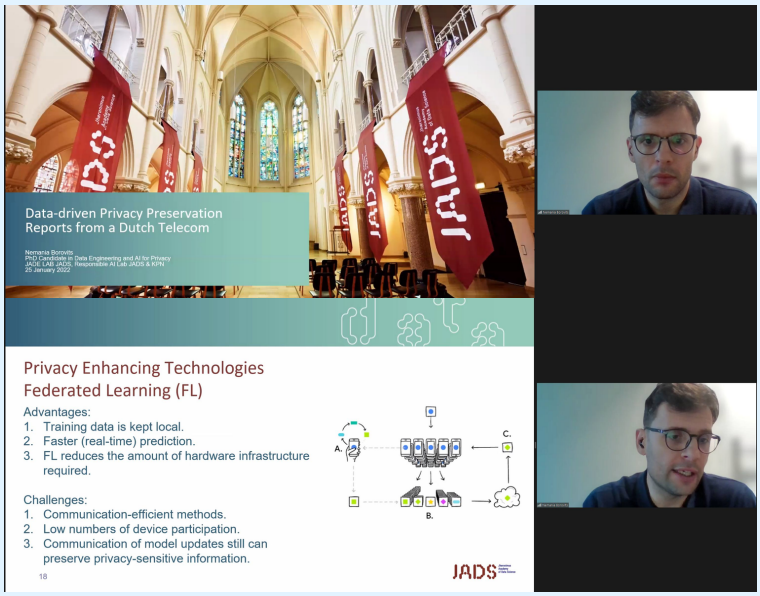
Mrs Andria Nicolaou, a PhD candidate from the University of Cyprus, presented a part of her recent research on **Rule Extraction in the Assessment of Brain MRI Lesions in Multiple Sclerosis: Preliminary Findings.** Mrs Nicolaou began her presentation by explaining what multiple sclerosis is, followed by some preliminary conclusions from her research about how rule extraction can help identify brain lesions related to multiple sclerosis, from MRI images.



25, January, 2022

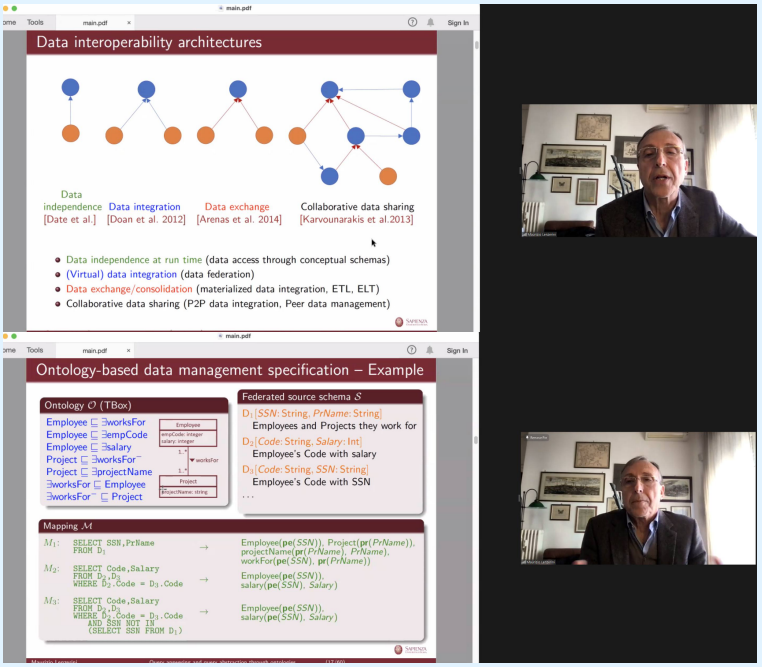
Day 2

Second School of DESTINI



Mr Nemania Borovits, PhD candidate from Tilburg University presented a talk on **Privacy preservation - Reports from a Dutch Telecom.** As part of the presentation, some principles about privacy by design were presented, followed by methodologies to enhance privacy, such as Federated Learning (FL). Moreover, advantages and challenges of the methodologies were discussed.

