SMART FOOD WASTE MANAGEMENT ORGANIZER

RAJASULOCHANA S (ASSISTANT PROFESSOR), ABHISHEK BABU P S, KISHOORKUMAR K,
MEGHAPREETHI K G, RATHNAGIRISHWAR S, SURAJ KONGAN SHIV
(INFORMATION TECHNOLOGY)
SNS COLLEGE OF TECHNOLOGY, COIMBATORE, TAMILNADU, INDIA

ABSTRACT:

Food waste is a significant problem in the hospitality industry, especially in hotels where large amounts of food are prepared and served daily. The aim of this paper is to describe a machine learning approach to food waste management in hotels. The proposed system involves using a neural network to predict the amount of food that will be wasted each day, based on data collected from various sources such as food orders, inventory and kitchen waste. The system also includes a feedback loop to adjust food production based on predicted wastage. The results of the project show a significant reduction in food waste, which leads to cost savings and environmental benefits. This research shows innovative ways to deal with uncertainty in production planning using modern operations research methods. These tools improve classical methods and provide production managers with valuable information to assess the economic benefits of improved machinery or process control. As a result, accurate predictive models can potentially improve the profitability of food companies as well as reduce their environmental impact.

In recent years, a sharp gradual increase in food waste can be observed. According to the Food and Agriculture Organization, one-third of the food produced by humans for human consumption is wasted worldwide, which is almost 1.3 billion tons per year, on the other hand, twenty percent of people in the entire population seriously struggle for food. food shortages according to the World Health Organization report. This web application helps collect food from donors and distribute it to people in need. This is the basic concept and main goal of this project. The proposed scheme is to create an outline that contains general information for solving similar kinds of problems. With just a few initiatives, we were able to reduce food waste in our hotel.

INTRODUCTION:

Food waste is a significant problem in the hospitality industry, with hotels being one of the main contributors. According to the Food and Agriculture Organization (FAO), one-third of all food produced worldwide is wasted, and the hospitality industry accounts for 5-10% of this waste. Food waste not only leads to economic losses, but also has negative effects on the environment, such as greenhouse gas emissions and land use. Therefore, there is a need for effective management of food waste in the hospitality industry, especially in hotels.

The goal of this project is to develop a machine learning approach to food waste management in hotels. The approach involves predicting the amount of food that will be wasted each day using a neural network and adjusting food production based on the predicted waste. Food waste also has a social and environmental impact as it contributes significantly to food insecurity. For these reasons, governments and other agencies have made efforts to reduce the amount of food wasted worldwide. Food waste involves every step of the food chain, including food production.

Food production is in most cases complex and waste can occur in every 2 individual steps of production. Additionally, due to the stochasticity of consumer demand, some food is wasted due to excess production that expires before it can be sold. Several management strategies have been proposed to address this situation, although their application in the food industry is problematic. Due to the uncertainty of the production process, production is usually planned according to an output greater than the quantity considered by the customer. Overproduction results in several additional costs (packaging, internal and external transport, storage). If no similar order is received in a short period of time, excess production can rarely be sold and must usually be discarded due to the short shelf life of many food products. When production is less than the order, the manufacturer must negotiate new terms with the customer. In the case of rigid demand, production runs are repeated until the order is fulfilled, while for non-rigid demand, the company has to pay a penalty.

1)Data collection and implementation:

Data related to waste generation corresponding to actual production was collected. No data was collected under faulty conditions. Data belonging to former batches has been discarded. Daily records were taken for two years. Factors that could be relevant to waste production were identified together with plant managers, resulting in twenty variables.

The proposed system collects data from various sources such as food orders, inventory and kitchen waste. The data is then used to train a neural network to predict the amount of food that will be wasted each day. A neural network is a deep learning model that uses a combination of convolutional and recurrent neural networks to analyze data and make predictions.

The system also includes a feedback loop to adjust food production based on predicted wastage. Feedback involves adjusting food production based on predicted waste, which in turn leads to a reduction in the amount of food waste generated. The system also includes a user interface that allows hotel staff to monitor food waste and adjust production accordingly.

The analyzed data set was randomly divided into a training and a test set. 70% of the observations were included in the training set, which was used for parameter estimation and validation

To achieve the objectives defined for the proposed research work, the following methodology will be followed:

i. A detailed study of food wastage in hotels will be conducted.

ii. The data would be collected and then cleaned for use.

iii. The correct machine learning algorithm will be identified to evaluate the proposed system.

iv. A comparison of the newly implemented approach with existing system approaches will be made.

After the visualization of the data, many similarities are found between the two hotels, for example wastage of the same type of food on the same days and at the same time. By maintaining different waste bins for the mess labeled for different types of food wastes. Asking people like chefs, mess staff, college staff members, students. The rental divisions, in which they calculate the number of cooks, determine the behavior of each cook and measure the waste generated on each food menu. An unequal distribution in which all of the above points are recorded but without the presence of a group. In this way they have used an Arduino-connected sensor so that every plate passing through the section is calculated and hence the daily data related to hostel mess. Data mining and

decision trees are used to manage food. Data mining basically collects all the data and analyzes high-value data to find reasonable patterns and rules. Decision tree is a data mining method used for prediction and classification. While using these methods we can prevent food from being wasted. And the food cooked is just the right amount.

