Industry-Academia Collaboration in Montenegro

Digital Solutions for Smart Agriculture

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Content

• Introduction
• Digital Solutions for Smart Agriculture
• Partnership Development & Collaboration Projects
• Conclusions
Smart Specialisation Priorities
- Innovative university with strong research and entrepreneurial orientation, intensive internationalization activities and individual approach to student
Overview

• Unique interdisciplinary institution, founded in 2007, located in suburban of Podgorica, capital of Montenegro.
• Currently, it has around 2500 students, and 305 professors and teaching staff.
• It offers at undergraduate and postgraduate level of education, including Bachelor, Specialist, Master’s and PhD level of studies.
Education model

• UDG mission: **THE HISTORY OF FUTURE** – UDG conceptual framework and values

• UDG strategy – education model represented through „Professor's equation“ $S = z \cdot i^2$
Research Domains in Focus

- Digital transformation, digital innovation
- Applied Computer Science
- Entrepreneurship
- Sustainable Development
The largest vineyard in Europe in one complex, area of 2310 ha
• Around 11 million vines
• 22,500 tons of table and wine grapes
• 1,5 milion kg of peaches
• 10,000 olive trees
• 1 million vine cuttings
• 100 tons of rainbow trout
• 17 milion bottles of wine and brandy annually
13. jul Plantažе

- **Wine cellars:**
  - Ćemovskо polje, 30 million liters
  - Lješkopolje, 2.8 million liters
  - Šipčanik, 2 million liters

- **Exports of products to 43 countries** worldwide

- More than **1000** international and national **awards**

- 2 restaurants, several retail facilities

- Horseback riding club

- About **720 employees**

- **Development sector**, over **20** national and international projects
Ready to be consumed

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Learn More
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Smart Agriculture Domains

- Arable Crops
- Fruit and Vegetables
- Livestock
- Supply Chain
Digital Solutions

- Weather conditions and **micro-climate**
- **Monitoring parameters** in fields, vineyards, orchard, livestock farms
- Agriculture **machinery** and fleet management
- Assessing **health** and **growth**
- Detecting **disease** or conditions for developing diseases
- **Growth** monitoring, detecting optimal **harvesting time**
- **Pest** control and spraying **optimization**
- **Irrigation** optimization
A Variety of IoT Devices
AgroNET: Decision Support System

- Integrated overview
- Pests and disease prediction
- Insects’ monitoring
- Machinery monitoring and integration
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Core Team

- University of Donja Gorica
- 13. Jul Plantaže
- DunavNET
Collaboration and Joint Projects

• **TagItWine** – H202O TagItSmart
• **Smart Irrigation** – 13. jul Plantaže
• **DIPOL** – Digital transformation of agriculture and food supply chain in Montenegro
• **H2020 DEMETER** – Building an Interoperable, Data-Driven, Innovative and Sustainable European Agri-Food Sector
• **VIRAL ErasmusPlus** – Vitalising ICT Relevance in Agricultural Learning
• **FoodHub** - Centre of excellence for digitalisation of food safety
TagItWine

• Use of active QR codes
• Food track and trace use case
• Counterfeit prevention and detection
Irrigation optimization

• Sensor
  • Soil moisture, Teros 10 (30cm/60cm)

• IoT node:
  • Mobile and/or LoRa communications
  • Solar and battery power
  • Embedded computing

• AgroNET platform in Cloud
  • Data Integration
  • Visualization
  • Decision Support: Irrigation Optimization
  • Web and mobile access and notifications

www.meteogroup.com
www.dunavnet.eu
DIPOL: Precision Agriculture

- Data collection
  - Weather stations
  - Soil moisture
  - Leaf wetness
  - Pheromone traps with cameras
  - Weather forecast data

- Digital platform (AgroNET) and Use Cases
  - Data collection and visualization (Cloud)
  - Irrigation optimization
  - Disease prediction
  - Insect monitoring and Spraying protection

www.dunavnet.eu
H2020 DEMETER

- Building an Interoperable, Data-Driven, Innovative and Sustainable European Agri-Food Sector
  - Horizon 2020, grant 8572020
  - Budget 17,704,191 EUR
  - Period 09/2019 - 02/2023
  - 60 partners
  - 2 institutions from Montenegro
15 member states

18 Countries

60 Partners

318k hectares of land
Working with

5.7k Farmers

29k Sensors used across 80 sites

9.2k Devices & 131 Large Machinery

20 Pilots

69 farming associations

47 Countries

1.5 Billion People

Multi-Actor Approach

Using Practical skills & knowledge to target real life needs, problems & opportunities.

DEMETER
VIRAL

• Educate educators
• Engage and educate farmers
• Engage business partners
• In-house and field labs
• Workshops / conferences / hackatons
• Partnership development
FoodHub CoE

- **Blockchain** DLT
  - Food track and trace
  - Balancing market access
  - Trade applications
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Conclusions

• Academia
  - Multidisciplinary Research
  - International Collaboration
  - Research and Innovation

• Business
  - Technology Providers
  - End Users
Conclusions

• Joint Projects / Grant Applications
  - Horizon 2020 / Horizon Europe
  - Erasmus Plus
  - IPA
  - National
  - Start-up
VITALISING ICT RELEVANCE IN AGRICULTURAL LEARNING