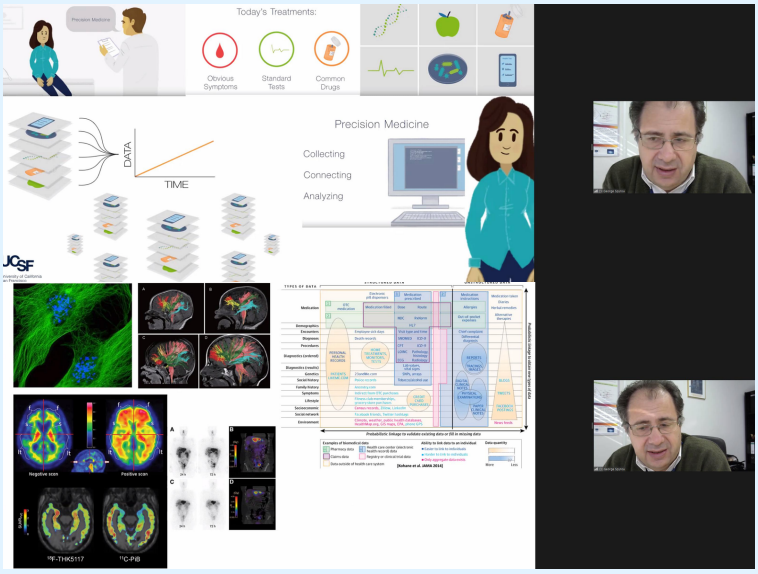
Professor Maurizio Lenzerini from Sapienza Università di Roma presented the topic **Query answering and query abstraction through ontologies**. During the presentation, Prof. Lenzerini explained what ontologies are, and how they can contribute to the interoperability of the data, through mapping the data into an ontology.



26, January, 2022

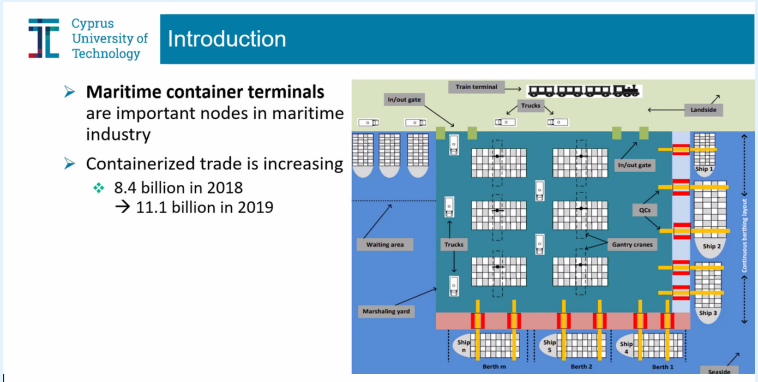
Day 3

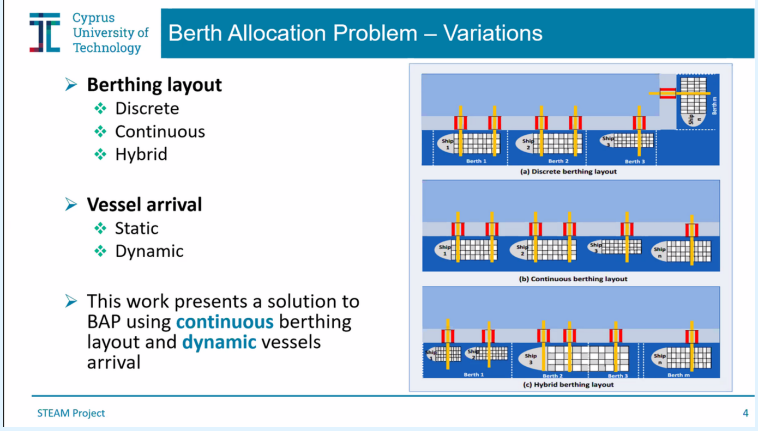
Second School of DESTINI



Professor George Spyrou, Head of the Bioinformatics department of Cyprus Institute of Neurology and Genetics (CING), presented **Complex Patterns of Biological Information Decoded with Network-based Bioinformatics.** A key focus of the presentation was Precision Medicine, which can be accomplished by combining data science with healthcare, by decoding and analyzing the information to produce more accurate and precise medicines.

