

Development of Website and Label based on Artificial Intelligence for Vegan Egg Powder

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Abstract

Artificial Intelligence (AI) is a common term that implies the use of a computer to advanced intelligent behavior with minimal human intervention. AI is generally accepted as having started with the invention of robots. The term derives from the Czech word *robota*, meaning biosynthetic machines used as forced labor. This makes the job of consumers easy, efficient and time friendly. Through the study, an attempt made to efficiently use artificial intelligence in ensuring food security by the consumers on their own. This technology is used in the product vegan egg powder through label and website specifically designed for it. This enables the consumer to get regular message alert about the expiry date of the product and object recognition helps to detect the storage life through simple scanners. The software makes it consumer friendly and also data once entered cannot be further changed or altered. It also furnishes with the data that used from initial stage to final stage of product development. This method will enable the awareness of consumers and also upgrade the food security that everyone can access and get benefited through virtual mode.

Key words: Artificial intelligence, Vegan egg, Food security, Website, Label, Message alert, Object recognition

Artificial intelligence (AI) is elaborate branch of computer science correlates with building smart machines capable of performing tasks that typically require human intelligence. AI is an interdisciplinary science with many approaches, but advancements in machine- learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry. The ideal characteristic of artificial intelligence is its ability to rationalize and take actions accordingly to have the best chance of achieving a specific goal. Algorithms often play an important part in the model of artificial intelligence, where simple methods are used in simple applications, while more complex ones help frame strong artificial intelligence [1]. Strong artificial intelligence systems are systems that carry on the tasks and roles considered to be human-like. These tend to be more structural and complicated systems. They are programmed to handle situations in which they may be required to problem solve without having a person intervene. These kinds of systems can be found in applications like self-driving cars or in hospital operating rooms.

QR Code is a two-dimensional symbol. It was discovered in 1994 by Denso, one of major Toyota group companies, and approved as an ISO international standard (ISO/IEC18004) in June 2000 [2]. This two-dimensional symbol was initially intended for use in production control of automotive models, but it has become widespread in other fields. Now QR Code is seen and used every day everywhere in Japan for the following reasons:

- Several characteristics superior to linear bar codes: much higher data density, support Kanji/Chinese character, etc.
- It can be used by anybody free of charge as Denso has released the patent into the public domain.
- Data structure standard is not prerequisite for current usages.
- Most mobile phones in Japan equipped with cameras that enable reading of QR Codes can access Internet addresses automatically by simply reading a URL encoded in the QR Code.

Object recognition is a computer vision technique for identifying objects in images or videos. Object recognition is a key output of deep learning and machine learning algorithms. The goal is to teach a computer to do what comes naturally to humans: to gain a level of understanding of what an image contains.

The object recognition problem can be defined as a labelling problem based on models of known objects. Formally, given an image containing one or more objects of interest (and background) and a set of labels corresponding to a set of models known to the system, the system should assign correct labels to regions, or a set of regions, in the image. The object recognition problem is closely tied to the segmentation problem: without at least a partial recognition of objects, segmentation cannot be done, and without segmentation, object recognition is not possible [3]. Hence, few applications of object recognition are:

- Activity recognition.
- Automatic image annotation.
- Automatic target recognition.
- Android Eyes – Object Recognition.
- Computer-aided diagnosis.
- Image panoramas.
- Image watermarking.
- Global robot localization.

MATERIALS AND METHODS

Process and software developments

Label designing

The label designing was done in Adobe Photoshop version 13.1.0. Main criteria with which the labels were designed are durable, suitable for food product, suitable for the packaging material and sufficient to include all the required information that a label should possess according to FSSAI recommendation and QR coding.

Inclusion of artificial intelligence

The sample “Vegan Egg” was prepared by regular preparation method mentioned in phase I and II. The component of AI was included in the labelling of the developed product. Those components are explained elaborately below:

i) Object recognition installation

The main portal for creation is done in cloud.ibm.com in which two main packages have been used namely, Machine language and Cloud Object storage. Machine language helps in recognition set up of data and the set of data to be recognized are stored in Cloud object storage from which it is uploaded in another portal called as cloud.annotation.ai. This is portal in which the data (images) to recognize are marked. Similarly, those data sets are also labelled with train module where contents like day, date or specific information needed to get displayed are aligned.

