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# Mall Loyalty: Application Built on AI System

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***Abstract:*** ***Every time we visit a mall, everyone has different purposes. Some visit for shopping of clothes, footwear, or even groceries while few visit for the purpose of eating in the food court. With the increase in the number of people who are moving towards online shopping, there is a need for a system that increases the footfall of people in shopping malls. Hence, we propose a system that works towards achieving this very goal. The project aims at creating a new kind of user experience for customers visiting shopping malls. As customers will be offered personalized service they will get attracted to the mall.***
***Index Terms: ML, dataset, Training Module.***

## I. INTRODUCTION

This system is basically when you enter the mall and you will find a machine. As you go in front of that machine it will recognize your face and if you are a first-time user you will be asked to register your face and give inputs such as your preferred shopping domain, favorite singer, age, and gender. And every time you visit the system again it will accordingly give the output as it will play your favorite singer's music and it will show offers of your liking. This system has a customized embedded OS with AI integrated into it. A software requirements specification (SRS) is a detailed description of a software system to be developed with its functional and non-functional requirements. The SRS is developed based on the agreement between customers and contractors. It may include the use cases of how a user is going to interact with the software system.

The software requirement specification document is consistent with all necessary requirements required for project development. To develop the software system, we should have a clear understanding of the Software system. To achieve this, we need continuous communication with customers to gather all requirements.

Like as now if we go to any mall mostly we get the same experience, so the motivation is to add some value to the particular mall.

We have implemented this system to improve customer loyalty and thus increase footfall in shopping malls. The Motivation behind this topic is to give a personalized experience to the customer with the emerging technologies which are new in the market and no one has ever seen them. Customized digital coupon issuance is a very important topic in online commerce. This is because maintaining existing customers is a more important business issue than acquiring new customers. Also, retaining existing customers is much more economically advantageous than acquiring new customers

## II. PROBLEM STATEMENT

Develop a customized embedded operating system with built-in Artificial Intelligence to achieve a facial recognition- based system that offers loyalty points and customized offers to the customers in the mall.

## III. LITERATURE SURVEY

### *A. Related Work*

In this system, face recognition is used for detecting the faces. For face recognition, there are different models available. Since the FaceNet model uses very less space to store the faces like it can store 10000 faces in only KBs. So a facenet model is used in our system.

### *B. FaceNet Model*

FaceNet model system, that directly learns a mapping from face images to a compact Euclidean space where distances directly correspond to a measure of face similarity. Once this space has been produced, tasks such as face recognition, verification, and clustering can be easily implemented using standard techniques with facenet embeddings as feature vectors.

This method uses a deep convolutional network trained to directly optimize the embedding itself, rather than an intermediate bottleneck layer as in previous deep learning approaches. To train, they have used triplets of roughly aligned matching / non-matching face patches generated using a novel online triplet mining method. The benefit of the approach is much greater representational efficiency: we achieve state-of-the-art face recognition performance using only 128 bytes per face.

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On the widely used Labeled Faces in the Wild (LFW) dataset, the system achieves a new record accuracy of 99.63%. On YouTube Faces DB it achieves 95.12%. The system cuts the error rate in comparison to the best-published result by 30% on both datasets. They also introduce the concept of harmonic embeddings, and a harmonic triplet loss, which describes different versions of face embeddings (produced by different networks) that are compatible with each other and allow for direct comparison between each other.

*C. Custom OS: Systems Challenges for AI*

With the increasing commoditization of computer vision, speech recognition, and machine translation systems and the widespread deployment of learning-based back-end technologies such as digital advertising and intelligent infrastructures, AI (Artificial Intelligence) has moved from research labs to production. These changes have been made possible by unprecedented levels of data and computation, methodological advances in machine learning, innovations in systems software and architectures, and by the broad accessibility of these technologies. The next generation of AI systems promises to accelerate these developments and increasingly impact our lives via frequent interactions and making (open mission-critical) decisions on our behalf, open in highly personalized contexts. Realizing this promise, however, raises daunting challenges. In particular, we need AI systems that make timely and safe decisions in unpredictable environments, that are robust against sophisticated adversaries, and that can process can ever -increasing amounts of data across organizations and individuals without compromising confidentiality. These challenges will be exacerbated by the end of Moore's Law, which will constrain the amount of data these technologies can store and process. In this paper, they have proposed several open research directions in systems, architectures, and security that can address these challenges and help unlock AI's potential to improve lives and society

## IV. CONCLUSION

We have built a system that uses the face of the user in the form of facial coordinates as the input and performs the respective functionality. This System is user-friendly and implicit in nature. It will improve the shopping experience of the user. The system generates appropriate responses relative to the input face thereby making it interactive and efficient.