Mr Sheraz Aslam, PhD candidate and researcher at CUT provided a talk on his recent research work on **Enhanced Berth Allocation Using the Cuckoo Search Algorithm.** During the talk, an algorithm was showcased (Cuckoo) which can schedule dynamically the vessel's arrival in order to avoid conflicts. The algorithm was based on the well-known berth allocation problem which was included in the presentation. Lastly, the algorithm is a part of the EU project STEAM (Sea Traffic Management in the Eastern Mediterranean), which is undertaken by CUT.





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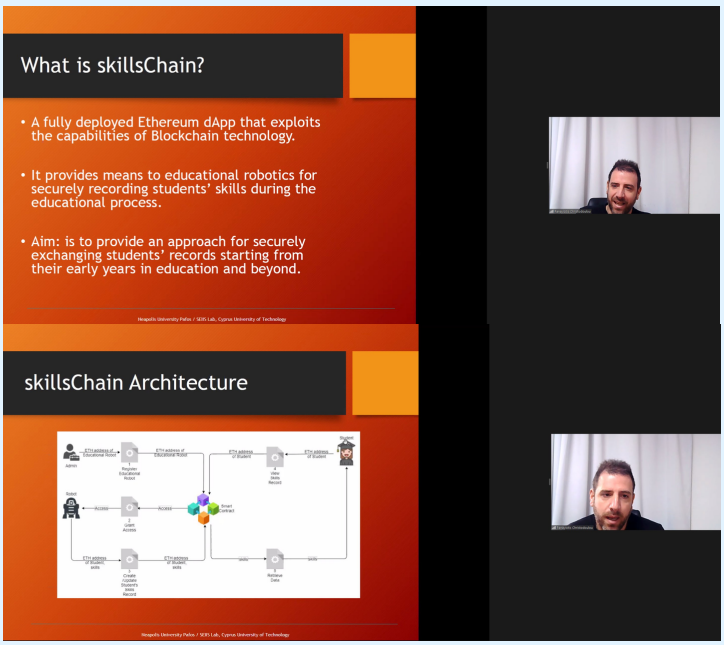
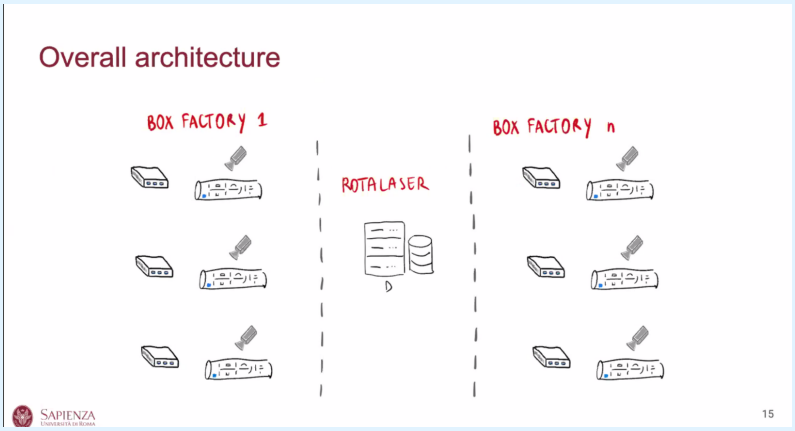


Professor Panayiotis Christodoulou from Neapolis University of Pafos / researcher at SEIIS lab of CUT, provided an overview of the scientific article **skillsChain: A Decentralized Application that Uses Educational Robotics and Blockchain to Disrupt the Educational Process.** SkillsChain is a case study for a decentralized application published in an academic journal, about combining educational robotics and blockchain, aiming on providing a way to secure the exchange of students' records.

Mr Jerin George Mathew and Mrs Flavia Monti from Sapienza Università di Roma presented **Transformation in Traditional Industry: Die Cutter 4.0.** The presenters explained the evolution of the industry, concluding on industry 4.0. Then, a case study followed, on the application of a Smart Die Cutter which contains sensors that are controlled by a mini-PC. The worker interacts through a dashboard, where he monitors and manages the production.



