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Use of Artificial Intelligence as an Assistant in Fashion Consulting

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Abstract. Several people have difficulty acquiring clothes. This is since she does not know her personal style. According to experts there are seven universal styles that are: Classic, Sporty, Contemporary, Romantic, Sexy, Creative and Dramatic. So, if a person cares about the image she is passing on to the world she needs a fashion consultancy. However, a fashion professional is not popular or as affordable, as it can be an expensive service for the end consumer. Therefore, this project aims to implement a platform where fashion professionals such as Fashion and Image Consultants offer the service. In addition to this modality the project will contain an intelligent agent that can be used as a fashion consultant. To training the artificial intelligence model data was collected through forms made available on the Internet and disseminated to certain populations such as schools and colleges. In this first phase, only 500 samples were obtained, and the model reached 95% accuracy, but it will be necessary to obtain a larger amount of data. After all, the identification of the correct style of a person is something complex, 248 characteristics were detected. In the next step will be collected more data and other machine learning models will be tested.

Keywords: Artificial Intelligence, Fashion Consulting, Fashion, Style

1. Introduction

Buying clothes is an activity that for many people goes beyond just covering the body and feeling comfortable, protecting you from climate change, or covering some parts for modesty. After all, through dress people transmit to the world their personal image loaded with information. To achieve the image that really wants to show is necessary self-knowledge about their personal style, because the person himself does not always have this knowledge.

According to studies, there are seven universal styles in the world, however, the set of two or three styles are used to characterize the person. Thus, the style of a certain person is identified by a unique set of inherent strengths and messages that sends to the world. Each individual belongs to a certain style because this is a stronger point, however, there are other secondary styles that characterize the person composing his main style [1].

The seven universal styles are called: Natural Sports, Traditional, Elegant, Romantic, Creative, Sexy, Urban Dramatic

Each of these styles has specific characteristics and is represented by clothing, shoes, and accessories of their own that convey a unique message. It is important to note that of the styles mentioned three are base and four secondary. Base styles: Natural Sporty, Traditional and Elegant. Whereas the secondary styles are: Romantic, Creative, Sexy and Urban Dramatic. The latter are called secondary because they are not fixed, depend on the spirit of the individual at a certain [2].

However, even in the face of the seven universal styles it is not simple to identify the correct style of a person. It depends on other factors, such as: biotype and intention. There are professionals capable of performing this task, which are the Fashion Consultants. They conducted extensive research until they arrived at the combinations of styles that best reflect the person as a whole: their attitudes, beliefs, way of being, way of life and even humor.

In addition to the Fashion Consultant, there is *also the Personal stylist,* who is another professional with the same characteristics, however, this professional aims to make the purchase for the client. Unlike the Fashion Consultant, who teaches the customer what their style is and which clothes are appropriate to their style, *the Personal stylist only* buys the pieces suitable for the customer's style.

However, not everyone can or does want to hire a Fashion Consultant or *Personal Stylist*. Thus, this project aims to create a fashion platform capable of offering virtual and /or real services. It will be a service where the customer can hire a virtual or real service. The virtual service will consist of an application endowed with artificial intelligence capable of identifying the style of the person and indicate clothes and accessories appropriate to their style. While the actual service is composed of fashion professionals able to perform various procedures such as: conversations, recordings to analyze the voice and behaviors, in addition to checking the image that the client wants to pass on to the world. In view of these elements, professionals can teach the customer what clothes and accessories are indicated.

In financial terms, the platform will greatly assist the consumer, because he will be very careful with his image in one place. You will pay for what is convenient and can choose between consulting carried out by intelligent software and / or by real professionals.
The software will use artificial intelligence (AI) and this technique can generalize when exposed to examples with their respective solutions (MITCHELL, 2011). An AI model can learn to recognize a person in a photograph through the computer vision technique, can respond with voice to questions through natural language processing, or identify whether there is fraud in a transaction, for example.

