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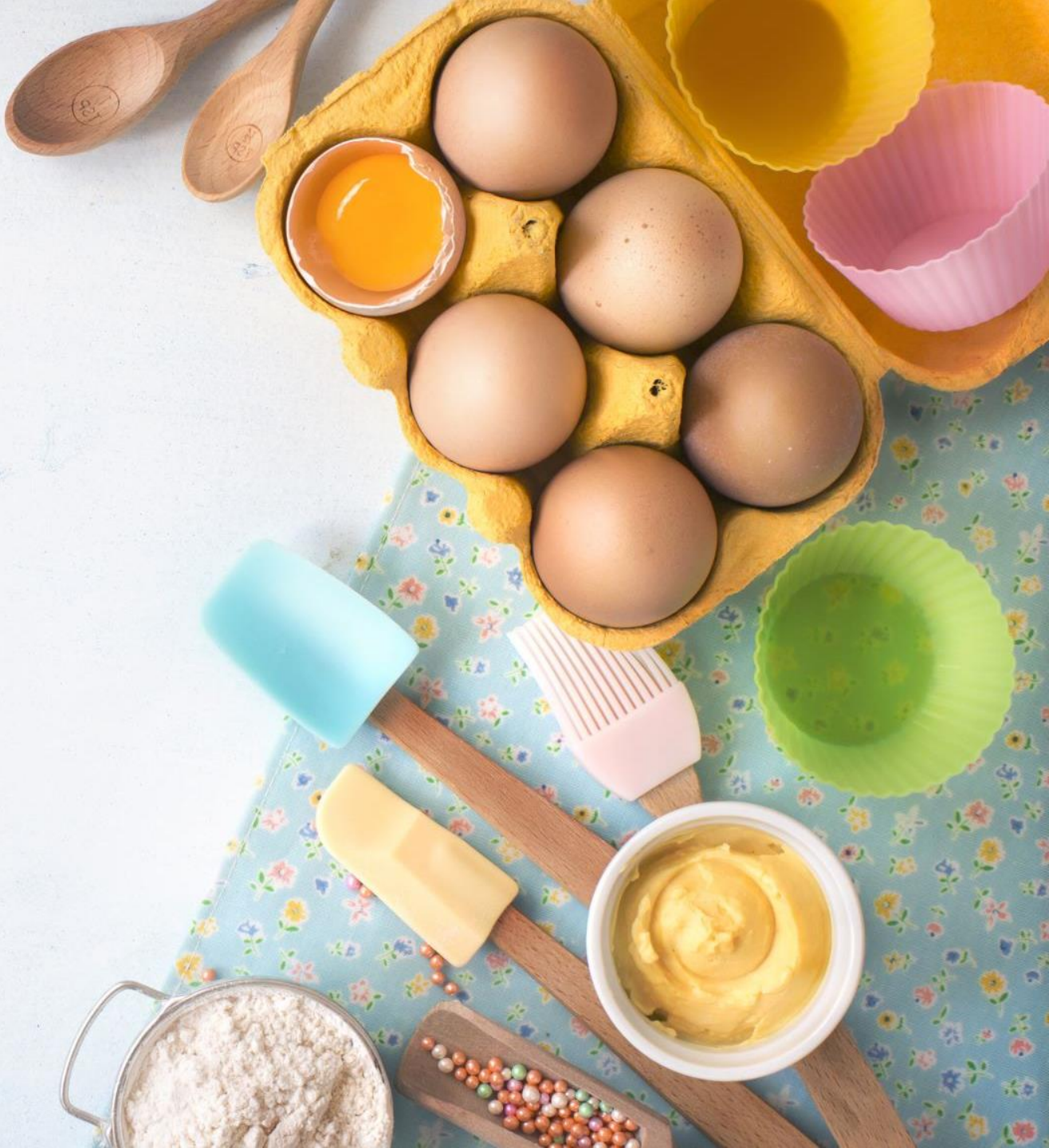
Recipe Suggestion System

BASED ON AVAILABLE INGREDIENTS



Statement of Objective

The main purpose of this project is to provide a solution to the problem of not having a recipe to cook. It sounds trivial but we humans face the problem of not getting any idea of what to cook despite having many ingredients just lying in our home. Not all of us are cooking enthusiasts and may not know what goes better with what another item. So, this project is aimed at solving this problem by suggesting users with recipes based on their available ingredients. We will be using a word-matching algorithm that we will be discussing in the coming slides. Through natural language processing, our objective of matching the corresponding ingredients and suggesting the perfect recipe will be met.

Statement of value

Our team decided to do this specific project because it serves a value in real life. The primary value of this project is to provide convenience to the users as it saves time and aids in choosing their desired recipe. The other purpose it serves is it prevents food waste as the ingredients are used and not wasted. The increase in efficiency also saves a lot of money. Moreover, people can choose what amount of nutrients will they like with their meal as multiple recipes can be generated from a list of ingredients. This also increases culinary interest and exploration among people

Review of the state of the art and relevant works

The challenge of deciding what to cook with available ingredients is common for many people. Recipe recommendation systems aim to address this by suggesting recipes based on ingredients users already have. Traditional approaches used collaborative and content-based filtering methods, which combined user preferences with recipe details (Mustafa et al., 2021).

Salvador et al. (2017) developed a framework to map recipe images and text into a shared space, facilitating efficient cross-modal retrieval.

Review of the state of the art and relevant works

This approach allows the model to recommend recipes based on images or vice versa, improving the interaction between visual and textual information. This method has shown effectiveness in bridging the gap between visual perception and textual data, which is crucial for improving recommendation accuracy.

In a related study, Salvador et al. (2019) delve into the inverse cooking paradigm, where recipes are generated directly from images of food. This innovative approach utilizes deep learning techniques to identify ingredients and suggest corresponding recipes.

Approach

The algorithm that we are going to use in this project is the word matching algorithm. We will be using the cosine similarity matrix that is used in similarity matching tasks. The main working model of this algorithm is to create a table of one word with all other words and match whatever has the highest similarity. After matching, we might need to do some filtering as well. We will be getting the data from Kaggle's Food dataset. Besides using similarity matrix, we will also be doing tokenization and lemmatization. We will be deploying the model through flask.

Deliverable

The deliverable for this project will be a deployable model that will suggest recipe based upon the provided list of ingredients. The model is to be web deployed through flask.

Evaluation methodology

We will be using both extrinsic and intrinsic evaluation methodologies. We will be using techniques such as precision, recall and F1 scores to have an idea about the confidence and accuracy of our model and we will also evaluate the user satisfaction scores. We will also be looking at users' dietary preferences and compare it to what the model has predicted. Response time and scalability will also be considered while evaluating the model.

References

- Mustafa et al. (2021). *Recipe Recommendation Using Collaborative and Content-Based Filtering*. IEEE Xplore. https://ieeexplore.ieee.org/document/10366631

- Salvador, A., Hynes, N., Aytar, Y., Marin, J., Ofli, F., Weber, I., & Torralba, A. (2017). *Learning Cross-Modal Embeddings for Cooking Recipes and Food Images.* IEEE Xplore. https://ieeexplore.ieee.org/document/8099810

- Salvador, A., Drozdzal, M., Giro-i Nieto, X., & Romero, A. (2019). *Inverse Cooking: Recipe Generation from Food Images*. *IEEE Xplore.* https://ieeexplore.ieee.org/document/8953192