26, January, 2022

Day 3

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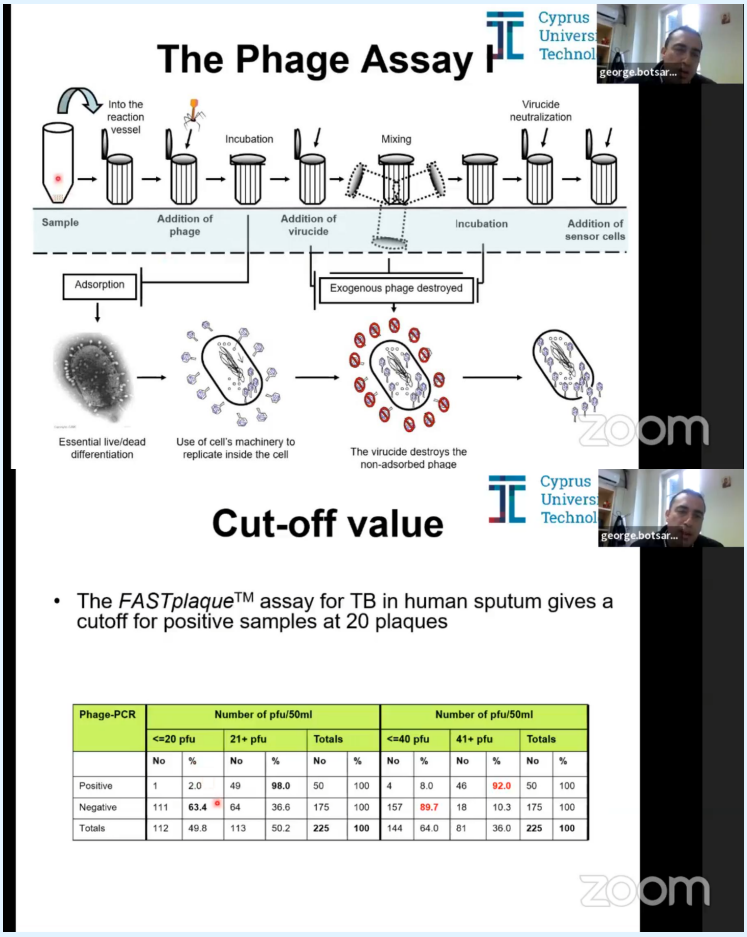


Professor George Botsaris from the department of Agricultural services, biotechnology, and food science of CUT presented the topic: **Data Driven Detection and Biological Control of Food Borne Pathogens: The Case of Mycobacterium Avium Subspecies Paratuberculosis.** Prof. Botsaris introduces a way of detecting food borne pathogens, using a data driven methodology. In the context of the presentation, the case study of Mycobacterium Avium Subspecies Paratuberculosis was examined.

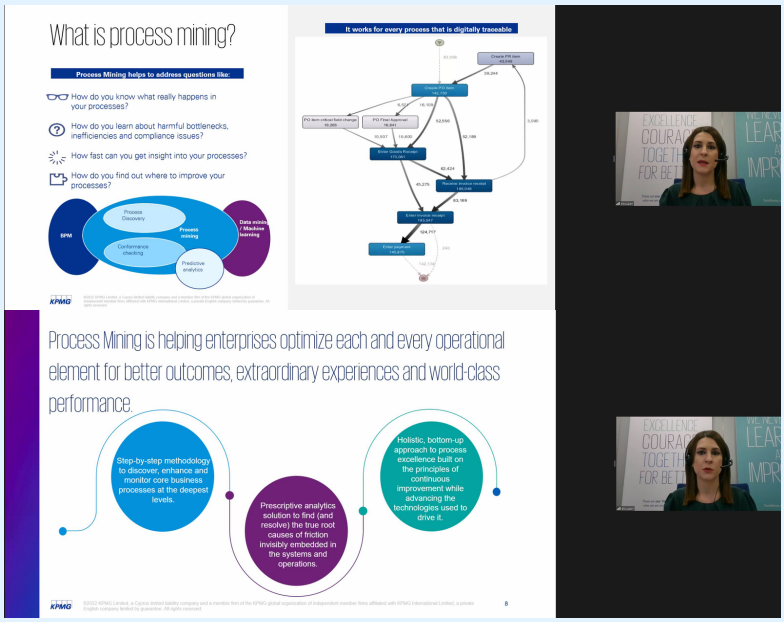
27, January, 2022

Day 4

Second School of DESTINI

Professor Stephania Loizidou from the Frederick University of Cyprus provided a talk on **Computer Graphics - Animation.** Prof. Loizidou, introduced to the audience the concepts of computer graphics and animations, followed by some innovational topics and examples, such as Virtual Reality, motion capture, and simulations.

