Selected Examples of Digitalization in Agriculture

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Introduction

• Why digitalization / ICT?

• Project that we are working on
  - PKP - Student project (FARMBEAST)
  - ŠIPK - Student project (FARMBEAST)
  - EIP AGRI (Italy) – vineyard robot (ROVITIS 4.0)
  - INTERREG CE - Transform 4.0 (3 pilots)
  - EIP AGRI (pilot) – (Drones + Multispectral)
  - EIP AGRI (pilot) – sensor networks (AI)
  - Bilateral cooperation – Russian federation (AI)
  - INOVUP (improve teaching praxis)
  - OISAIR (LIDAR + spraying)
  - ERASMUS – VIRAL
  - SYNERGY
  - Other – Termodrone d.o.o.
  - Other - Slovenian ministry of agriculture
  - …
Field Robot - FARMBEAST

**Field Robot Event**
- 1st task – Basic Navigation
- 2nd task – Advance Navigation
- 3rd task – Weed Detection
- 4th task – Weed / Plant Handling
- Freestyle

**Robot**
- **Hardware**
  Distributed system (Rpi + NUC), VLP16 LIDAR, dig. cameras, IMU, 4 DC + 4 BLCD motors, LiFEPo..
- **Software**
  ROS + autonomous driving + obj. detection and manipulation

**Support / funding**
- **Sponsors**
- **PKP projects – companies**
- **ŠIPK projects – non profit entities**
- **Competition - refund**
Vineyard robot – ROVITIS 4.0

Starting point
- DODICH loader
  - Wheels, SKID STEER
- Sensors
  - 2D LIDAR, MEMS IMU, odometry
- Software
  - Linux + Programs in C++

Research & development
- DODICH loader
  - Wheels, SKID STEER
- Sensors
  - 2D LIDAR, MEMS IMU, odometry, RTK GPS
- Software
  - LINUX + ROS + algorithms (row following)

Current phase
- ENERGREEN remote controlled platform
  - Tracks, SKID STEER
- Sensors
  - 3D LIDAR, MEMS IMU, odometry, RTK GPS
- Software
  - LINUX + ROS + algorithms (path planning, path following, localization, FieldSLAM)
DRONES – Termodrone d.o.o.

• Challenges in agriculture
  – Use less plant protection products
  – Use less fertilizers
  – Detect problems

• Drones + multispectral camera
  – DJI Phantom 4
  – Parrot Sequoia+

• Solution
  – Variable application maps
  – Integration to existing farming machinery for automated precise local treatment
Thank YOU!

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