EUROPEAN UNIVERSITY OF LEFKE

FACULTY OF ENGINEERING

Graduation Project I

AI - Fashion Assistant

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Short Introduction

In its short form, my project is an artificial intelligence-based web platform that detects and recommends products and similar clothes from the scanned image, and also offers discounts, restock notifications and style suggestions. The main idea and purpose of my project is to help users with a user-friendly platform to have an easier and more enjoyable shopping experience with the help of artificial intelligence.

The reasons why I think it can be used are that, in addition to being notified automatically when a favorite product drops in price or comes into stock, I can make a decision by seeing the same version of a favorite product or different brand versions with similar features at the same time. Moreover, thanks to the combination suggestion system, it makes it easier to choose a style. Such users will be able to save time and have the best shopping experience according to their budget.

Supervisor

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1.Introduction

1.1 Problem Definition

Today, artificial intelligence offers personalized recommendations to consumers based on their behavior or the behavior of groups similar to them. Consumers see these personalized suggestions as a factor that makes their jobs much easier, and they insistently request them. Personalization is widely desired in AI fashion or sales platforms, thanks to a group that accounts for 69% of consumers according to statistics. In other words, a brand that wants to grow in the market must now use artificial intelligence on their own platforms to make a quick profit. (Vogue Business, 2023) The main goal of my project is exactly this, to enable fashion customers to reach their wishes in a more personalized way, easily and by saving time, with the support of artificial intelligence.

We can search the internet by scanning images or uploading images to some tools such as Google Lens. If we look at it from the consumer perspective, consumers can now search and purchase a particular product using only the image of the desired product, without looking at its description.(Rilli,Bezzei,2023). This shows how necessary a feature is our model, which helps show the product similar or identical to the scanned product with the help of the artificial intelligence model. Because people prefer to choose by seeing, comparing and eliminating rather than reading anything. Thanks to this feature, users can make a choice by making price comparisons between similar products of their choice.

In addition, thanks to the combination suggestions, users will be able to see if they can combine an outfit with other products they have, so that they can make both savings and a more sustainable purchase. At the same time, by comparing different options similar to a product they like, we will choose the more durable one and support a more sustainable shopping. Due to reasons such as global warming etc., people are now aware that fashion should be sustainable. Thanks to consumers who adopt the motto "Buy less, buy better", with the help of artificial intelligence and in brands that adopt more sustainable ideologies, people shop less but spend more. (Eraslan,2023)

In our project, users will be able to upload their combinations, and thanks to the artificial intelligence model we developed with this combination data, users will be able to look at combination ideas that include any product, thus saving time and even their budgets with smart shopping, as we mentioned before. Because people can create their style much more easily by taking inspiration from other styles, that is, from other people's thoughts. As an example of this, Amazon's Echo Look was an artificial intelligence style consultant. For use, he used the device to rate the clothes people wore and even give suggestions to people about their styles (Yılmaz, 2023).

In addition, with the price and stock tracking feature, which is another feature of our project, users can follow the product they want in these aspects with the automatic and instant notifications they will receive. This helps them both save time and contribute to their budget.

The working logic of my project is that users can quickly see the same or similar clothes with the clothes images they scanned and by comparing prices/features. At the same time, they can choose to follow the stock-price status of the clothes they choose, so that the system automatically sends notifications to users when the product they choose reaches the desired condition. In addition, if the user wishes, after scanning the product, she can look at the clothing combinations made with that product with the option of finding combination suggestions. They can also upload their combinations to our site to make suggestions and help other users.

Example-Problems :

- **Lack of a personalized assistant for fashion:** For example, although Google Lens is an application with a very advanced scanning feature and a wide range of services, it is not a fashion-oriented application. For example, when you scan any clothing, it may find the place where it is sold and different sellers, but it cannot do anything other than that. It doesn't tell you the price of each one, just the brands and images. In addition, it does not offer combination suggestions, display similar products, or price-stock tracking, which are our other features. But our application offers all these to the user, providing a personalized assistant in fashion.
- **Lack of price stock tracking feature:** Even Amazon, the largest e-commerce platform, does not provide an application that allows its users to track the products they want to buy according to whether they are in stock or on sale. However, this is very important for a user. In our system, users can track the discount or stock of the product they choose, and these desired situations are constantly monitored by our system. When the desired happens, an instant notification is automatically sent to the user.
- **Lack of Direct Combination Suggestions:** Some e-commerce sites such as AliExpress offer suggestions by following users' habits. But it does not offer combination recommendation options based on any product. In other words, it offers combination suggestions for sales rather than helping the user with their style. In our application, the user gets more than one combination option that includes the product they want.

1.2 Goals

Goals and their details:

- **Clothing Scanning with Artificial Intelligence Visual Processing Model:** It will be a model that we develop with the clothing data we receive from ShopStyle's API. This model displays the same or similar clothes that users scanned, prices, images and brands etc. It will also display it and present it to the user.