Mrs Elia Kouzari (Assistant Manager at KPMG) presented **The Art of Process Mining.** A detailed introduction on Business Process Mining was established, including the four main phases of a business process mining lifecycle (Collection, Discovery, Enhancement, Monitoring). Furthermore, the benefits of BPM, reason of existence as well as some tools, were described.



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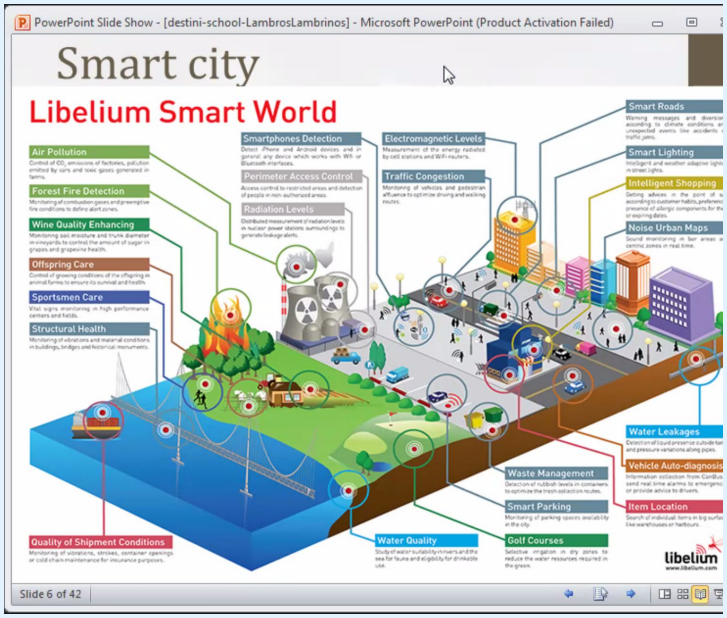
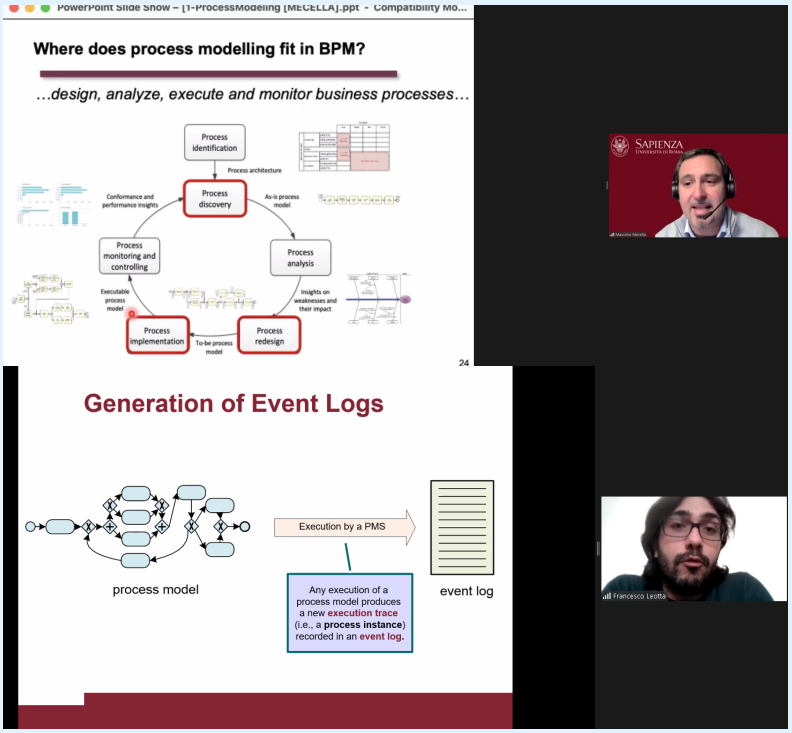
Day 4

Second School of DESTINI



Professor Lambros Lambrinos from the Cyprus University of Technology provided a talk on **Integrating the Internet of Things in Real-life Scenarios.** During the talk, the concept of Internet of Things (IoT) was explained, followed by some real world applications such as smart cities, and smart parking.

Professors Massimo Mecella & Francesco Leotta from Sapienza Università di Roma presented the topic: **Business Process Management and Process Mining.** The presentation focused on the context of business process mining and the larger area of business process management. The concepts of business process and process model were clarified, showcasing some of the multiple different ways of creating a process model. Furthermore, the speakers explained the main goals of BPM, concluding with some examples.