In the market were found two applications in the same segment, such as:

RosaRosa - is an image consulting application created to help women who want to learn how to dress better by connecting them with fashion experts from all over Brazil, making this task easy even with the rush of daily life [3].

Roupology – is an application that allows the exchange of information, opinions and tips from the *fashion world*[4].

There are dozens of apps in the virtual stores, but none of them have the same functionality as this project. Practically all aim to organize the clothes cabinet or combine pieces. The purpose of the proposed application is to identify what is the style of the person and to teach about which are the pieces that make up their style, so the consumer will really make good use without leaving at the bottom of the wardrobe until they decide to donate.

The main objective of this project is to implement a platform that enables fashion consulting carried out by professionals or by an intelligent agent who through a questionnaire will identify the style of the client. Identifying an individual's style has great complexity, 248 characteristics were found for AI analysis.

Secondary objectives:

- Implementation of the platform and database for registration and availability of fashion professionals.
- Generation of database containing information from multiple people for history generation for smart agent training.
- Implementation of functionality to perform data preprocessing.
- Implementation of machine learning algorithms to act on the data and generate an appropriate model for identifying styles.

2. Methodology

The process for implementing the project consists of a platform with professionals registered and exposed to hire customers. In this way, the project has two active parts, individuals, and intelligent agent (AI).

In this first phase, tests were carried out to build the intelligent agent. The database was generated from questionnaires made available on the Internet to collect responses from the public. The questions were extracted from the base book that explains the seven universal styles. In addition, it was included along with the images

issues to get more details of the styles, after all, usually people do not know your style. They mark one answer, but then contradict another. Figure 1 shows part of the questions sent to the public and figures 2 and 3 can be seen questions related to the style itself demonstrated in images:

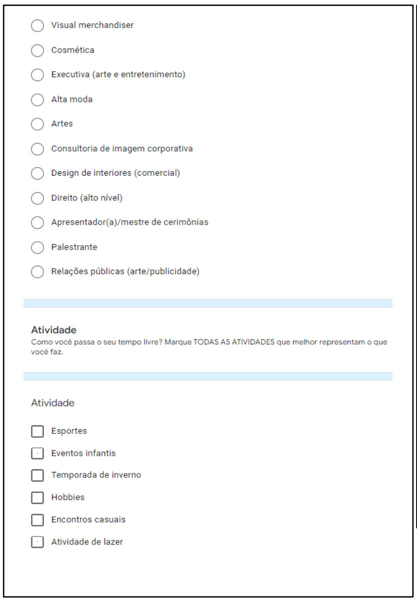


Figure 1: Questions sent to the public.
Fonte: autores

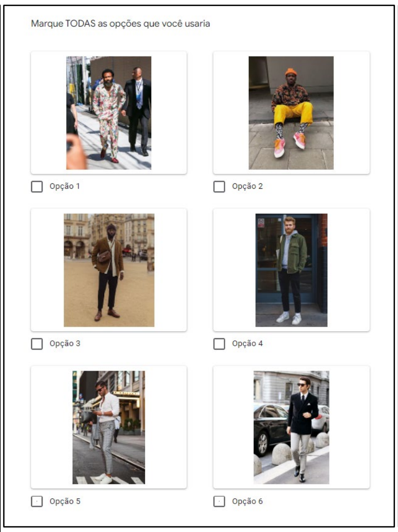


Figure 2: Images sent to the audience choose the style they like.
Source: authors

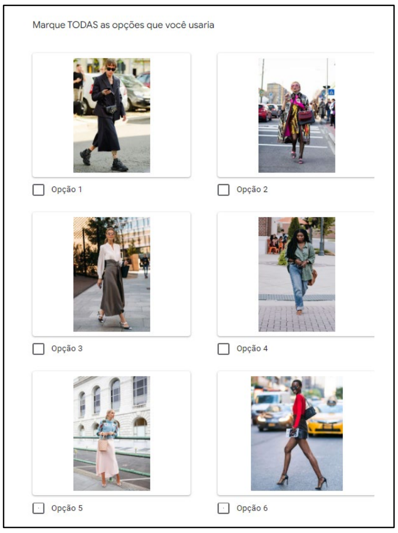


Figure 3: Images sent to the audience choose the style they like.
Source: authors

After data collection, a software was implemented to perform data preprocessing and organize in databases. Then the data were transformed to be used as historical for a neural network algorithm. Figures 4 and 5 show examples of collected and transformed data.

