

Retailer Recommendation Using Facial Recognition

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Abstract- The goal of this project is to supply the user with a really personalized selection of outlets to shop for from by using face recognition. Crucially, face recognition technology enables offline stores to try to what their online counterparts are doing for years – identify shoppers, link them to past purchases and generate personalized product recommendations supported the information. When a retailer knows its customers, it can serve them more effectively. Face recognition has the potential to offer traditional stores a wider view, showing who's buying what and when. Access to the present data allows shops to spot problems and grasp opportunities, providing superior customer service which will keep shoppers happy and engaged. Face recognition will consider certain aspects of a customer like gender, emotion and age to recommend shops which can best provide what the customer might want.

Keywords- Age segmentation, Customer Service, Facial Recommendation, Retailer.

I. INTRODUCTION

The planet is moving towards online shopping thanks to the advantages it provides to the purchasers. Big ecommerce sites like Amazon, Flipkart etc. provide tailored recommendations to their customers supported their previous behavior. These aid the purchasers during their shopping and supply satisfactory shopping experience. These recommendations are given by recommender systems employed by the sites. As these systems evolve and become more complex, more accurate predictions and proposals are given to the users. If this continues, retail business might wane within the future.

Hence, a system which uses user's facial characteristics to supply personalized recommendations to the purchasers can help provide business advantage to the retail stores.

Understanding your customer has become an important aspect for retailer. Knowing your customer gives you a foothold in marketing strategy.

The main objectives are:

- To supply the customer a customized experience.

- To supply a far better marketing strategy for offline retailers

II. LITERATURE SURVEY

The Phoenix Market City Mall currently has an implemented system which directs their customers to a selected floor for a specific brand. Interaction from the customer's side is required on the touch screen for the system to function. This technique however, doesn't understand or make a customized experience for the customer. Hence, it makes it only an easy guide for the mall.

Following papers were considered for the research of this project-

- Age Group Estimation and Gender Recognition Using Face Features[1].
The International Journal of Engineering and Science
- An Image Mining System for Gender Classification & Age Prediction Based on Facial Features[2].
ISSN:2278 Volume 10, Issue6(May.-Jun.2013)
- Partial Face Recognition :Alignment-Free Approach[3]
IEEE transactions on pattern analysis.

III. METHODOLOGY

Convolution Neural Network

A Convolutional Neural Network (ConvNet/CNN) may be a Deep Learning algorithm which may absorb an input image, assign importance (learnable weights and biases) to varied aspects/objects with in the image and be ready to differentiate one from the opposite. The preprocessing required during a ConvNet is far lower as compared to other classification algorithms. While in primitive methods, filters are hand engineered, with enough training, ConvNet shave the power to find out these filters/characteristics. In a way, CNNs are regularized multilayer perceptrons.

The convolutional neural network for this python project has 3 convolutional layers:

Convolutional layer; 96 nodes, kernel size 7
 Convolutional layer; 256 nodes, kernel size 5
 Convolutional layer; 384 nodes, kernel size 3
 Input: Images/Videos
 Output: Age, Gender.

Random Forest

Decision trees leave you with a difficult decision. A deep tree with many leaves will over fit because each prediction is coming from historical data from only the few houses at its leaf. But a shallow tree with few leaves will perform poorly because it fails to capture as many distinctions within the data. The random forest uses many trees, and it makes a prediction by averaging the predictions of every component tree.

Input: Age, Gender, Emotion(These are the outputs of Facial Recognition).

Output: Brand Name.

Support Vector Machine(SVM)

A Support Vector Machine (SVM) is a discriminative classifier formally defined by a separating hyper plane. In other words, given labeled training data (supervised learning), the algorithm outputs an optimal hyper plane which categorizes new examples. In two dimensional space this hyper plane is a line dividing a plane in two parts where each class lay on either side.

