Food Quality Identification using Machine Learning

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Abstract*: In food safety and regulation, there is a need for an automated system to be able to make predictions on which adulterants (unauthorized substances in food) are likely to appear in which food products. An illegal red dye, to adulter "strawberry ice cream", but not "bread". In this work, we show a novel application of deep neural networks in solving this task. We leverage data sources of commercial food products, hierarchical properties of substances, and documented cases of adulterations to characterize ingredients and adulterants. Taking inspiration from natural language processing, we show the use of recurrent neural networks to generate vector representations of ingredients from Wikipedia text and make predictions. Finally, we use these representations to develop a sequential method that has the capability to improve prediction accuracy as new observations are introduced. The results outline a promising direction in the use of machine learning techniques to aid in the detection of adulterants in food.*

Keywords: Adulterants, Deep Neural Networks, Machine Learning.