

# Intelligent Mannequin

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**Abstract** - Through Intelligent Mannequin System, it is now possible to engage the customer through a unique experience! This marketing platform helps the retail world to interact with their customers, offering targeted purchases.

*When you walk in a mall and you stop and stare at a model displaying a product, wouldn't it be amazing if they talked back to you? Thus this model is aimed at providing future benefits to the textile industries.*

**Key Words:** Mannequin, HaarCascade, Python, GTTS, Face Detection

## 1. INTRODUCTION

Nowadays how many clothes go to waste just because the market didn't like it? Everyday tons of clothing material is manufactured not knowing whether they will be used or not. Due to this large waste, huge losses are incurred by the store owners and resulting in shut down of various shops.[2]

## 2. BACKGROUND STUDY

According to a survey, consumers throw away shoes and clothing, an average of 32 kilograms per person, annually. About 85% of this material scrap goes to dumps and landfills where it consumes approximately 5% and increasing of land space. After oil, the clothing and textile industry takes the second rank as the largest polluter in the world.[5] As mentioned above, in today's world, so many clothing materials and products are being designed that no one really wears or utilizes. Instead how about you choose what kind of material you like and according to your feedback it will be given to you and an analysis will be made according to overall customer's response. That is the motto of this model "Intelligent Mannequin".

## 3. PROPOSED MODEL

In this paper, the proposed model is an Intelligent Mannequin system developed for store owners, focusing to the clothing product to be bought due to the market demand and easy to use as compared to others.

Thus the shopkeeper and eventually the designer would know about the effectiveness and impact of the product in the market and he would know if he/she has to make any changes in his marketing to increase his/her revenue.

A shopper needs to be within close range of a Smart Mannequin to start interacting. Additional information such

as product analysis, size and color options is just a number of ways to engage the consumer.

## 4. WORKING OF PROPOSED MODEL

The proposed model or solution is based on the face recognition and detection technique which is an important factor to achieve the goal. The mannequin/figure contains a camera to detect human presence for more than 5-10 seconds and then responds to the customer. This experimental app includes real-time face recognition and detection to detect the face when the user reads the text. HAAR Cascade Classifiers used for face detection followed by execution of primary component analysis algorithm for recognition of their faces. If a face is found, then GTTS (Google Text to Speech) will be activated and will ask a set of predefined questions. The user's response will be stored in a database(MySQL) using 'XAMPP' software and a copy of the conversation between customer and mannequin will be sent to the store owners email ID. The data entered into the database will be analyzed and plotted into graphs; with the help of a python library called 'numpy'; for convenient use of store owner.

## 5. COMPONENTS REQUIRED

- Mannequin
- Cameras with microphone
- Speakers
- Personal computer
- Anaconda IDE
- MySQL
- XAMPP

## 6. CONCEPTS USED

**Text To Speech:** Google Text-to-Speech is an interface between user application and operating system displayed on the computer screen. It allows applications to read out loud the text on the screen. Speech computer or rather we say speech synthesizer is used in hardware and software components. This is later on translated into speech with the help of this synthesizer. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood clearly. [6]

**Google Translate:** Google Translate is a machine translation service that offers an API which converts text between thousand of language pair. It offers an interface that helps developers create software applications. During a translation, it looks for patterns in millions of documents to help decide on the best translation. Google Translate would switch to a neural machine translation engine which translates whole sentences at a time, rather than just piece by piece. It uses this broader context to help it figure out the most relevant translation, which it then rearranges and adjusts to be more like a human speaking with proper grammar. [7]

### 7. FACE DETECTION

Face detection is a technology that detects and determines the sizes. It detects face features and ignores anything else, such as trees, buildings, and bodies. HAAR-like feature is utilized to encode and enhance contrast among different regions of the image. HAAR Cascade is a recognition process that is more efficient if based on the detection of features that encode some information about the class to be detected. Some of these features may be utilized to encode those exhibited by the human face. HAAR-like features are so called as they are calculated like coefficients. The process of face detection must detect the face first then cascade classifier which is available in OpenCV Library for the face detection.[1] Here are the steps how face recognition works. Compute the distance between the face and of the camera. Select the face that's closest to the camera. If the distance to that face is near or far text will automatically start, otherwise if face is not detected then it displays "0 faces found".