To separate the two classes of knowledge points, there are many possible hyper planes that would be chosen. The target is to seek out a plane that has the utmost margin, i.e. the utmost distance between data points of both classes. Maximizing the margin distance provides some reinforcement in order that future data points are often classified with more confidence.

Output: Brand Name

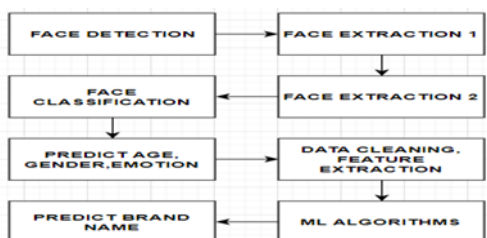


Fig.1 Overall view of methodology.

1. Dataset Cleaning: We'll impute the missing values in the dataset with the mean values for continuous variables, and median for categorical variables.
2. Feature Extraction: By using PCA or feature importance we'll select the simplest features that contribute the foremost.
3. Face Recognition: Employing methods like Adaboost, Random Forest, XGBoost, SVM and Artificial Neural Network we'll attempt to classify the pictures into Male or Female.
4. Predicting: Using Features like Age, Gender alongside face recognition we will use to predict the mall outlets.
5. Output: The Output Screen will suggest users with the Outlets that they ought to visit.

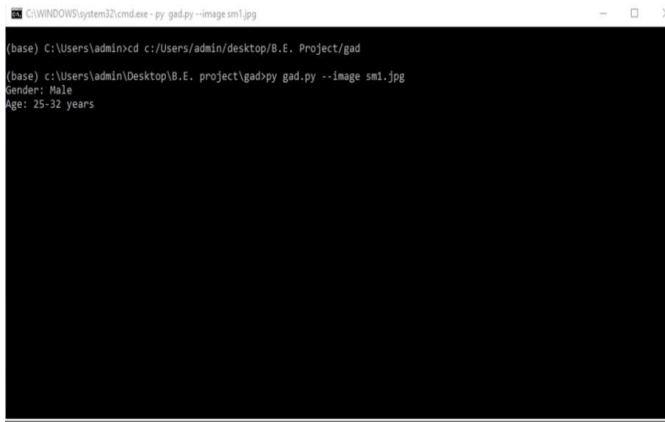
We will create a prototype face recognition system supported pre trained CNN models that's able to predict their gender and age a picture or video. Using face recognition, we'll determine age, sex and gender and make their columns within the dataset. Another column for "Season" are going to be hard coded.

The next and final phase of the training algorithm is going to be to predict the target variable "Brand" using algorithms like Random Forest, Decision Tree etc. Thus, brand names are going to be recommended to the customer which are the results of customer's countenance.

IV. SOFTWARE DESIGN



Fig.2 Image of a man is given as an input to the system. The rectangle represents the tracking of the face and therefore the predicted gender (Male) and age range (25-32).



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C:\WINDOWS\system32\cmd.exe - py gad.py --image sm1.jpg
(base) C:\Users\admin>cd c:/Users/admin/desktop/B.E. Project/gad
(base) c:\Users\admin\Desktop\B.E. project\gad>py gad.py --image sm1.jpg
Gender: Male
Age: 25-32 years

```

Fig.3 The command prompt details the features extracted from the image of the person.

Software requirements:

- Software design: Anaconda
- Windows 7 or above
- 64 bit system.

V. CONCLUSION

The main purpose of the proposed system is to supply business advantage to the retail industry. By moving the recommender technology to offline stores, multiples of possibilities would be opened for entrepreneurs and retail stores. By serving their customers with personalized offers, they increase their customer loyalty and their sales. This equips them to effectively combat the main online retailers like Flipkart, SnapDeal, Amazon etc. Thus, we conclude that by using our model, the sale and therefore the user experience can be significantly improved.

The offline retailers can go toe to toe with the web retailers and may have a major say in the market share. Offline stores are integral part of any economy and this project will help them to survive the battle with online retailers.

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