International Journal of Artificial Intelligence & Applications (IJAIAP)
Volume 01, Issue 01, Jan-Dec 2020, pp. 1-6. Article ID: IJAIAP_01_01_001
Available https://iaeme.com/Home/issue/IJAIAP?Volume=1&Issue=1
Journal ID: 4867-9994, DOI: https://doi.org/10.17605/OSF.IO/E7JUV

WHAT SHOULD I WEAR – MACHINE LEARNING AND IMAGE PROCESSING APPROACH

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ABSTRACT

This project addresses the common challenge of choosing appropriate attire for various occasions by leveraging machine learning and image processing techniques. The aim is to develop occasion-specific outfit recommendation models, utilizing positive and negative samples for training. The system employs user-provided clothing images as test data, enabling the algorithm to classify garments according to the occasion they are suitable for. Users can request outfit suggestions by specifying the occasion, and the algorithm will present relevant choices. The project's innovation lies in its potential to offer personalized attire recommendations and enhance user decision-making, effectively aiding individuals in selecting the right outfit for any event. The proposed model promises to simplify the often complex task of outfit selection, presenting users with five suitable options for their specified occasion.

Keywords: Attire Recommendation, Occasion-Based Outfit Selection, Image Classification, Fashion Ai, Personalized Styling, Outfit Suggestions.

Cite this Article: Lakshmi Namratha Vempaty, What Should I Wear – Machine Learning and Image Processing Approach, International Journal of Artificial Intelligence & Applications (IJAIAP), 1(1), 2020, pp. 1-6.
https://iaeme.com/Home/issue/IJAIAP?Volume=1&Issue=1

1. TITLE

The title of our project is **What should I wear?**

Figure 1: Source: http://www.christwill.com/performance-resources/what-to-wear.html

2. BRIEF DESCRIPTION OF THE END GOAL

The goal of our project is to suggest a suitable attire for a person from whatever clothes he/she gives as input and also on the occasion selected.

3. DESCRIPTION OF THE PROJECT

The basic idea of zeroing in on this project is because, most people usually get confused regarding what the attire should be for a particular occasion (say party, office, casual, marriage etc.). So, our project will be to help a person pick the right outfit based on the occasion. To achieve this, we will be building one model for each occasion. The number of occasions will be decided upon the availability of data and time. For each occasion, we will create a model by collecting positive and negative samples corresponding to that occasion which will help to train that particular model. A user must give the images of his or her clothes (which will form the test data), to the algorithm, which will classify these clothes based on the occasion for which it can be worn. When the user is going for a particular occasion, he or she can request a suitable outfit by mentioning the occasion to the algorithm. Then, the algorithm will pick suitable outfits from the test data and display to the user. An additional feature which can be built, is to request the user to input if the outfit displayed for the requested occasion is indeed suitable or not.

4. AREA OF INTEREST

Firstly, I will begin by working on suggesting an attire for women. This can be extended for male audience as well.

5. DATASET TO BE USED OR COLLECTED

A major component of our project is data collection and its appropriate categorization. We will use images from the dataset used in the paper titled ‘Apparel classification with style by Bossard et.al’ and also images from other online sources.

6. MAIN CHALLENGES

The major task is to collect sufficient data and categorize it for each occasion as relevant or irrelevant. Also, the required number of relevant samples for each occasion must be collected in order to have sufficient features to build each model correctly. The algorithm must be efficient enough to classify the input images into categories even when the size of the images is large. Generating and extracting the relevant features based on occasion is not straight-forward.

7. LEARNING OBJECTIVE

This project will be a great opportunity for us, to get hands on experience with various tasks, like data collection, building and training classifiers for different occasions, implementing the corresponding testing algorithms and taking feedback from the user to check the accuracy of our model.

8. DATASET USED TO TRAIN THE MODEL

I have collected data to train the model, Collected and classified data into 4 categories, “Party”, “Traditional”, “Jeans”, “Kurtas”. Collected 500 images each category.

