

Hermann Büstmayr, Andreas Gronauer, Andreas Holzinger,
Peter M. Roth, and Karl Stampfer (eds.)

**Proceedings of the
OAGM Workshop 2022**

Digitalization for Smart Farming and Forestry

October 18, November 7 and 8, 2022

University of Natural Resources
and Life Sciences, Vienna

Austrian Association of Pattern Recognition (OAGM)

Editors

Hermann Bürstmayr, Andreas Gronauer, Andreas Holzinger, Peter M. Roth,
and Karl Stampfer

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Preface

The OAGM Workshop aims to bring together researchers, students, professionals, and practitioners from the fields of Computer Vision and Pattern Recognition to present and actively discuss the latest research and developments. As every year, there is a core topic which was "Digitalization for Smart Farming and Forestry" in the 2021 edition. Originally, the OAGM Workshop 2022 was planned again as an on-site event at the University of Natural Resources and Life Sciences, Vienna (Campus Tulln) in September 2022. As a result of the official restrictions by both the university and the government due to the still ongoing COVID-19 pandemic, we needed some re-organization, with the final decision not to cancel the workshop but to have an online event scheduled in three sessions (October 18, November 8, and November 9, 2022).

Consequently, it was possible to publish the conference proceedings. We thank the authors and reviewers for their contributions to this publication. We received 22 original contributions which 21 (9/9 full papers, 2/3 student papers, and 10/10 industrial and scientific spotlight papers) have been accepted. Each contribution was peer-reviewed in a double-blind process by at least two reviewers from an international program committee. One outstanding contribution will be awarded the best paper prize sponsored by OCG. In addition, there will be an IEEE Women in Engineering Award, sponsored by the Austrian Institute of Technology, for the best contribution of a female first author. We want to thank OCG and IEEE/AIT for sponsoring these awards and the project DILAG for the financial support.

We would also like to thank the invited speakers, Ribana Roscher (University of Bonn) and Martin Hirt (Austrian Chamber of Agriculture) for their presentations taking into account the scientific and application points of view.

Hermann Bürstmayr, Andreas Gronauer, Andreas Holzinger, Peter M. Roth, and Karl Stampfer
(conference chairs)
Tulln, November 2022

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Hermann Bürstmayr (University of Natural Resources and Life Sciences, Vienna)

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Andreas Holzinger (University of Natural Resources and Life Sciences, Vienna)

Peter M. Roth (University of Veterinary Medicine, Vienna, Technical University of Munich)

Karl Stampfer (University of Natural Resources and Life Sciences, Vienna)

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Pablo Rischbeck (University of Natural Resources and Life Sciences, Vienna)
Antonio Rodriguez-Sanchez (University of Innsbruck)

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Keynote Talks

Generating the unseen and explaining the seen

Ribana Roscher

Institute of Geodesy and Geoinformation

University of Bonn

Abstract

Deep generative models and explainable machine learning are two emerging areas of data science that we can use to address current challenges in agricultural and environmental sciences. Deep generative models are neural networks that are capable of learning complex data distributions. In general, they can be used for a variety of applications, such as anomaly detection, current state estimation, and prediction. Explainable machine learning, which analyzes the decision-making process of machine learning methods in more detail, is used whenever an explanation for the result is required in addition to the result. This can be done for various reasons, e.g., to increase confidence in the outcome or to derive new scientific knowledge that can be inferred from patterns in the decision process of the machine learning model. This talk addresses methods and applications from both areas and how we can take advantage of their combination.

Uptake & usage of Smart Farming in Austrian agriculture

Martin Hirt

Austrian Chamber of Agriculture

Abstract

In 2021 Austrian Federal Institute of Rural Education and Training conducted a survey among 1.000 farmers regarding attitudes, motivation and investment intentions towards increasing digitization in Austrian agriculture. The study aimed to provide valuable insights into actual usage and intended uptake of digital and precision farming technologies since this has been very much discussed since several years. While general attitude towards digitization seems to be quite “positive-pragmatic” (only 11% stated to be sceptical or negative), the actual usage vary largely between technology groups: Low-cost solutions in farm management like nutrient management recording are used more often than specific precision farming technologies. When asked about motivations for using digital technologies, farmers don’t argue with higher yields or performance but rather with more easier environmental recording (73%), less physical strain (65%) and increased time flexibility and leisure time (59%). Coming to the barriers of a quicker uptake, they stated mainly economic factors like doubtful cost-benefit considerations (70%), initial investments (69%) and running costs (62%). It’s interesting that even while most farmers named themselves as well-informed about new technologies in farming, a high share stated to be open for visiting further training (68%) or even individual advisory (59%) dealing with digital technologies in their specific agricultural branches.