The data received through the questionnaires answered by the users were transformed. Figure 4 shows part of the responses transformed into zero (0) and one (1), where 0 indicates that the user did not mark it as a style characteristic, and 1 indicates that the user has marked the style.

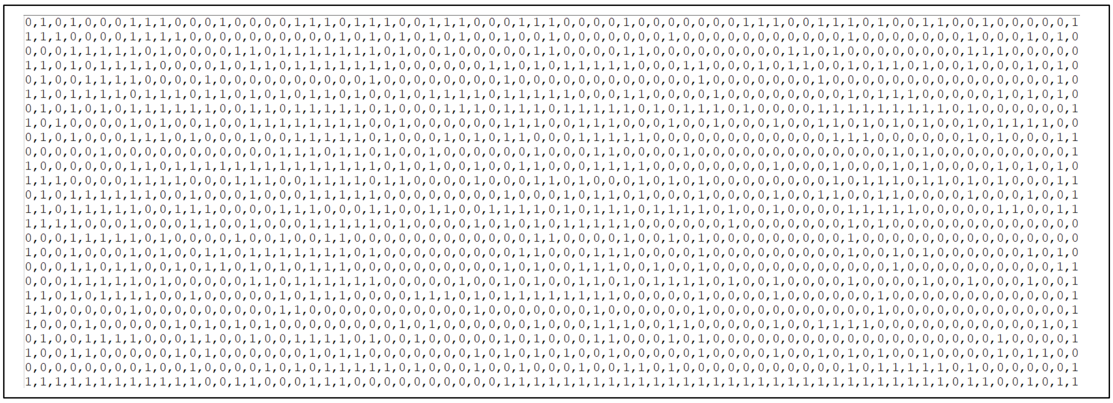


Figure 4: Part of the database file cleaned and transformed.
Source: authors

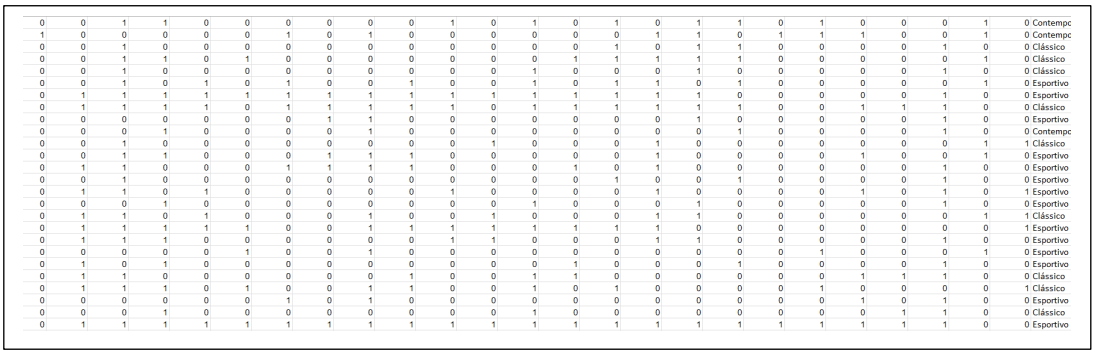


Figure 5: Part of the database file cleaned and transformed.
Source: authors

Figures 4 and 5 can be seen only part of the data since there are so many combinations that 248 columns of data have been generated.

