

Predicting Avian Flu Outbreaks in Europe Using Machine Learning

The highly pathogenic avian influenza virus infection – commonly known as bird flu – primarily affects birds. Mammals, however, are also increasingly infected. This, the researchers report, increases the probability that the virus will cross over to humans. To better predict bird flu outbreaks and put early prevention measures into place, Prof. Rocklöv's team at the Interdisciplinary Center for Scientific Computing and the Heidelberg Institute for Global Health developed a model that combines various indicators for a possible outbreak and uses machine learning methods for modeling.

The model was trained using data of bird flu outbreaks in Europe documented between 2006 and 2021. As potential indicators of an imminent event, the Heidelberg researchers identified local factors such as temperature and precipitation conditions, the wild bird species, poultry farm density, vegetation composition, and water levels. By combining these complex interdependent seasonal and regional variables, the researchers were able to model outbreak patterns with an accuracy of up to 94 percent.

“Combining our modeling approach and targeted data collection can help us to map more precisely the high-risk areas and seasons when outbreaks of bird flu are more likely,” stresses Joacim Rocklöv, an Alexander von Humboldt Professor conducting research on the effects of climate and environmental change on public health in a number of projects at the university and Heidelberg University Hospital. According to Prof. Rocklöv, the research results could be used to design regional surveillance programs throughout Europe and improve early detection.

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Original publication

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