28, January, 2022

Day 5

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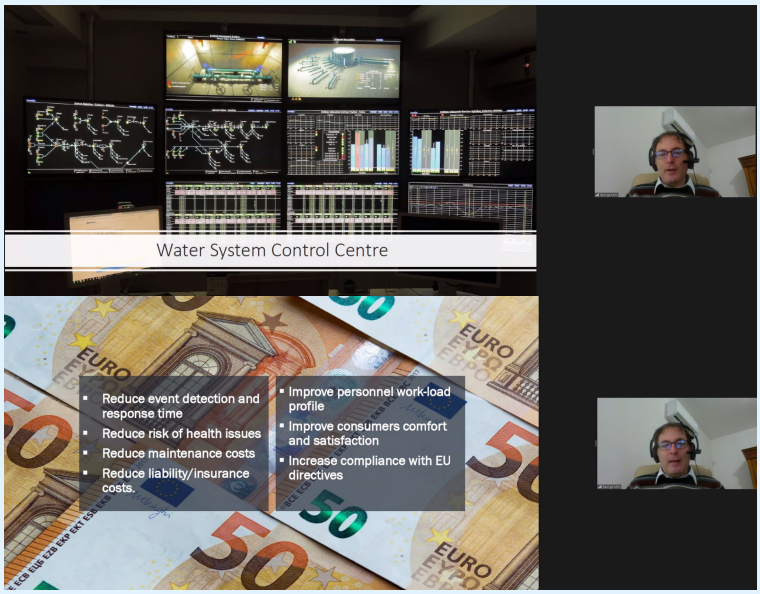
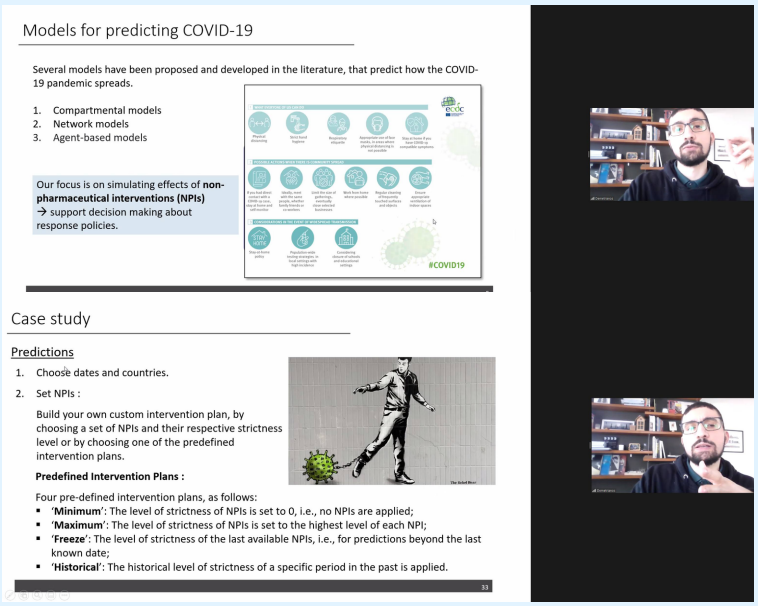


Mr George Milis (Director and Innovations Manager at PHOEBE Research & Innovation) presented the topic **The Water Analytics Digital Twin.** The main focus was on the technology of Digital Twins, including the benefits, and how it can contribute to improve the quality of life of the general public. Furthermore, a case study of a Digital Twin replicating an intelligent Water System was presented.

Mr Demetrianos Gavriel (Data Analytics Expert at PHOEBE) presented the topic **PandoraSEAL: An AI-based Decision Support Tool for the Selection of Non-Pharmaceutical Interventions During Pandemics.** PandoraSEAL, is a Neural Network tool that aims to assist decision makers to select and implement the most efficient responses regarding the pandemics. Aside from the tool, a case study was also showcased, for the methodology followed in order to build the tool, including predictions, historical results, and what-if scenarios.



