Data-driven approaches to predict states in a Food Technology case study

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In Food Science and Technology applications complex phenomena that involve macroscopic measurements are generally challenging to be modelled [1]. Starting form [2], where a mathematical model has been defined describing the variation of dough volume due to the fermentation as a function of time, we describe the evolution of some morphology descriptors of bread making process by adopting a well-known methodology: the Particle Filtering [3, 4, 5, 6]. The main idea is to describe the volume variations, related to the yeast content in a bread dough, with a stochastic differential model to forecast the dynamics of leavening and baking bread processes, when some samples are known in several time instants. Numerical experiments confirm that the proposed approach is able to accurately predict values of leavening and baking function. Finally, we highlight that for Food Science and Technology applications an interesting feature of the proposed scheme is its ability to forecast variable states also when few instant samples are available.

References

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