Fig 1: Face Detection using OpenCV

### 8. HAAR CASCADE

**HAAR Cascade Classifier** It is a classifier which is used for the detection of the object for which the system has been trained for based on the region of interaction between a classifier and a live image. The classifier is an image model. HAAR divides the image into subsections (refer Fig 2).

Cascade is a mechanism to find the region of interaction by applying the classifier. Faces were detected by using open source library of OpenCV which is HAAR-Cascade-Classifer. OpenCV is imported in Python using imagecv. If the face is detected and already stored in a database or a computer directory, then it activates GTTS and records the conversation. [4]

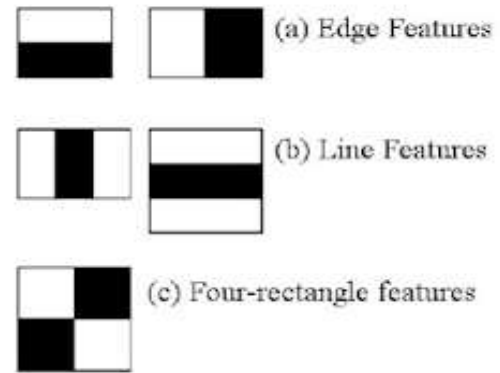


Fig 2: HAAR Cascade Classifiers

### 9. ADVANTAGES

- User friendly interface
- Gives evaluations of live users visiting offline stores
- Gives in-hand feedback of the product designed[3]
- Attract consumers and increase their interest in purchasing the given product.[3]
- Can be enhanced to create much more complex systems
- Allow interaction with visitors in stores, museums and much more creating pathways of augmented reality.

### 10. APPLICATIONS

- Fashion Designing businesses
- Mall kiosks
- Exhibitions
- Museums
- Large scale events and product launches

### 11. RESULT

Thus graphs are plotted (Refer Fig 3 and Fig 4) giving the data a proper scrutiny providing information as to which products must be manufactured according to market survey as to save on large textile production costs. In addition to this, the privacy of the customer is maintained as only general data is obtained not personal.

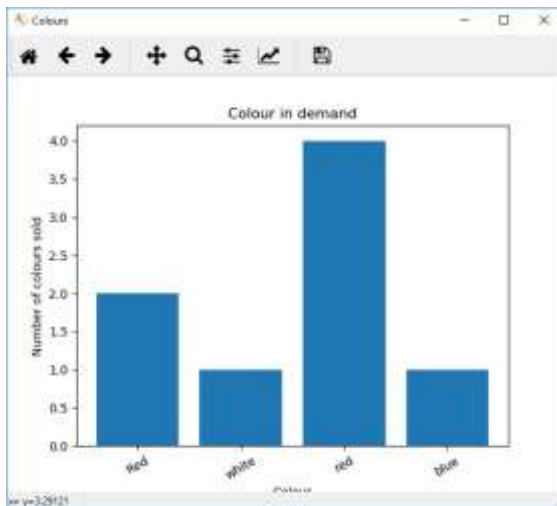


Fig 3: Required Colors Graph

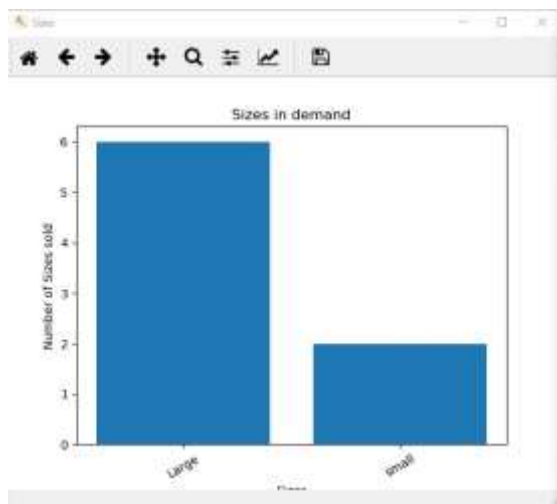


Fig 4: Required Sizes Graph

## 12. CONCLUSION

Our intelligent system will detect the user’s interest based on their input to the mannequin. This data is provided to the shop owners so that they can analyze and sell the targeted products into the market.

## 13. FUTURE SCOPE

The major goal for this product is that in the future, people will find an easy way to buy and sell customized products based on market survey. The users will be able to carry out all this in a secured and managed environment. It shall be easy for the administrator to handle the orders and sales processes. In the near future, these mannequins can be automated and equipped to handle large amounts of data and linked with software applications to increase consumer reach.

## 14. REFERENCES

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