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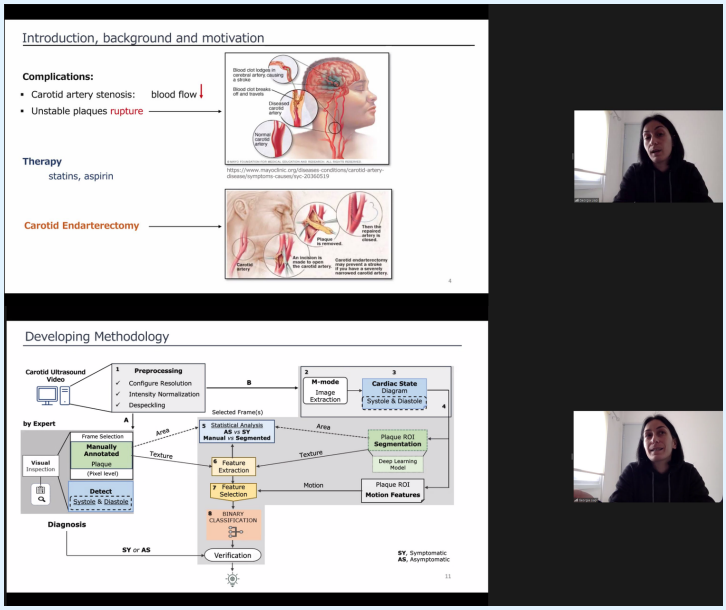
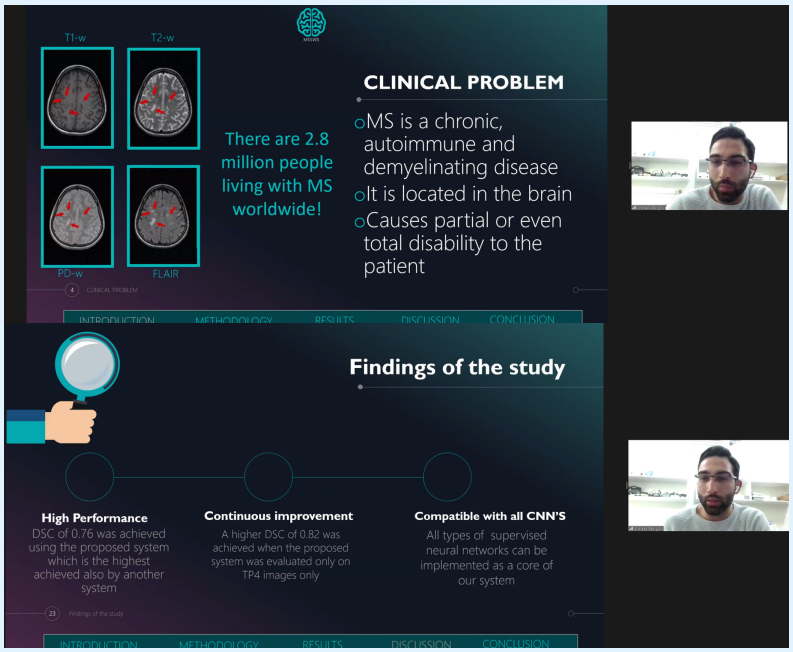


Mrs Georgia Liapi (PhD candidate at Cyprus University of Technology) presented the topic: **Ultrasound Carotid Plaque Video Data Analysis for the Estimation of the Risk of Stroke.** During the presentation, a methodology was presented for the estimation of the risk of stroke, using Ultrasound Carotid Plaque Video analysis.

Mr Andreas Georgiou (MSc student at Cyprus University of Technology) provided a talk on **An Adaptive Semi-Automated Integrated System for Multiple Sclerosis Lesion Segmentation in Longitudinal MRI Scans Based on a Convolutional Neural Network.** The presenter proposes a simple solution that comes provides lesion segmentation to MRI scans of Multiple Sclerosis, where the user has the opportunity to correct errors from the model, so the model can be constantly improved.