3. Results

3.1 Using 80% for training and 20% for testing.

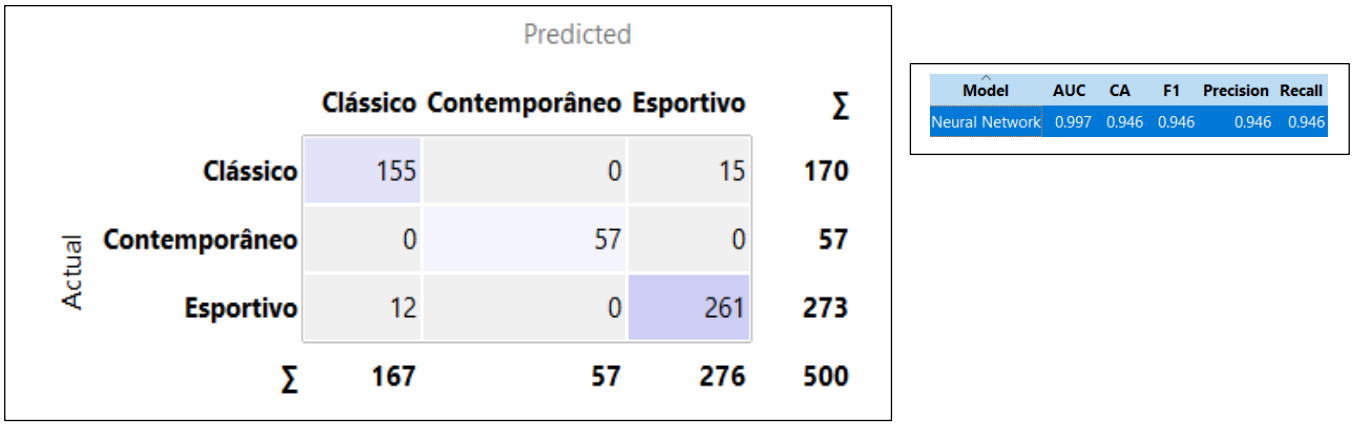


Figura 6: Matriz de confusão usando o modelo de rede neural MLP

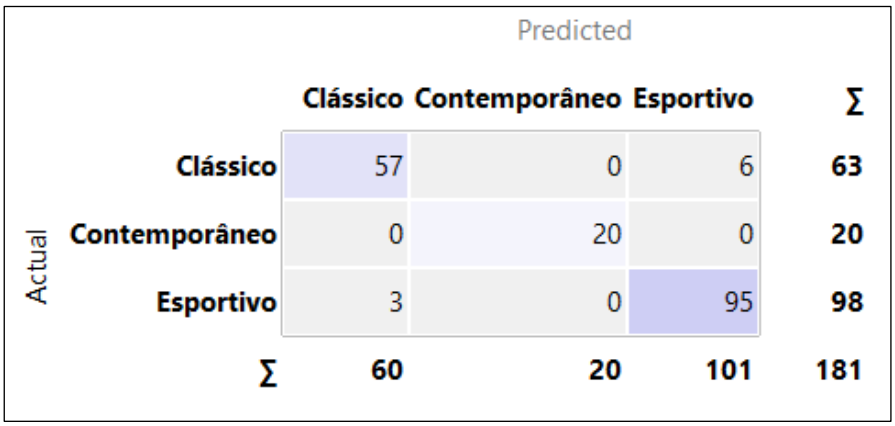
Although the amount is small, only 500 samples were used, it is noticed that the algorithm obtained 95% accuracy and AUC of 99%, as can be seen in Figure 6.

The confusion matrix in Figure 6 shows the result of the model classification. The model presented 500 samples with the answer to the 3 universal styles: Classic, Contemporary and Sports. Of the total, the model correctly classified 473 samples, i.e., 95% as can be visualized in the accuracy, F1, precision and recall metrics.

Classic style, 155 samples were correctly classified and 15 the model misclassified. This equates to 91% of the total samples of this style. From contemporary style the model correctly classified 57 samples 100% of the total. However, the Sports style contained 273 samples in total, the model correctly classified 261 and missed 12.

