Project Design Phase-I Solution Architecture

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| Date | 23 October 2023 |
| Team ID | Team-591797 |
| Project Name | Vitamin Detection Using Deep Learning |
| Maximum Marks | 2 Marks |
| Team Size | 4 |
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**Solution Architecture:**

The solution architecture for vitamin detection in food using deep learning consists of the following components:

**Data collection and preparation:** This component involves collecting a large dataset of food images with corresponding vitamin labels. The dataset is then cleaned and preprocessed to ensure that the images are consistent in size, format, and quality.

**Deep learning model training:** This component involves training a deep learning model, such as VGG19, to identify and quantify vitamins in food images. The model is trained on the preprocessed dataset and evaluated on a held-out test set to ensure that it has good generalization performance.

**Model deployment:** Once the model is trained and evaluated, it is deployed to a production environment so that it can be used to identify and quantify vitamins in food images. The model can be deployed as a mobile app, integrated into existing dietary apps, or used in various industrial settings, including food production and distribution.

**Data Collection and Preparation:** The data collection and preparation component is a critical step in the development of any deep learning model. The quality and quantity of the training data have a significant impact on the model's performance. For the vitamin detection task, the training dataset should include a wide variety of food images with corresponding vitamin labels. The dataset should also be balanced, meaning that it should contain a representative sample of all vitamin types and concentrations.

Once the dataset is collected, it needs to be cleaned and preprocessed. This may involve resizing the images, converting them to a specific format, and normalizing the pixel values. The goal of preprocessing is to ensure that the images are consistent and that the model can focus on learning the relevant features.

**Deep Learning Model Training**

The deep learning model training component involves training a deep learning model to identify and quantify vitamins in food images. The VGG19 convolutional neural network is a good choice for this task, as it has been shown to be effective in a variety of image recognition tasks.

To train the VGG19 model, we need to provide it with the preprocessed dataset of food images and corresponding vitamin labels. The model will then learn to map the input images to the corresponding vitamin labels.

The training process is iterative, and the model is evaluated on a held-out test set after each iteration. This helps to ensure that the model is not overfitting to the training data.

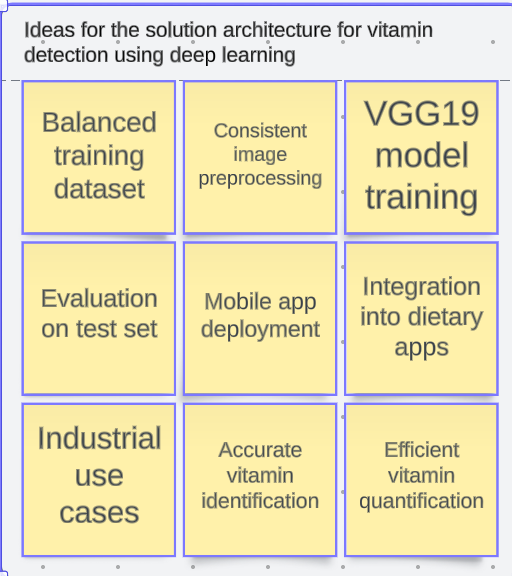
**Conclusion**

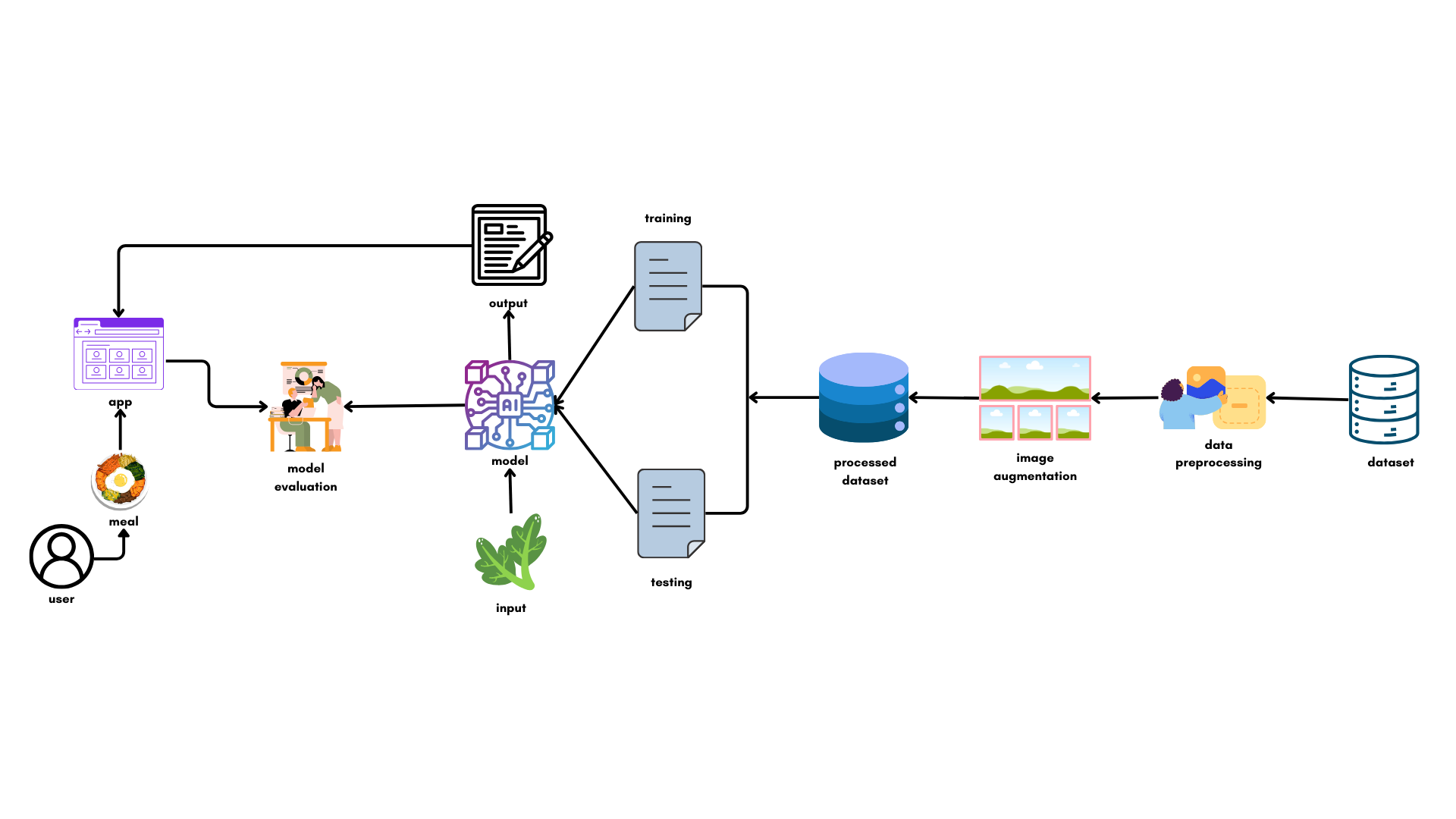
The solution architecture for vitamin detection in food using deep learning is a viable and scalable approach. The proposed architecture can be used to develop a system that can accurately and efficiently identify and quantify vitamins in food images. This system has the potential to make a significant impact on the nutrition and health industry.

Our solution leverages Convolutional Neural Networks (CNNs) to address the vitamin classification problem effectively.

* Data Gathering
* Image Preprocessing
* Model Building
* Vitamin Prediction
* Real Time Analysis

# Solution Architecture Diagram

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