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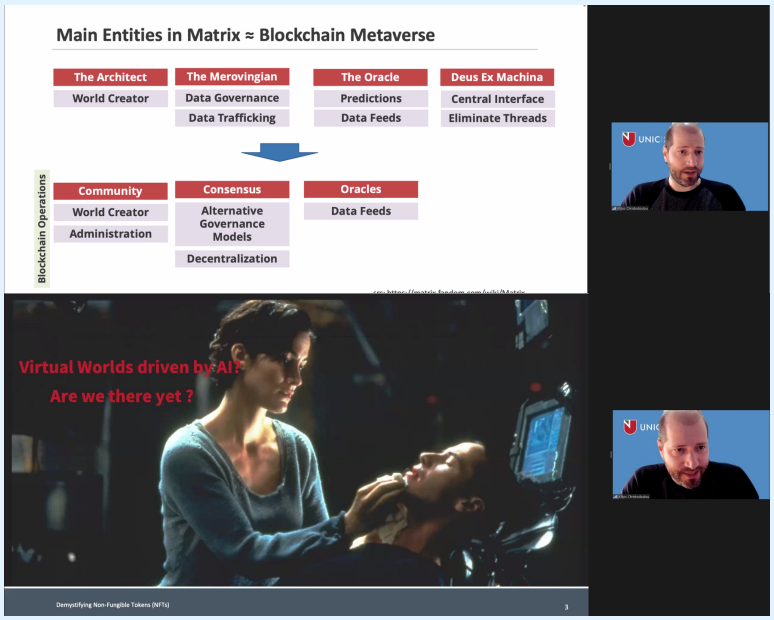
Day 5

Second School of DESTINI

Professor Willem-Jan van den Heuvel & Geert Monsieur from the Jheronymous Academy of Data Science & Tilburg University provided a talk on **The Service Paradigm Rebound: Data Products, Meshes & Markets.** The speakers initiated with a brief history of distributed data, followed with the mentioning of the latest technologies of handling big data, such as data meshes & data products.

Professor Klitos Christodoulou from University of Nicosia presented the topic: **Demystifying Non-Fungible Tokens (NFTs).** The speaker introduced the ideology behind the production and trend of NFTs, their relation with blockchain and the idea of tokenization in blockchain technology. Moreover, the presentation also mentioned the involvement of NFTs in the upcoming virtual technological ecosystem "metaverse".



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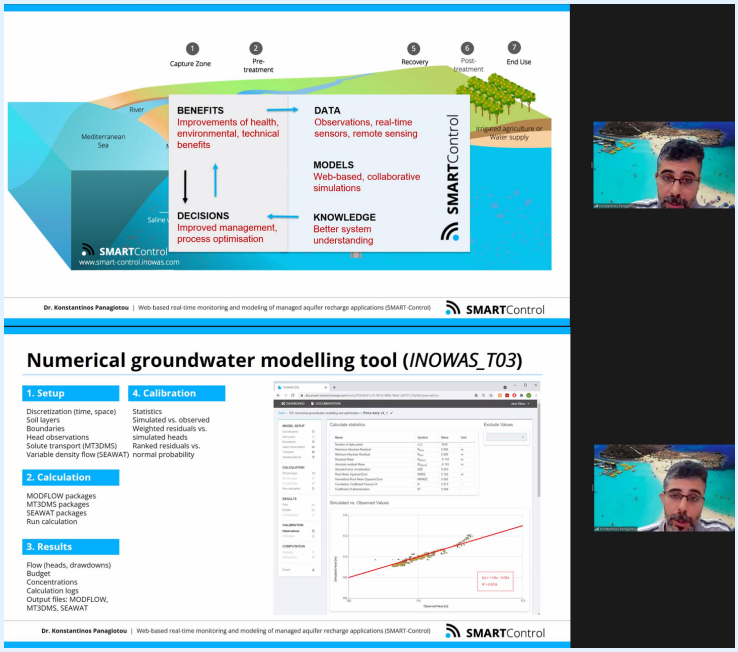

Dr. Constantinos Panagiotou from Excelsior – Eratosthenis CoE presented the topic **Web-based Real-time Monitoring and Modeling of Managed Aquifer Recharge Applications.** In the context of the presentation, a Smart Real Time Monitoring Web Application was presented, which gathers data from different locations of the world about groundwater systems. These data are utilized in order to make some assessments, such as the states of the groundwater systems.

Conlusion

TWINNING PROJECT - HORIZON2020

The Second School of the DESTINI project was successfully held on January 24-28, with participation from universities, researchers, students, businesses, offering their knowledge and expertise to the audience. The topics of the presentations covered a wide variety of topics and scientific areas, and it was demonstrated how applied research can the project's stakeholders and the general public.

The consortium of DESTINI would like to thank all the presenters and participants of the event, for their courtesy to be a part of this and honor us with their presence.

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