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Engaged and Entrepreneurial European University as
Driver for European Smart and Sustainable Regions

VERTICAL FARMS IN CITIES

TOPIC: AI

THEME: URBAN HEALTH

VERTICAL FARMS IN CITIES

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- DEVELOPING FUTURE SKILLS

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VERTICAL FARMS IN CITIES

ANDRÁS REVOLY

Educational Entrepreneur

Academic background

1. Master degree in electrical engineering, from Technical University of Budapest (1997)
   Specialisations: data communications and broadcasting, software technology
2. Currently PhD student at the Department of Technical Informatics at the Hungarian University of Agriculture and Life Sciences (2022)
3. Field of research: Data modelling of a vertical farm using AI

Instructor at the Department of Technical Informatics at the Hungarian University of Agriculture and Life Sciences (MATE)

Specialized in software development, data and image processing using Machine Learning

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Valentin Ciupe

Education Entrepreneur

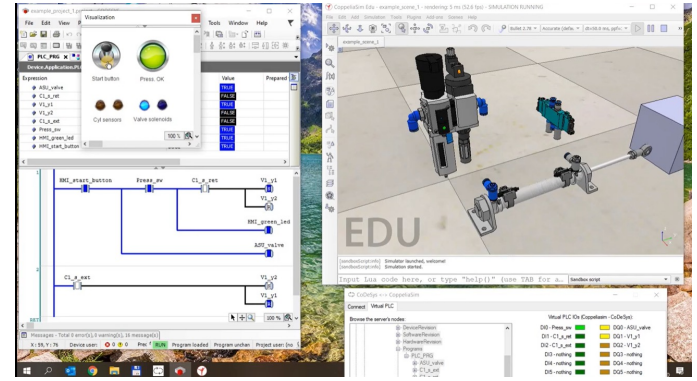
Academic background

1. Degree in Mechanical Engineering specialized in industrial robotics, from Politehnica University of Timisoara (2001)
2. PhD in Mechanical Engineering from Politehnica University of Timisoara (2006)

Associate Professor of Actuation systems and Automation at UPT.

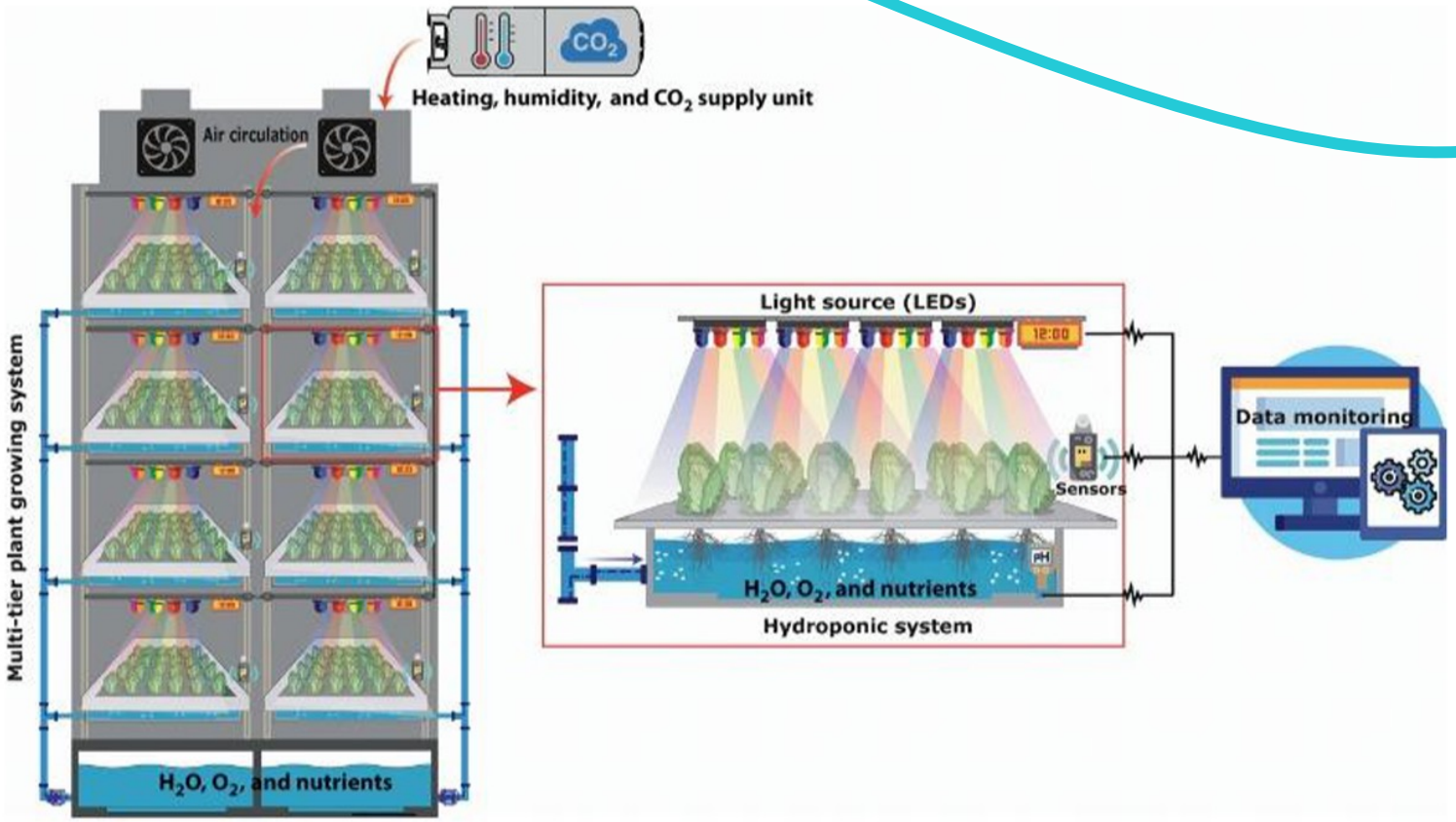
Scientific researcher in mechatronics, industrial and service robotics, actuators and control for mechatronic systems, industry 4.0.

