CEMLA
CENTER FOR LATIN AMERICAN MONETARY STUDIES

DEUTSCHE BUNDESBANK
EUROSYSTEM

IV Course on Machine Learning and Central Banking

Digital format, April 19 – 21, 2023

Agenda

WEDNESDAY 19 APRIL 2023

México City Local time (UTC -6)

Moderator of the day: Gerardo Hernández-del-Valle, CEMLA
Speakers: Gabriela Alves Werb y Sebastian Seltmann, Deutsche Bundesbank

09:00 – 09:20	**Welcome Remarks** Dr. Gerardo Hernández-del-Valle, Acting Director, Center for Latin American Monetary Studies (CEMLA)
09:20 – 10:30	**Introduction** • Structure and Organization of the Course • Train, Test and Validation Samples • Cross-Validation
10:30 – 10:45	Break
10:45 – 12:15	**Introduction II** • Confusion Matrix • Evaluation Measures (Precision, Recall, F1-Score, etc.) • PR Curve

THURSDAY 20 APRIL 2023

México City Local time (UTC -6)

Moderator of the day: Gerardo Hernández-del-Valle, CEMLA
Speakers: Gabriela Alves Werb, Sebastian Seltmann, y Stefan Bender, Deutsche Bundesbank

08:30 – 09:30	**Q&A**
09:30 – 10:30	**Tree-based methods** • Decision Trees (CART) • Conditional Inference Trees
10:30 – 10:45	Break
10:45 – 12:15	**Ensemble methods I** • Bagging • Boosting

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FRIDAY
21
APRIL
2023

México City Local time (UTC -6)

08:30 – 09:00	**Q&A**
09:00 – 10:30	**Ensemble methods II** • Random Forest • Gradient Boosting
10:30 – 10:45	Break
10:45 – 12:15	**Machine learning use cases in central banking** • Showcase of Current Applications • Open Discussion with Participants
12:15 – 12:30	**Wrap-up and closing remarks**

Optional Readings

For a comprehensive introduction to R, we recommend participants to take the online tutorial "Introduction to R" from Datacamp (https://www.datacamp.com/courses/free-introduction-to-r).

Athey, S. (2017), "Beyond prediction: Using Big Data for Policy Problems", Science, 355, 483–485.

Bali, R., Dipanjan, S., Brett, L. (2016), "R: Unleash Machine Learning Techniques", Birmingham, UK, Packt Publishing.

Breiman, L. (2001), "Statistical Modeling: The Two Cultures Source", Statistical Science, 16(3), 199-215.

Hastie, T., Tibshirani, R. & Friedman, J. (2009), "The Elements of Statistical Learning. Data Mining, Inference, and Prediction", New York, Springer.

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013), "An Introduction to Statistical Learning: with Applications in R", New York, Springer.

Shmueli, G. (2010), "To Explain or to Predict?", Statistical Science, 25(3), 289–310.