

## **INTELLECTUAL ASSISTANTS IN CULINARY: PECULIARITIES OF DESIGN AND IMPLEMENTATION**

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Nowadays many industries effectively implement intellectual assistants in their processes, among them are retail, finance, automotive, consumer electronics, healthcare, tourism, government and also cooking. As of early 2025, popular culinary intellectual assistants are: Chef Watson, ChefGPT, Dishgen, Let's Foodie, FoodAI, SuperCook, PlantJammer, EmptyMyFridge, Cooklist.

The main drivers of intellectual assistant's implementation in cooking are the following main factors. Firstly, it is the implementation of Internet of Things technology both in personal kitchens and in the corresponding professional environment, which provides a completely different level of overall process efficiency. Secondly, it is machine learning and artificial intelligence algorithms application to support personalized decision-making. Many intellectual assistants focus on generating unique recipes. They use natural language processing and deep learning algorithms to analyze existing recipes, identify trends, and create new culinary combinations. Some assistants use generative artificial intelligence methods to create personalized recommendations based on users' preferences. They analyze order history, take into account dietary restrictions, and offer individually adapted recipes.

When analyzing AI using a black box model, the input parameters set may include the following: list of available/desired food products and their volumes/quantities; calorie content of the dish; number of people for whom the dish needs to be prepared; total cooking time; available kitchen appliances; admissibility of ingredient substitutions; diet features. These parameters can play the role of both controlled and normative. At the output, we get a recipe and/or instructions for preparing either a separate dish, or a set of recipes if a more complex task of menu or diet formation was formulated. If the assistant is an embedded component of a more complex system (for example, a smart home system), at the output we expect a ready-made dish.

Intellectual assistants in general can have quite different architectures depending on their intended purpose. Culinary assistants usually have a hybrid architecture that combines the advantages of reactive architectures and knowledge-based architectures. The first option is used to support the processes of implementing routine tasks (controlling the cooking process according to a template recipe). The implementation of the second option allows you to significantly expand the functionality of culinary intellectual assistants and solve complex poorly structured tasks. In most of the analyzed culinary intellectual assistants, the main function is recipe generation, which is implemented using machine learning and artificial intelligence methods. Depending on the set of input parameters, IA implement additional recipe personalization functionality, allowing you to take into account various limitations. The degree of this personalization is one of the key factors that distinguish modern culinary assistants.