Trainer for the industry since 2006, providing knowledge in the fields of pneumatics, electro-pneumatics, PLC automation, electric drives, safety in pneumatics and energy-saving in pneumatics.



WHAT IS A VERTICAL FARM

- Closed crop production system
- Multi-layered structure
- Utilizing artificial light and controlling growing parameters
- Regarded as the future of agriculture



- Maximizing crop output per available area
- Using the least amount of resources
- Using sensors and cameras to collect data

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ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Sustainable
- Produce more food per square meter of land, reducing the footprint
- Short supply chain
- Utilizes less water, up to 95%
- Less infections, pests
- No chemicals
- Decreases the effect of climate change
- Effective thanks to the high-precision algorithms

DISADVANTAGES

- High investment costs
- High power consumption

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USING AI

We are using AI algorithms to:

- Create lighting recipes (different spectrum, wavelengths)
- Create lighting programs (continuous, intermittent, pulsed)
- Identify diseases
- Estimate biomass
- Minimize power consumption

WHAT ARE ROBOTS? WHAT IS ROBOTICS?

- ✓Interdisciplinary field of science and engineering
- ✓Programmable machines, with tools attached
- ✓Tasks done traditionally by human beings
- ✓Usually dirty, dull or dangerous activities
- ✓Industrial robots
- ✓Service robots
- ✓Other types / not machines / software automation

the ones found in factories (KUKA, ABB, Yaskawa, Fanuc, Universal Robots)

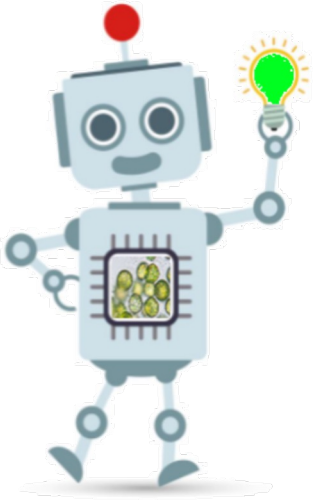
WHAT ARE ROBOTS? WHAT IS ROBOTICS?

- ✓Service robotics is a constantly growing topic
- ✓Found around the house or mostly around humans
- ✓Vacuum cleaners, assistants and companions
- ✓Toys, entertainment, pizza makers
- ✓Farming robots, field tractors, tube inspectors
- ✓Underwater explorers, drones, military carriers

some applications rely on industrial robotics arms (usually on collaborative robots)

USING ROBOTICS...