Benefits of the project:

Users can easily find a version of a product they like that suits their budget, thereby contributing to their budget and saving time. In addition, they will quickly find any product they see and like without wasting any time.

- **Providing Combination Suggestions with Artificial Intelligence Model:** We will provide an area where users can upload their combinations. We will develop our artificial intelligence model with the data obtained and provide a service that offers combination suggestions to users according to the desired outfit. For example, by scanning a black turtleneck, the user will directly see the combination suggestions that include it.

Benefits of the project:

Users can create their styles more happily and confidently thanks to combination suggestions. They also spend less time creating combinations. And when they are going to buy an outfit, they can choose more confidently whether to buy it or not by seeing how it will be combined.

- **Price Tracking:** Any product liked by the user can be tracked for discounts if the user wishes, so that when the tracked product goes on sale, the user will be notified by sending an automatic notification.

Benefits of the project:

Thanks to the discount tracking feature, users do not need to constantly check whether the product they want is on sale or not, thus saving time. In addition, users contribute to their budget by paying a more affordable price for the product they like.

- **Stock Tracking:** Any product liked by the user can be kept under stock tracking if the user wishes, and when the tracked product is in stock, the user is notified by sending an automatic notification.

Benefits of the project:

Thanks to the stock tracking feature, users do not have to constantly look for the product they want, they are automatically notified by our system when the product is in stock, thus saving time.

2. Literature Survey

Compare 1 Google Lens :

The common feature of the Google Lens application and our site is that they scan an object with the camera and show similar or identical things. Their difference is that ours is a website application, you can use Google Lens as both a web and mobile application. It scans by dragging either the URL of the object you want to scan on the web or the file of the object's image. Also, while our scanning area is specific to clothes, hers is general. Other differences are that while this is a browsing application, ours is an application that helps users with fashion, so other features of our site that are not available in Google Lens are; It provides notifications when the product is in stock or on sale, and provides combination suggestions. These features we mentioned are not available in Google Lens.

Compare 2 Amazon :

Another feature of the Amazon application that is similar to the features offered by our website is that it notifies you when the desired product is on sale. In addition, thanks to the Amazon virtual search feature, it gives users results containing the same or similar products scanned, just like our clothing scanning feature. However, it is an online trading platform and the only products it displays to the scanned product are the products it contains. Also, we have a single product range (clothing), but Amazon has many products and they can be scanned and give results.

Apart from this, Amazon monitors a stock level that only notifies sellers and automatically alerts sellers to restock accordingly. However, this is only for sellers. On our site, we offer stock tracking and notification when stock is renewed as a service for our consumer users. Additionally, Amazon does not have the feature of suggesting combinations based on the selected outfit on our website.

Compare 3 Zalando:

Zalando is an online sales platform in the fashion field. Zalando uses artificial intelligence to make combination suggestions based on the choices users make while using the application, but our application uses the visual processing aspect of artificial intelligence to suggest combinations based on the image uploaded by the user. Additionally, Zalando does not have the visual scanning feature that we have. In other words, there are no features such as suggesting similar outfits, finding the outfit you are curious about, or, as we mentioned above, using clothes scanning in terms of combinations.

Zalando also does not have a feature that allows the user to receive notifications by tracking the product's stock status or discount status.

3. Background Information

3.1 Required software

- **HTML/CSS :**
  For web developing.
- **Javascript :**
  For web developing and adding dynamic features.
- **OpenCV :**
  For image provessing and clothing scanning via images.
- **AliExpress API :**
  For giving clothes advices for our users
- **Python :**
  Visual processing, data analysis , in short, to provide machine learning.
- **Visual Studio Code :**
  It is a good code editor.
- **MYSQL :**
  For database.
- **Marqo - Fashion CLIP**
  Getting fashion data for develop our ai assistant.

3.2 Other software

- **Canva :**
  For web site design and icons.

- **Git :**
  For storing my project safely.

4. Modules

4.1 Frontend Module

This module is used by user. The design of this module will be user-friendly and simple to understand. This module is a website interface that we will develop using HTML/CSS and Javascript languages. The main part is a section where users can upload and scan photos. The user receives products similar or identical to the product scanned in this pane as output. They can select and follow the product they like for stock tracking or discount tracking. There will be another section showing that they are following this. In addition, when the output of the scanned outfit is given, the user who likes any outfit is transferred to another section with the suggest combination option and sees combination suggestions made with those clothes in this section.

4.2 Backend Module

As the name suggests, this module handles the background work of our website. We will develop our module with MySQL and Python languages. In this module, data is captured, stored and processed through the Shop Style API. Instant tracking of the products that users have marked for stock or discount tracking or updating them on our website as a result of price changes or out of stock of the product is also done here. In addition, the security and storage of users' information is also ensured by this module.