Of all the samples the model confused the Sports style with the Classic. Of the 273 samples corresponding to the Sports style, the model classified 12 as belonging to the Classic style, i.e., 4%. In addition, the model presented some confusion of the Sports style compared to the Classic. It is noticed that the model classified 15 of the 170 samples of the Classic style as being Sports, that is, 8%.

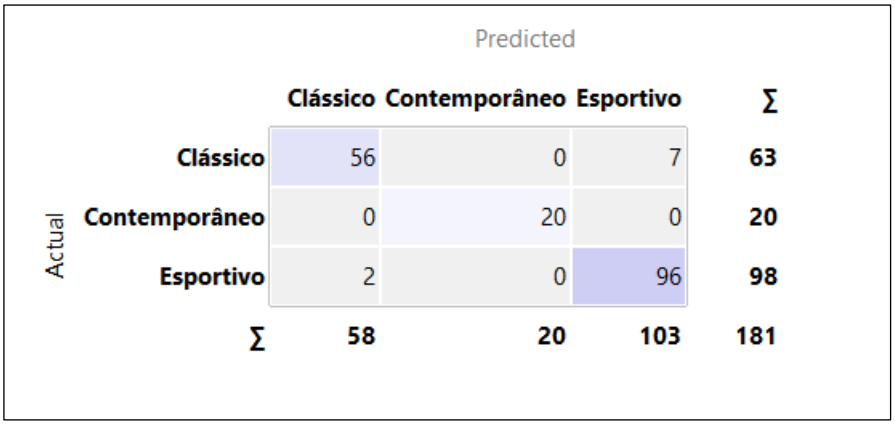
3.2 Using 5 folds



Model	AUC	CA	F1	Precision	Recall
Neural Network	0.997	0.950	0.950	0.950	0.950

Figure 7: Confusion matrix using the MLP neural network model

3.3 Using 10 folds



Model	AUC	CA	F1	Precision	Recall
Neural Network	0.996	0.950	0.950	0.951	0.950

Figure 8: Confusion matrix using the MLP neural network model using 10 folds.

In performing the tests of the Machine learning model using cross-validation, the model maintained similar accuracy to the previous tests. The number of incorrect ratings decreased for some styles and increased for others. For example, using 5 folds the wrong sports style rankings compared to the Contemporary were 3%. Using 10 folds the difference dropped to 2%.

4. Conclusions on the Database

No database was found appropriate to the problem. Therefore, in this first phase, public collection focused on schools and colleges was performed. It was noticed that the answers are not consistent implying that people mark often without commitment to the truth that she believes, just marks an option. And this impairs the learning of the model, in fact, such answers even the fashion professionals of this project were not able to classify.

Therefore, in the next step it will be necessary to identify other proposals to obtain the data. After all, the process is complex even for professionals. They usually use client images to assist in identifying the style, so they check behavior. In this project, it was decided that we would not use this artifact for the smart agent being available only to fashion and image professionals.

5. Conclusion

In this project, research was implemented to analyze the feasibility of using artificial intelligence (AI) to identify a person's personal style. In addition, the design of a platform where Image and Fashion Consultants could register to offer services to the population.

Thus, when accessing the platform, the client could choose between conducting a fashion consultancy using an artificial intelligence or a fashion professional.

Tests were performed to generate an AI model that could learn the seven (7) universal styles. As no available database was found was made form on Google to obtain information from potential customers. The form was made available for one month and received only 500 responses. To train an AI model you need a lot of data, and this challenge will be circumvented in the next step.

Due to the complexity of the problem, it is necessary to analyze various characteristics of a certain person. In this work, 248 characteristics were identified to point out a style. And it was decided that no images would be used in videos due to image rights. According to fashion professionals, the use of images to analyze behavior is essential to assistance determine the style of a certain person.

6. References

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