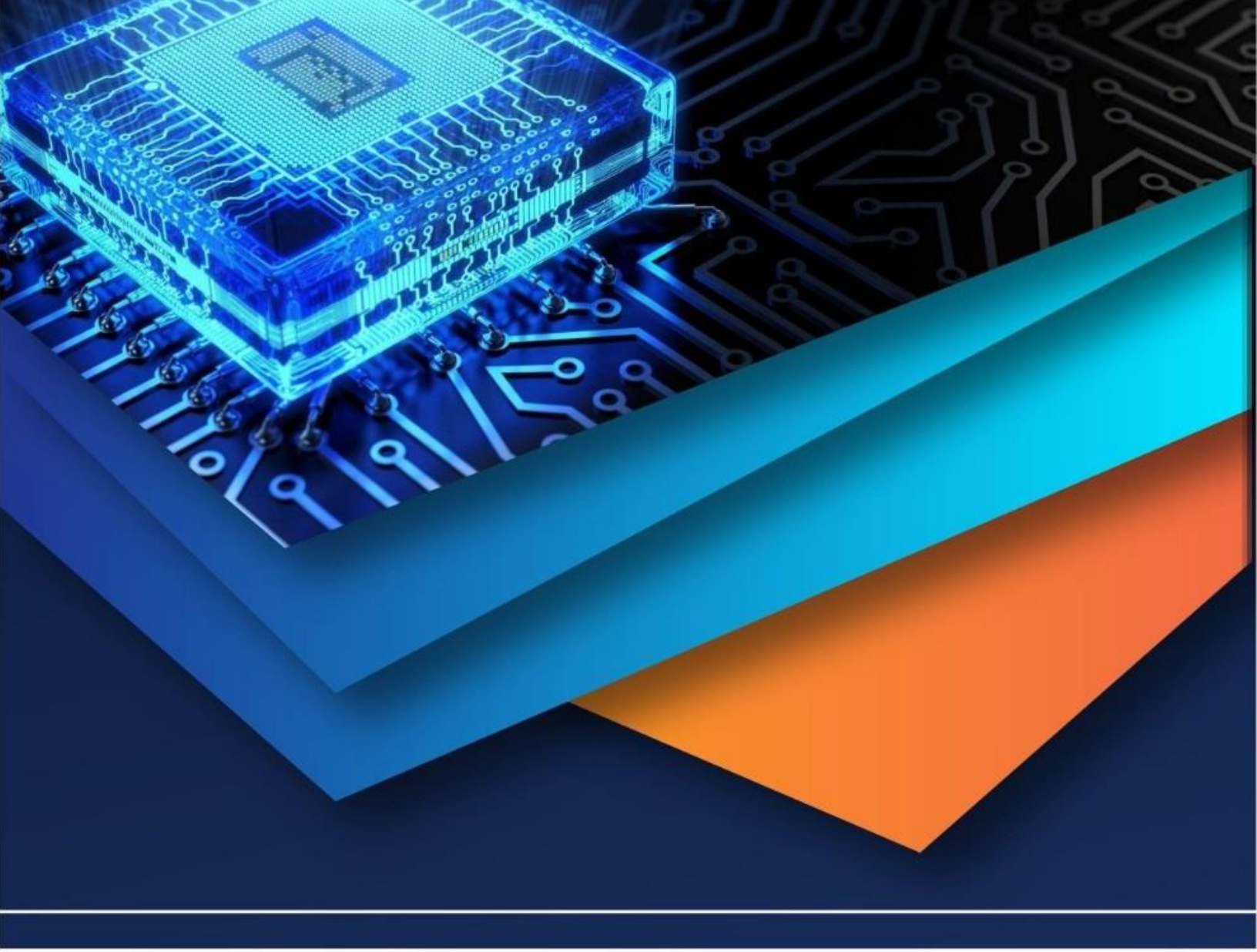
## V. FUTURE SCOPE

Integration of all hardware like keyboard, mouse, camera, board, and sounds into one touch screen system. We can update the AI module using Cloud. We can incorporate this system in the form of an Android application that will run only when connected to the Wi-Fi of the mall this will ensure that customer does not have to wait for the system to be free and use it from their personal mobile phones.

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