# The use of AI in food safety and food fraud: early warning systems

H.J.P. MARVIN

Wageningen Food Safety Research (WFSR)

Wageningen, the Netherlands

Email: hans.marvin@wur.nl

Y. BOUZEMBRAK

Wageningen Food Safety Research (WFSR)

Wageningen, the Netherlands

Food is produced in a complex web of supply chain actors and companies that interact on the global scale, and which is influenced by interrelated international and local developments that directly or indirectly influence the performance of the food supply chain. Such complexity makes the food systems vulnerable to the development of food safety risks or food fraud that may be harmful to the health of the consumers. To encounter this problem, early warning (EW) systems have been put in place to warn food producers and authorities for potential food safety risks or food fraud. Traditionally, these systems were reactive-symptom based, measuring hazards in food products, which limits the potential to take proactive measures to prevent the problem to occur. In the past decade, new approaches have been developed that consider the whole context in which food is being produced, hence taking a holistic/ system approach [1]. These systems seek (weak) signals within or outside the food supply chain domain that might warn for a potential food safety risks. Because of the complexity & diversity of the data, Artificial Intelligence (AI) and Big data analytics is needed. Recently successful approaches have been published showing the potential of AI to predict food safety and food fraud [2, 3] and to find unknown hazards from a bulk of scientific literature ore media reports [4]. These early results demonstrates the power of AI and opens the opportunity to make use of the huge amount of available data in predicting models of food safety and food fraud.

References

[1] MARVIN, H.J.P., BOUZEMBRAK, Y., A system approach towards prediction of food safety hazards: Impact of climate and agrichemical use on the occurrence of food safety hazards. Agric. Syst., 178, (2020), 102760. Doi.org/10.1016/j.agsy.2019.102760

[2] BOUZEMBRAK, Y, STEEN, B., NESLO, R., LINGE, J., MOJATAHED, V., MARVIN, H.J.P., Development of food fraud media monitoring system based on text mining. Food Control 93 (2018) 283–296. Doi.org/10.1016/j.foodcont.2018.06.003

[3] MARVIN, H.J.P., BOUZEMBRAK, Y., JANSSEN, E.M., VANDER FELS-KLERX, H.J., VAN ASSELT, E.D., KLETER, G.A., A holistic approach to food safety risks: Food fraud as an example. Int. Food Res. 89 (2016): 463–470. Doi: 10.1016/j.foodres.2016.08.028

[4] GAVAI, A.K., BOUZEMBRAK, Y., VANDEN BULK, L.M., NINGJING, L., VAN OVERBEEKE, L.F.D., VANDEN HEUVEL, L.J., MOL, H., MARVIN, H.J.P., Artificial intelligence to detect unknown stimulants from scientific literature and media reports. Food Control, 130, (2021), 108360. Doi.org/10.1016/j.foodcont.2021.108360