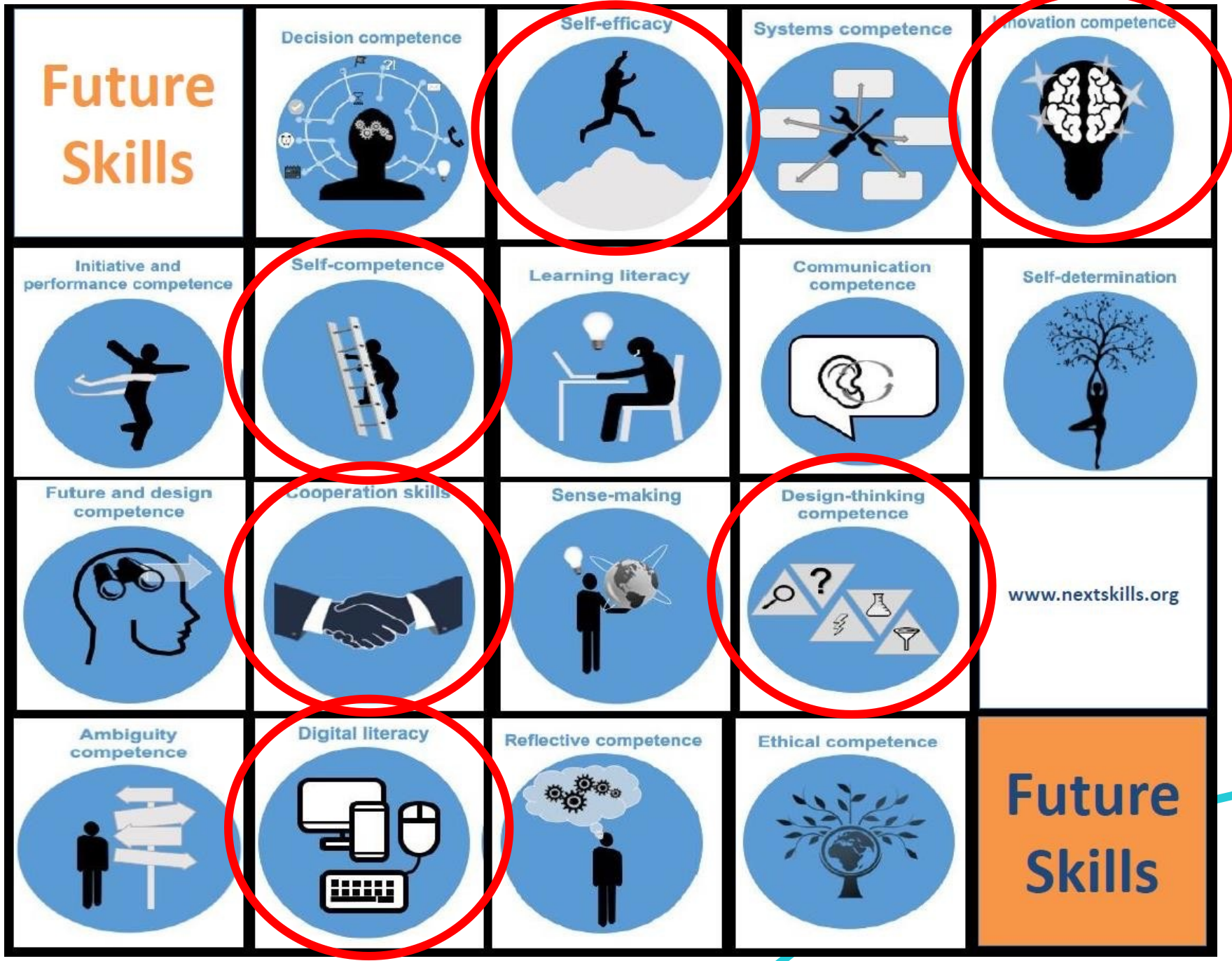
it can help. It can provide solutions for optimized crop inspection and tray manipulation.



... IN RELATION TO VERTICAL FARMING

it can help. It can provide solution for upscaling the production efficiently and safe.

FUTURE SKILLS



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