VIRTUAL EDUCATION SPACE FOR LIFELONG LEARNING

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UNIVERSITY OF PLOVDIV
RATIONALE

• One year ago we applied in open competition that raises some changes in our group
• We had to inventory existing software tools and rethink our research strategy
  • Especially Virtual Education Space that was supposed to be successor of DeLC
• Project application
  • Identification of existing tools suitable for the proposal
  • Identification of tools convenient for adaptation
  • Rethinking of the concepts of the Virtual education space (successor to DeLC)
DELC LABORATORY

• Mission:
  • Developing and improving DeLC 2.0 as a real e-learning environment
  • No prototyping, no research
• Financing: deduction from collected student fees
EDUCATION IN DELC 2.0

• 2000+ bachelor students in 4 curricula:
  • Informatics
  • Software engineering
  • Business information technologies
  • Software technologies and design

• about 150 masters in 4 curricula in Software engineering
  • SE (Graphical environments and user interfaces)
  • SE (Mobile systems and applications)
  • SE (Software architectures and tools)
  • SE (AI systems)
STRUCTURE OF MSC

Basic Module
• 4 mandatory courses

Specialized Module
• 3 mandatory
• 2 elective

Practical project
• Part 1
• Part 2

Diploma thesis (or final exam)
COGNITIVE ROBOTICS

Plovdiv University

Burgas Free University

Prof. д-р Hans-Dieter Burkhard

Professor of Informatics in the Humboldt University, Berlin

1991-98: Member of the Board of the Humboldt University
1991-96: Chair of the Berlin Interes Group on IJ
1998-2008: Member of the Executive Committee of the RoboCup-Federation
2000: Member of the Organizational Committee of the ABKO 2000 in Berlin
2002: Member of the European Coordination Committee for IJ
2004-2008: Vice President of the RoboCup-Federation for Europe
2006: Member of the Executive Committee of the RoboCup 2006 in Bremen

Lecturer at the Humboldt Kinder University (Children University)

1997: World Champion in the Simulation 2D League of RoboCup with the "AT Humboldt"
2004, 2005, 2008: World Champion in the Four-Legged Robots League of RoboCup with the "German Team"

Course "Cognitive Robotics" is based on lectures by Prof. Burkhard.

Thank you Prof. Burkhard!
ELECTIVE COURSES (EXAMPLES)

• IoT
• IoT applications
• Machine learning
• Personal assistants
• Blockchain technologies
LEARNING WITH DELC 2.0

• Education portal supporting various forms of e-learning, incl. LLL
• Provides 40+ lecture courses for masters and bachelors at the Plovdiv University (partly BFU)
• Version for secondary school
SELF-PACED LEARNING

- SCORM 2004 support of students’ self-study
- Personal reporting of learning progress
BLENDED LEARNING (E-TESTING)

• QTI 2.1-like e-testing module providing a lot of functionalities
GAME-BASED LEARNING (AS LLL)

• Studying traffic rules playing (primary school)
COGNITIVE ROBOTICS (AS LLL)

• A new version of lecture course as LLL
CHH (AS LLL)

- E-content “Cultural-historical heritage”
- Semantic modeling (ontologies)
3I LABORATORY

OPERATIONAL PROGRAMME “SCIENCE AND EDUCATION FOR SMART GROWTH”

**Project:** “Center of Excellence in Informatics and Information and Communication Technologies”

Start date: 03.08.2018
End date: 31.12.2023
3I (INTEGRATED INTELLIGENT INFRASTRUCTURE) LABORATORY

• Mission:
  • Building a research and prototyping infrastructure for CPSS and IoT ecosystems
  • Sustainability: 10 years after completion of the project

• Challenges:
  • Identifying suitable projects
  • Partners from the business
  • Building a team - not only with good theoretical knowledge but also rich practical experience
TARGET INFRASTRUCTURE
VIRTUALIZATION OF “THINGS”

• Objects with attributes
  • Attributes present the inherent characteristics of things

• Additional aspects:
  • Space
  • Time
  • Events

• Integrated formal environment
  • AmbiNet (CCA)
  • TNet (jTempura, AjTempura)
  • EventNet (EM)
  • OntoNet (OWL 2, Protege)
REFERENCE SOFTWARE ARCHITECTURE

Personal Assistants

Operative Assistants

Web Applications

ViPS User Interface

ViPS Middleware

ViPS Physical World

Analytical Subspace (ENet, TNet, AmbiNet)

OntoNet

Engines (Services, µServices)

Digital Libraries Subspace

Guards

IoT Node$_1$

IoT Node$_2$

⋯

IoT Node$_n$
INTENDED DOMAINS AND PROTOTYPING

• Possible domains
  • Smart Medicine
  • Smart Agriculture and Environment
  • Smart City
  • LLL, Historical-Culture Heritage, Secondary School

• Prototypes
  • TG
  • BLISS
  • GENE (Evolutionary IOT platform)
TOURISTIC GUIDE (ANCESTOR)

Who Is Using CCO?

CCO practice has been adopted and implemented in a range of settings by a diverse group of cultural organizations, academic institutions, and special initiatives. Following is a select list of such projects. Please contact us if you would like to be added to this list.

- ARTstor, a Non-Profit Digital Image Library for Education and Scholarship
- California Digital Library - UC Shared Images
- Centro de Documentacion de Bienes Patrimoniales (Chile). The documentation system for the state museums of Chile is based on CDWA and the manual developed for museum professionals uses CCO as its model. See article: Nagel, Lisa, ed. “Manual de registro y documentación de bienes culturales,” Santiago de Chile: Andros Impresores, 2008.

Cabinet of Visual Resources Association Foundation announces the Russian translation of Cataloging Cultural Objects

The Visual Resources Association Foundation is pleased to announce that a Russian translation of Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images is available online. The translation is a project of the Boris Yeltsin Presidential Library, Saint-Petersburg, Russia.
TOURISTIC GUIDE

• IoT PA for tourists
  • Based on DeLC 2.0 tools and content
• Also be used as a LLL environment
BLISS PROJECT

• Project goals:
  • There is a specific problem that needs to be addressed
    • In a region, working people want to complete secondary education
    • Like part-time students
    • Personal timetable - for various reasons frequent changes are required
  • One teacher is responsible for the organization
  • 2018/19: 40+ enrolled students
  • Building a reference architecture that can be adapted to various domains
BLISS ARCHITECTURE (UP TO DATE)

BLISS-Server

IoT Platform

School Ledger

Blockchain

Student

PA

GENE Project

PA

Teacher
4 channels:
- MQTT
- Block chain
- DB chain
- Real-time analysis (intelligent services)
BLOCKCHAIN TECHNOLOGY

- Ethereum
  - Instant confirmation of transactions
  - No mining fees
  - Extremely high scalability
  - Secured through digital signatures
  - Immutability
  - Assign aliases to users instead of using base-58 addresses
  - Multiple levels of control:
    - Fully open ledger that can be joined anonymously
    - Closed loop ledger where participants must be approved by the administrator
    - A mix of the above where approved users enjoy more rights than anonymous users
- Client applications access
  - Standard REST API
THANK YOU!