Once the set of the data finished, the content is inserted in the website created for the purpose of recognition of the sample namely “React Web App”. With the help of labelled data set many other apps in both android and ios, website and website can be created.

ii) QR code development

QR code development is done with python programming. The package used for the purpose is “QR Code” in which a single string is used to all the require details needed to get displayed on scanning is encoded as an input. Once the process gets over, the contents get stored in the admin’s Personal computer in the PNG format. This is one of the applications generally involved in pre-production stage and do not have any specific role in post-production stage.

iii) Website development

The language used for website creation is “React Language” where it acts as a front end. For the assistance of the react, “Google Firebase” is used as a back-end language. In the Google Firebase, the authentication is also done. This form of website accepts data from object recognition, videos and sends email notification to the users along with creating a remainder.


The object recognition is linked with the website. To access the website, users should login with the name, mobile number and email id. The users get all the information related to the product once the QR code is scanned where information about the product and manufacturer will display. The calendar

in the registered mobile number automatically gets, set remainder of the expiry date of the product. The alert will be given once the product reaches the expiry date.

RESULTS AND DISCUSSION

QR Code

The basic and simple 96dpi QR code is applied for the purpose. The data’s that delivered through scanning the QR Code are termed as Characteristic details. The characteristic contents are direct link to website (URL), expiry date of the product, the cost and the address of the manufacturer. This enables the consumer to get access to the website.

QR code development details	
Type	Simple generic 96 dpi QR Code
Characteristics	<ol style="list-style-type: none"> 1. Website URL 2. Expiry Date 3. MRP of the Product 4. Manufacturer Address
	

Website

A website is a collection of web pages and related content that is identified by a common domain name and published on at least one web server. A specific website developed for the Vegan Egg for the purpose of creating a single portal to gain all the details regarding the product and the respective recipes that could be prepared out of it. Within this website, access for the message alert and object recognition software is made available.

Website related details	
Software	React
Program	Herokuapp
	Html
	Javascript
	React
Elements	JQuery
	<HTML>, <CSS>, <JSX>

Object recognition

The main aim in including the application in the study is creating a space for the consumers to analyze the purchased Vegan Egg Powder based on its shelf life and the quality. It creates a motivation in increasing the marketing of the product and also prevents malpractices in quality of the product. The pre-equipped photo on daily basis till the actual expiry date will deliver the actual shelf of the product.

Object recognition development details	
Software	Self-generated algorithms
Program used	JavaScript
Elements	A. Nearest-colour
	B. React-HTML-5 Camera
Accuracy	About 92 percent

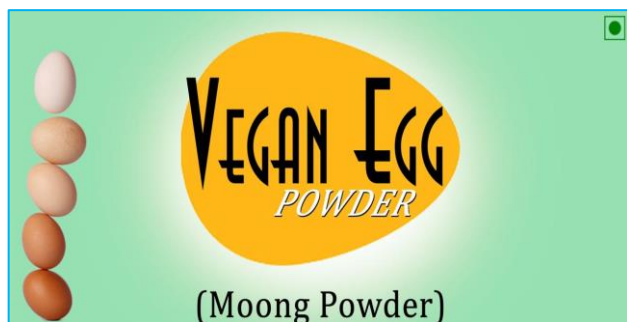
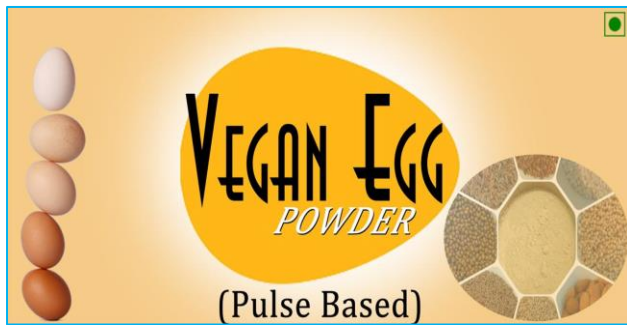
Message alert

Software	True push server
Program	True push service worker file
Element	Service worker file

The application is included in the study, is to alert the consumers of the product about the expiry date and on the day of expiry once after linking their mail id or phone number with the website. This is to ensure the consumers not use the product after the product is expired or make them aware about the importance of manufacturing date and the expiry date.