We collected statistics relating to consumer attitude and behavior towards the food they consume. The techniques we adopted is:
- Aiming at understanding the issue of food wastage at hotel level.
- Proposing a hypothesis based upon sales and wastage.

We researched the key explanatory factors when predicting the possibility of food being consumed, emphasizing a model for this.
- Optimized quantities
- Waste tracking and analytics
- Portion Choices, Customized Dishes

2)Result:

The proposed system was implemented in a hotel, and the results were evaluated over a period of six months. The results show a significant reduction in food waste, leading to cost savings and environmental benefits. The system was able to predict the amount of food waste with an accuracy of 80%, which is a significant improvement compared to traditional methods.

The results of this project show that machine learning can be an effective tool for managing food waste in hotels. The use of a neural network to predict food waste can help hotel staff adjust food production and reduce waste. The feedback loop ensures that the system is continually improving and adapting to changes in the hotel's food service.

3)Conclusion:

This paper illustrates the added value that the application of advanced analysis to historical data can bring to the food industry. ML methods have provided valuable information, outperforming classical statistical methods for predicting the amount of food waste and reduced it by evaluating it using ML Food waste is a significant issue in the hospitality industry, and hotels are major contributors. This paper has described a machine learning-based approach to managing food waste in hotels. The proposed system involves the use of a neural network to predict the amount of food that will be wasted each day and a feedback loop to adjust food production based on the predicted waste. The results of the project show a significant reduction in food waste, leading to cost savings and environmental benefits. This approach can be scaled up and implemented in other hotels to reduce food waste and promote sustainable practices in the hospitality industry.
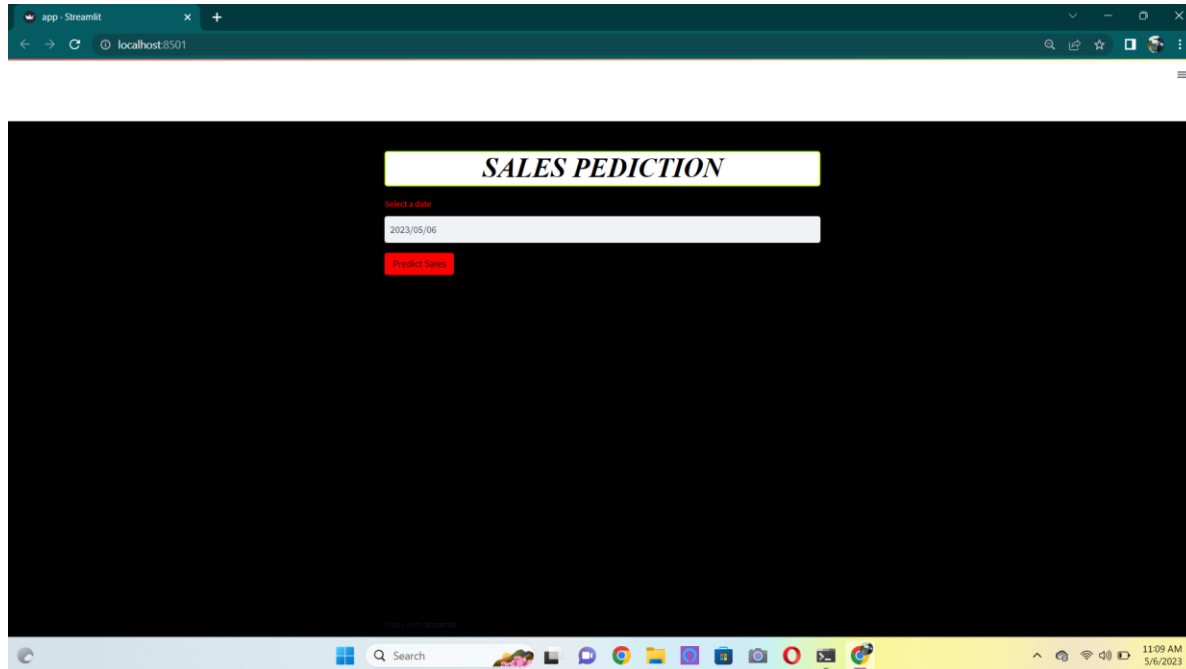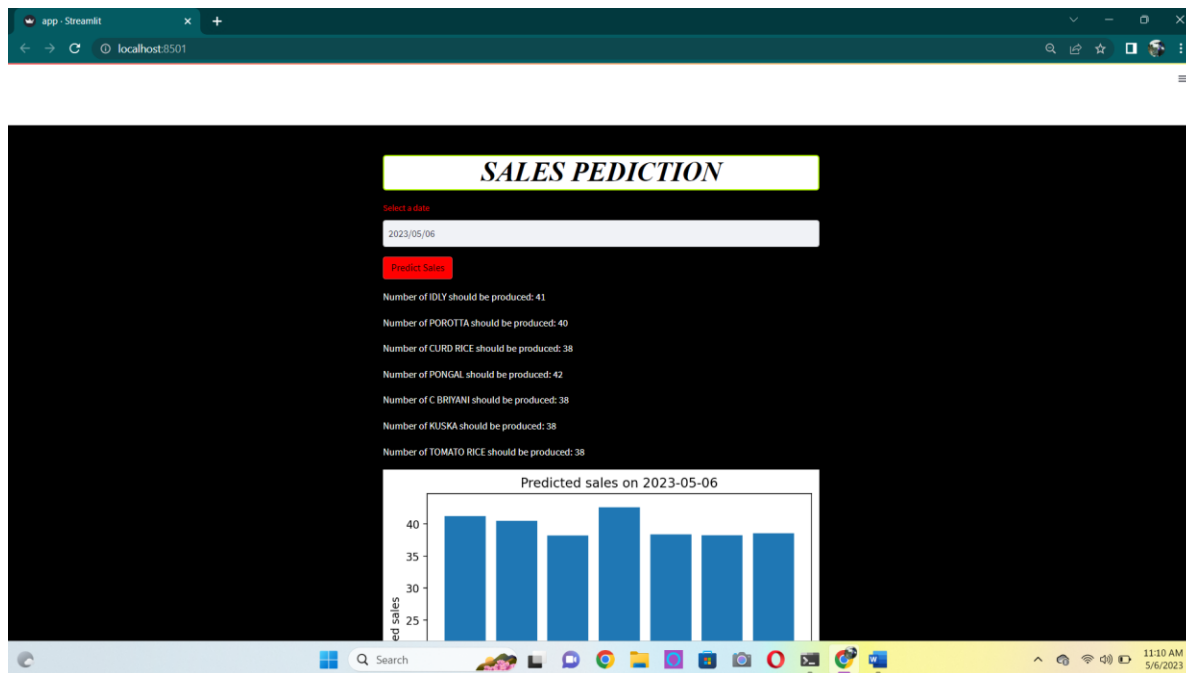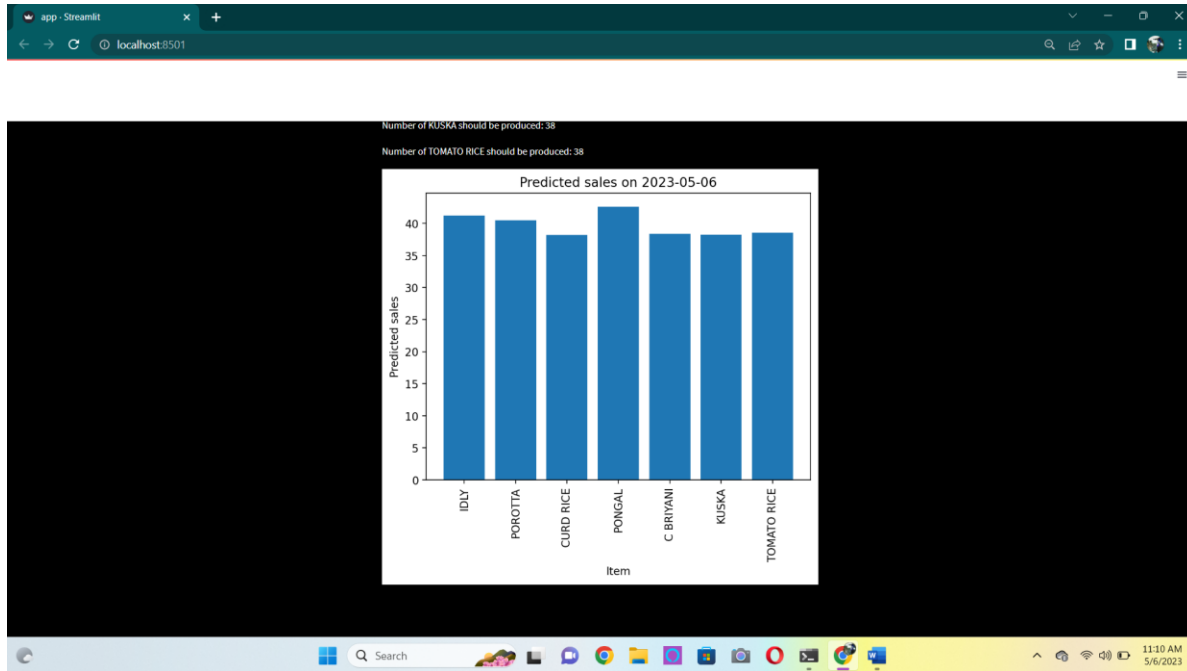
Fig:1.1

Fig:1.2

Fig:1.3

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