Announcement of a topic for:

Seminar Research ☐
Seminar Methods ☐
Master Theses **X** (please mark one or more)

Topic	Assessment of the impact of the 9-Euro-Ticket on mobility and air pollution in Leipzig, using machine learning algorithms
Release Date	21.08.2023
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Second Reviewer	
Description:	Positive environmental impacts of the 9-Euro-Ticket (9€-T) have been claimed based on expected reductions in air pollution according to modal transport shifts observed in surveys. However, there is a lack of studies corroborating the actual environmental impact of the ticket based on actual measured variables. In this context, the goal of this investigation is to evaluate eventual changes in air pollution during the 9€-T period in Leipzig, by combining long-term time series of air pollutants and meteorology using a Machine Learning algorithm. The algorithm is used to do meteorological normalization of air quality data and evaluate changes in air pollutant trends in a robust way. The work includes (i) the processing of long-term time series of particulate and gaseous air pollutants, meteorological variables, and traffic density, (ii) the application of a Random Forest Algorithm based on Machine Learning for multiple air pollutants and monitoring stations in Leipzig, and (iii) the interpretation of results.
Literature:	• Grange SK, Carslaw DC, Lewis AC, Boleti E, Hueglin C (2018). "Random forest meteorological normalisation models for Swiss PM10 trend analysis." ACP, 18(9), 6223–6239. doi:10.5194/acp-18-6223-2018. • Grange SK, Carslaw DC (2019). "Using meteorological normalisation to detect interventions in air quality time series." Science of The Tot Env., 653, 578–588. doi:10.1016/j.scitotenv.2018.10.344. • Cuesta-Mosquera, A., Poehlker, M., Mueller, T. (2023): Evaluating the impact of the 9€-ticket on air quality in Leipzig, Germany, through machine learning algorithms, XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) (Berlin 2023). https://doi.org/10.57757/IUGG23-4995