Accordingly, the consumer after getting himself logging into the website through the link in QR Code would receive alert on every Monday and Friday in general and on the expiry date. Through this study, the consumers are made more alert about the food they purchase, store and consumer.

Label with artificial intelligence



Sequential procedure for ai application

QR Code

INSTRUCTION

VEGAN EGG OMELETTE:

- Take one table spoon of the powder mix with 3 table spoon of water and make into a semi thick batter consistency.
- Add the desirable veggies and salt as required amount.
- Place in the frying pan, cook till no liquidity appears at the top.
- Repeat that once again to the other side of the omelette.

VEGAN EGG DOSA:

- Take one table spoon of the powder mix with 3 table spoon of water and make into a semi thick batter consistency.
- Pour the dosa batter in pan and add the vegan egg content and spread uniformly.
- Add required salt and veggies if required.
- Cook both the sides properly.
- Serve hot with spicy chutney.

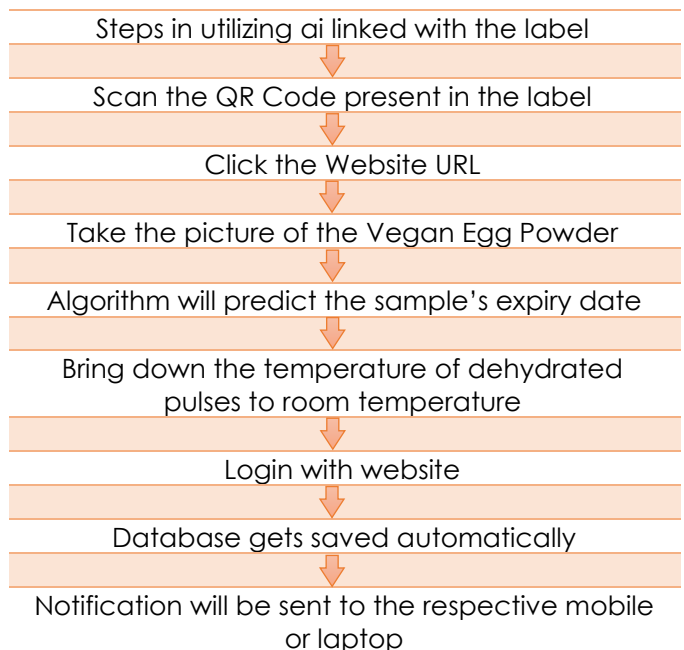
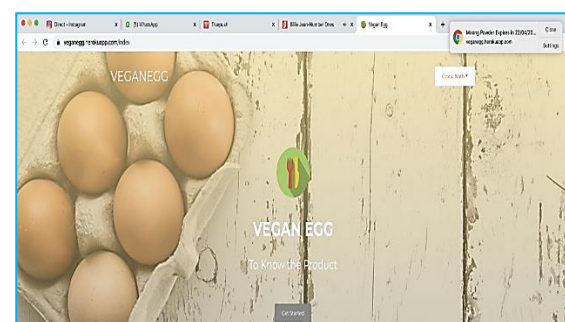
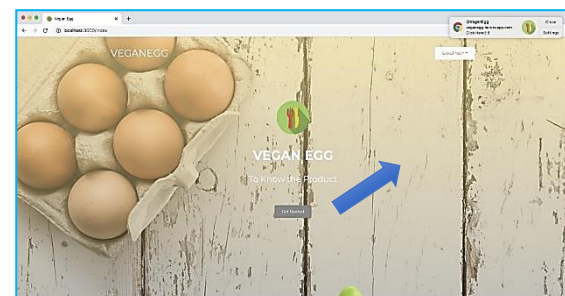
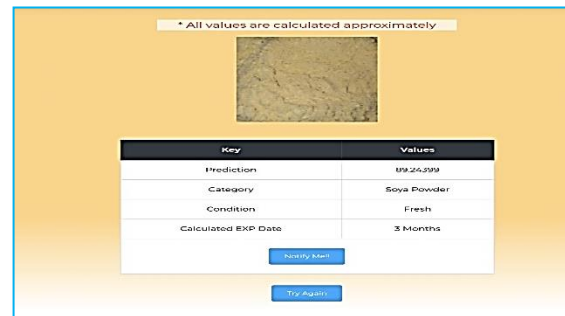
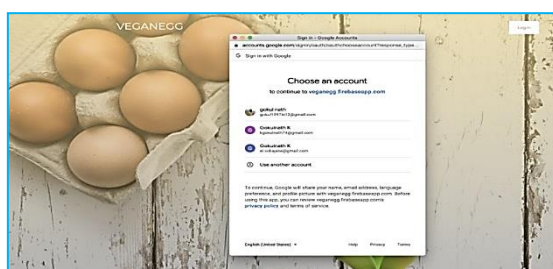
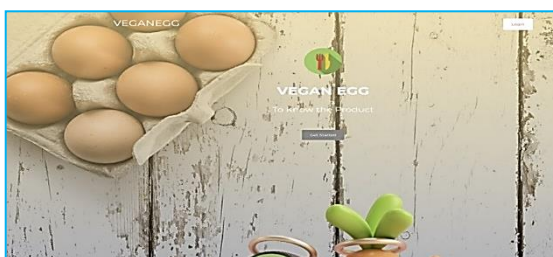
VEGAN EGG NOODLES:

