	G-AGR00 8Y102 LE85			
< **>**	Special Lecture on global issues in agricultural science 2			
	1		1		2024
	7/23　7/26　13:15-16:30				

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This intensive course, themed " Introduction to Machine Learning for Agricultural and Food Economics," will be taught in person by Dr. Xiaohua Yu, Professor (with Chair) of Agricultural Economics in Developing and Transition Countries at the Department of Agricultural Economics and Rural Development, University of Goettingen, Germany.

Machine learning is changing the world from different dimensions, and agricultural and food economics is no exception. In contrast to econometrics of causal analysis, machine learning put more emphasis on prediction and pattern recognition. This course will briefly introduce machine learning algorithms for research of agricultural and food economics. It will help students to master bask techniques in programing R (or Python) for machine learning.

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This course will introduce basic algorithms in machine learning and apply them to research of agricultural and food economics. Specifically, we will introduce R (or Python) language, and how to use R (or Python) to realize feature engineering, linear regression, logit model, support vector machine, k-nearest neighbor, random forest, k-means clustering and neural network.

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   The course dates have not yet been finalized, but this course will be held in person in July 2024. More details (dates, time, classroom, etc.) will be announced later.

Lecture 1)
Introduction to R (or Python) and application of machine learning in agricultural economics

Lecture 2)
Plotting the data

Lecture 3)
Linear regression and Feature Engineering

Lecture 4)
Logit model and support vector machine

Lecture 5)
k-nearest neighbor and discrimination analysis

Lecture 6)
Classification and random forest

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Lecture 7)
Neural network

Lecture 8)
k-means clustering and unsupervised learning

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Understand the basic models taught in the class and use a software to analyse the given data.

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Able to analyze data with the models taught in the class and explain the results as well.
Participation (20%), exam (50%) and homework (30%)

Refer to "2024 Guide to Degree Programs" for attainment levels of evaluation.

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Lesmeister C. 2015, "Master Machine Learning with R", Packt Publishing.

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1) Wang H. , X. Yu (2023) "Carbon Dioxide Emission Typology and Policy Implications: Evidence from Machine Learning". Forthcoming in China Economic Review.

2) Wang H., J. F. Feil and X. Yu (2023) Let the Data Speak about the Cut-off Values for Multidimensional Index: Classification of Human Development Index with Machine Learning. Forthcoming in Socio-economic Planning Sciences.

3) Maruejols L., L. Hoeschle, X. Yu (2022) Vietnam between economic growth and ethnic divergence: A LASSO examination of income-mediated energy consumption. Energy Economics.

4) Liu C., Zhou L., Hoeschle L. And X. Yu (2022), Food Price Dynamics and Regional Clusters: Machine Learning Analysis of Egg Prices in China. Forthcoming in China Agricultural Economic Review.

5) Graskemper V., X. Yu and Jan-Henning Feil (2022) Values of Farmers-Evidence from Germany, Journal of Rural Studies. Vo. 89:13-24.

6) Wang H., L. Maruejols, and X.Yu (2021) Predicting energy poverty with combinations of remote-sensing and socioeconomic survey data in India: Evidence from machine learning. Energy Economics. Vol. 102, 105510. https://doi.org/10.1016/j.eneco.2021.105510

7) Graskemper V., X. Yu and Jan-Henning Feil (2021). Farmer Typology and Implications for Policy Design - an Unsupervised Machine Learning Approach. Land Use Policy. Volume 103, April 2021, 105328.

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Practice with R (or Python)

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