4.2.1 Visual Processing Submodule

In this submodule, images uploaded or scanned by users are analyzed by our artificial intelligence model and used for training. We train this artificial intelligence model using combination photos uploaded by the user or clothing images we obtain through the ShopStyle API. We will also use OpenCV and Python's machine learning libraries for this training process.

4.2.2 API Integration Submodule

It is a module that integrates our system with ShopStyle API. In this way, our system communicates with this API and provides clothing data that will be presented to the user and used for the training and recommendation of our artificial intelligence model.

4.2.3 Notifications Submodule

In this module, as you can understand from its name, our system ensures that users are instantly and automatically informed when the products that users have marked for discount or stock go on sale or in stock. Our system regularly monitors the desired products in line with the users' wishes. The notification sent to users will be sent to both our website and the user's e-mail address. For example, if they have chosen a blouse to track its sale status, the user system will automatically notify them via our website and e-mail addresses as soon as that blouse goes on sale.

4.3 Login/Logout Module

As the name suggests, this module allows users to log in and log out of our system. For this process, users first register on our website with their e-mail and password. Then, they always log in to our website with this information. Thus, it enables users to maintain and manage their sessions securely.

5. Risk Analysis

1. Since this is not a shopping site, users can choose applications that have some of our features or similar ones and also offer direct shopping opportunities.

2. Users may not prefer our website due to similar applications in the market.

3. Since it is a website, not a mobile application, they may not prefer our project over time as they cannot reach us directly when needed.

4. The API from which we retrieve the data we use may be disabled, so we cannot give any output to the users.

5. The combination photos section to be uploaded may be misused by some users, and if this is not properly controlled, the reputation of our project may be damaged.

6. If there is any problem in our artificial intelligence model, the result of accurate clothing scanning or combination suggestions cannot be given to the users.

7. The products we recommend or scan results may not be available in some users' countries, or even if they order from abroad, they may not be able to benefit from most features of our website due to the permits/difficulties of tax laws. For this reason, our project may not be used globally.

6. Ethics

1. My project will prevent users from making unnecessary purchases by ensuring they become conscious consumers. For example, they will avoid buying products that they will never wear in their daily lives or that they cannot combine with the products they have.

2. The user will be transparently informed about why, where and how much his and other data are collected.

3. When using software such as ShopStyle API, license and terms of use will be complied with.

4.When making similar product recommendations, no particular brand will be given an advantage. Recommendations will always be displayed in order of most to least similar to the product.

5. All product data used in similar or identical product recommendations will be provided by brands that allow their data to be used.

6. The uploads of users whose combination data we have uploaded for combination suggestions will first be examined to ensure that there is no inappropriate content, and then the data will be collected to be used accordingly, otherwise the upload will be deleted.

7. Copyrighted images will not be used in the combination suggestion system. Only the combination photos uploaded by users will only be taken as data for combination suggestions and this will be told to the users from the beginning.

8. Our project may be sued as a result of some users uploading a copyrighted photo as their own.

7. Conclusion

7.1 Benefits

a. Benefits to users :

1. By scanning an outfit they like, they can quickly find where to buy it.

2. They have the opportunity to shop more economically by seeing similar products in different price segments of the product they like.

3. They do not have to constantly check for discounts on the product they like and save time.

4. They will be notified as soon as the product they like is in stock, so they do not have to constantly monitor whether the product they are waiting for has arrived.

5. They can see combination ideas for the product they want and decide more quickly whether to buy the product or not.

b. Benefits to me :

1. I gain experience and knowledge about project and time management.

2. I will be experienced in website design and development.

3. I will improve myself by gaining knowledge and experience in artificial intelligence and image processing.

Why did I choose this project?

The main reason why I chose the project was that I was suffering from some issues. For example, when I saw any product on an influencer, I was wondering where he bought it, but I did not want to spend minutes in the comments or examine the links one by one. Additionally, there may be versions of the same product that are of almost similar quality but at very different prices, and I did not want to research them one by one. In addition, the most famous online shopping applications in the country I live in did not have the feature of scanning clothes and showing suitable options.

In addition, clothing stocks run out quickly during discounts, and since the stock created by people returning them is very small, it requires a lot of follow-up, which is quite time-consuming. I thought it would be much better if we received automatic notifications instead. In short, I chose this project for such reasons.

7.2 Future Works

Yes, I plan to continue developing it. I am thinking of enabling the Tik Tok platform to connect to our website. The reason for this is that trying or combining any product is often shared on the Tik Tok platform, so people can see the combinations they want.

In addition, I wish there was an application that could scan not only clothes but also make-up products and show which products they are. Especially for make-up products, people watch trial videos on platforms such as Tik Tok, and thanks to the feature I mentioned above, they can easily examine how the products are.

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