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## Using Machine Learning to investigate Heat Waves and Myocardial Infarctions in Augsburg, Germany

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Myocardial infarctions (MI) are a major cause of death worldwide. In addition to well-known individual risk factors, studies have shown that temperature extremes, such as encountered during heat waves, lead to increases in MI. The relationship between health impacts and climate is complex, depending on a multitude of climatic, environmental, sociodemographic and behavioral factors. Machine Learning (ML) is a powerful tool for investigating complex and unknown relationships between extreme environmental conditions and their adverse impacts that has already been applied to other climate extremes, such as in the prediction of flood damages. By combining heterogeneous health, climatic, environmental and socio-economic datasets, this study is a first step in developing an ML model for predicting past and future MI risk due to heat waves.

Here, we present first results of our ML approach for modelling heat-related health effects in Augsburg based on the KORA MI and environmental data. The basis of our data-driven approach is the KORA cohort study and the MI Registry in the Augsburg region of Bavaria, Germany, comprising detailed information on MI and underlying health conditions. Additionally, weather and climate data, air pollution data (e.g., PM<sub>10</sub>, PM<sub>2.5</sub>, nitrous oxides, and ozone), as well as socio-economic data (household income, education) are used for this study. One of the key challenges is to assemble and integrate heterogeneous data from various sources and prepare them for the appropriate spatial scales. We outline major challenges in combining these data and deriving quantitative models from them.

Moreover, we present initial results based on both regression and classification models, discussing model performance for the period between 2000 and 2015, with a focus on two major heat wave events in Germany during 2003 and 2006. Ultimately, this research may be useful in better understanding heat-related MI risks, supporting possible adaptation options in urban areas and in identifying high-risk groups within society.