Compte-rendu

Workshop- **AGRI2IA**
18-19 December 2023

Institut de Recherche en Informatique de Toulouse, 118 Rte de Narbonne, Toulouse

Organised by : Josiane Mothe & Nathalie Neptune

Program

18th December

9:30 - 12:30: Presentation of the on-going research by each team

- **Josiane Mothe**, SIG, Université de Toulouse (France)
  Introduction
- **Lotfi Chaari**, INPT (France)
  Sparse Bayesian techniques for change detection *[postpone to the 19th]*
- **Fabio Del Frate – Davide de Santis**, Tor Vergata University (Italy)
  Tor Vergata University research activities with possible connections with the AGRI2IA project.
- **Nathalie Hernandez**, Melodi, Université de Toulouse (France)
- **Mihai Ivanovici**, Politehnicii, Brasov University (Romania)
  Soil roughness estimation using AI
- **Mohammad El-Sakka**, Université de Toulouse (France)
  CNN in smart agriculture
- **Behnood Rasti**, Helmholtz-Zentrum Dresden-Rossendorf (Germany)
  Fast Semi-supervised Unmixing for Earth Observation
- *Yasmina Beddar, Isabelle Yu Wai Man, CNRS& UT3* Marie Curie projects (MSCA PF & DN)

12:30-14:00: Lunch

14:00-15:00: Brain storming on the key parts of the new proposal (International Research Network[1]) and/or Marie Curie Erasmus

15:00-16:30: Working group for each part of the proposal

16:30-17:00: Break

17:00-18:00: Sharing results

20:00: Dinner

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[1] https://international.cnrs.fr/wp-content/uploads/2020/06/Fiche-IRN-2020.pdf and
https://www.ins2i.cnrs.fr/fr/international

19th December

9:00-10:30: Working groups (continue)

10:30-11:00: Break

11:00-11:30: Working groups

11:30-12:30: Sharing results, next steps

12:30-14:00 Lunch

14:00-16:00: Use case Soil roughness - IA and Agriculture in collaboration with AI4AGRI EU project. Mihai Ivanovici, Politehnicii, Brasov University (Romania)

    14:00 – 14:10 – Welcome word and context
    14:10 – 14:20 – Importance of measuring soil roughness
    14:20 – 14:45 – Soil roughness estimation
    14:45 – 15:00 – Demo
    15:00 – 16:00 – Discussions with coffee
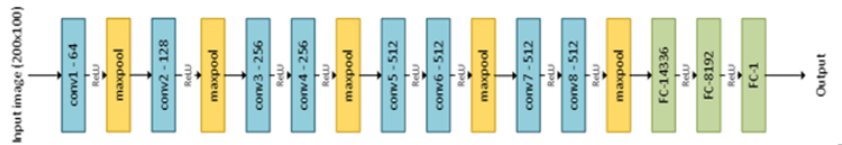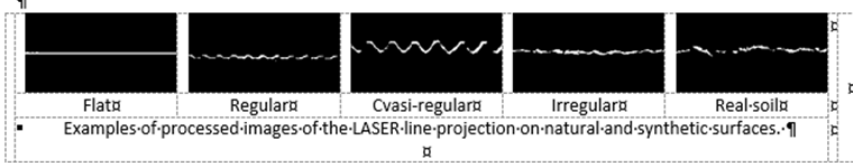
16:00 - Closing

WORKSHOP
on
Soil Roughness Estimation
using digital images and artificial intelligence

19 December 2023
Paul Sabatier University, Toulouse, France

Soil Roughness is a measure of soil surface irregularities. The measure is used to estimate the soil's ability to absorb water, its erosion resistance and stability. Soil roughness can be determined by classical, contact methods, such as the pinboard method or ruler chain method, or by modern, non-invasive methods, such as LASER scanning or image processing. We propose to estimate the roughness of the soil based on the digital images of the projection of a LASER line on the surface of the soil, using artificial intelligence. Using the supervised training of the neural network with the data obtained by the pinboard method, we obtained an estimation accuracy of the soil roughness of 99.42%.

| Flat | Regular | Cvasi-regular | Irregular | Real soil |

Examples of processed images of the LASER line projection on natural and synthetic surfaces.

The convolutional neural network architecture used for soil roughness estimation.

20th December

9:00-12:00: Further discussions

12:00: Lunch

Participants

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