- Take one table spoon of the powder mix with 3 table spoon of water and make into a semi thick batter consistency.
- Boil the noodles add salt as required.
- In pan sauté onion, tomato, green chilies and spices in oil as required.
- Finally add the vegan egg mixture and mix till no raw taste is left.
- Add the cooked noodles to the mixture.
- Mix uniformly and allow cooking for 2 to 3 minutes.
- Serve hot with any your favourite sauce.

BEST BEFORE THREE MONTHS FROM PACKING
For Exp Date, M.R.P, Webpage. See the QR CODE

Nutrition Facts

Nutrients	Soya
Energy	658.3kcal
Total Fact	29.1gm
Cholesterol	0mg
Protein	63.3gm
Carbohydrates	35.3gm
Sodium	108mg
Vitamin E	1 mg
Vitamin B6	0.3mg
Phosphorus	525 mg
Calcium	483.3mg



CONCLUSION

The implementation of a simple 96 dpi QR code for Vegan Egg Powder serves multiple purposes, enhancing consumer engagement and ensuring product safety. The QR code provides critical characteristic details such as the website URL, expiry date, product cost, and manufacturer address, thus facilitating easy access to essential information. The dedicated website, developed using React, HTML (Hyper Text Markup Language), JavaScript, and JQuery, offers a comprehensive portal for consumers to explore product details and recipes. Additionally, it integrates message alert and object recognition software to enhance user experience and product quality assurance. Object recognition, developed with self-generated algorithms and JavaScript components like Nearest-colour and

React-HTML-5 Camera, provides about 92% accuracy in assessing the product's shelf life. This feature empowers consumers to verify the quality of their purchase regularly. The message alert system, built with True push server software, ensures that consumers receive timely notifications regarding the product's expiry date, thus promoting safe consumption practices. Alerts are sent twice a week and on the expiry date to users who have registered their email or phone number. Overall, this integrated approach leverages QR code technology and artificial intelligence to improve consumer awareness, prevent malpractices, and ensure the safe consumption of Vegan Egg Powder. By scanning the QR code, consumers can easily access the website, verify product quality, and receive timely notifications, thus enhancing their overall experience and satisfaction.

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