Party:

party001.jpeg	Apr 2, 2017 at 5:02 AM	23 KB	JPEG image
party002.jpeg	Apr 2, 2017 at 5:02 AM	36 KB	JPEG image
party003.jpeg	Apr 2, 2017 at 5:03 AM	19 KB	JPEG image
party004.jpeg	Apr 2, 2017 at 5:07 AM	28 KB	JPEG image
party005.jpeg	Apr 2, 2017 at 5:07 AM	20 KB	JPEG image
party006.jpeg	Apr 2, 2017 at 5:07 AM	17 KB	JPEG image
party007.jpeg	Apr 2, 2017 at 5:04 AM	20 KB	JPEG image
party008.jpeg	Apr 2, 2017 at 5:09 AM	31 KB	JPEG image
party009.jpeg	Apr 2, 2017 at 5:04 AM	19 KB	JPEG image
party010.jpeg	Apr 2, 2017 at 5:09 AM	27 KB	JPEG image
party011.jpeg	Apr 2, 2017 at 5:09 AM	30 KB	JPEG image
party012.jpeg	Apr 2, 2017 at 5:10 AM	19 KB	JPEG image

Traditional:

saree001.png	Apr 2, 2017 at 5:03 AM	333 KB	PNG image
saree002.png	Apr 2, 2017 at 5:04 AM	350 KB	PNG image
saree003.png	Apr 2, 2017 at 5:05 AM	404 KB	PNG image
saree004.png	Apr 2, 2017 at 5:06 AM	234 KB	PNG image
saree005.png	Apr 2, 2017 at 5:07 AM	580 KB	PNG image
saree006.png	Apr 2, 2017 at 5:08 AM	313 KB	PNG image
saree007.jpg	Apr 2, 2017 at 5:09 AM	105 KB	JPEG image
saree008.jpg	Apr 2, 2017 at 5:09 AM	43 KB	JPEG image
saree009.jpg	Apr 2, 2017 at 5:10 AM	70 KB	JPEG image

Kurtas:

kurta001.jpg	Apr 2, 2017 at 5:22 AM	74 KB	JPEG image
kurta002.jpg	Apr 2, 2017 at 5:21 AM	9 KB	JPEG image
kurta003.jpg	Apr 2, 2017 at 5:22 AM	38 KB	JPEG image
kurta004.jpg	Apr 2, 2017 at 5:21 AM	9 KB	JPEG image
kurta005.jpg	Apr 2, 2017 at 5:22 AM	4 KB	JPEG image
kurta006.jpg	Apr 2, 2017 at 5:23 AM	134 KB	JPEG image
kurta007.jpg	Apr 2, 2017 at 5:23 AM	13 KB	JPEG image

Jeans:

9. ALGORITHM

As part of algorithm to classify images and label them, I had split the dataset using K-fold cross-validation. After taking the training and testing datasets used K-nearest neighbors' algorithm with Number of clusters as 4 as we are looking at 4 different classes here. Then each of the images are sent to extract features and keypoint detector objects using SIFT Classifier.

Once all the descriptors are vertically stacked, we compute the histogram of features. Then we perform TF-IDF vectorization and assigned weights to those one that is accuring more frequently. Then we perform predictions on the test dataset on the extracted features and each of these images will be labelled according to the prediction.

10. DESCRIPTION OF APPROACH

Feature Extraction

- In the initial stage, to extract the features from the image, we use SIFT description algorithm. It detects features from the images and describes each and every point with a descriptor that contains 128 numbers. It outputs the array of point descriptors.
- Then we build bag of features using the above implemented SIFT algorithm. This involves two steps: Obtaining the set of bag of features and then obtaining the bag of features descriptor for given image.
- Set of bag of features can be obtained by selecting a large set of images, applying SIFT on it, cluster the set of feature descriptors for the amount of bags we defined and train the bags with clustered feature descriptors using k means algorithm and then obtain the visual vocabulary.
- For obtaining the bag of features descriptor for a given image, we apply SIFT and match the feature descriptors with the vocabulary created in the above step.
- Then we build the histogram.
- FLANN matcher is used to match the descriptor with the vocabulary. The final output will be the bag of feature descriptor. We assigned labels for each image.

Modeling

- After building the dictionary and performing the training, we start testing the model. For this, we compute the feature points of the test image and try to classify it by using a KNN or SVM classifier.
- Then we predict if the image is office wear/party/traditional/casual wear.

11. RESULTS – CATEGORIES COULD BE ANYTHING

Positive Results:

Negative Results:

Accuracy of the model around 89%, as we wear few clothes for multiple occasions these accuracies might vary accordingly.

12. CONCLUSIONS

So, based on the inputs given to the model, if anyone gives their set of clothing and what occasion they like to wear it for, then when a person wants to go for a particular occasion and they ask “What should I wear? – our model will give out 5 options to choose from?”

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Article Link:
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Abstract:
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