

AI-Based Information System for Hygiene and Safety Management of Shared Kitchens

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Abstract : The shared kitchen is a concept that transfers the value of the sharing economy to the kitchen. It is a type of kitchen equipped with cooking facilities that allows multiple companies or chefs to share time and space and use it jointly. These shared kitchens provide economic benefits and convenience, such as reduced investment costs and rent, but also increase the risk of safety management, such as cross-contamination of food ingredients. Therefore, to manage the safety of food ingredients and finished products in a shared kitchen where several entities jointly use the kitchen and handle various types of food ingredients, it is critical to manage followings: the freshness of food ingredients, user hygiene and safety and cross-contamination of cooking equipment and facilities. In this study, it propose a machine learning-based system for hygiene safety and cross-contamination management, which are highly difficult to manage. User clothing management and user access management, which are most relevant to the hygiene and safety of shared kitchens, are solved through machine learning-based methodology, and cutting board usage management, which is most relevant to cross-contamination management, is implemented as an integrated safety management system based on artificial intelligence. First, to prevent cross-contamination of food ingredients, we use images collected through a real-time camera to determine whether the food ingredients match a given cutting board based on a real-time object detection model, YOLO v7. To manage the hygiene of user clothing, we use a camera-based facial recognition model to recognize the user, and real-time object detection model to determine whether a sanitary hat and mask are worn. In addition, to manage access for users qualified to enter the shared kitchen, we utilize machine learning based signature recognition module. By comparing the pairwise distance between the contract signature and the signature at the time of entrance to the shared kitchen, access permission is determined through a pre-trained signature verification model. These machine learning-based safety management tasks are integrated into a single information system, and each result is managed in an integrated database. Through this, users are warned of safety dangers through the tablet PC installed in the shared kitchen, and managers can track the cause of the sanitary and safety accidents. As a result of system integration analysis, real-time safety management services can be continuously provided by artificial intelligence, and machine learning-based methodologies are used for integrated safety management of shared kitchens that allows dynamic contracts among various users. By solving this problem, we were able to secure the feasibility and safety of the shared kitchen business.

Keywords : artificial intelligence, food safety, information system, safety management, shared kitchen

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