Chapter 13
Digital Transformation Required by the Brick and Mortar Retailers to be the Customers' Choice in the Post-COVID-19 Era

Sanjay Das, Soumen Santra, and Anirban Sarkar

Abstract The pandemic transformed consumer behaviour, emphasising safety and contactless shopping. To remain relevant, Brick and Mortar (B&M) retailers must innovate by integrating physical and digital experiences. This paper proposes the use of artificial intelligence (AI) to transform B&M retailers, enhancing their efficiency and appeal to modern consumers. The goal is to create a unique walk-in shopping experience that combines physical and digital elements. The study suggests several AI-based implementations. A machine learning-(ML)based K-means unsupervised learning algorithm to analyse customer data, including location and purchase patterns. The K-Nearest Neighbours (KNN) clustering technique guides prospects to nearby stores. An AI-based Voice Assistant (AIVA) at B&M stores to interact with customers, provide product information, and assist sales personnel in product demonstrations. A Satisfaction Assessment System (SAS) using AI to detect customer emotions through facial images upon leaving the store. Digital marketing communication (DMarCom) strategies based on SAS feedback to inform customers about products and services and address customer satisfaction levels. Implementing AI-based K-means clustering will help identify target customer segments. DMarCom efforts will create customer awareness through various digital channels. AIVA will enhance the purchasing experience by explaining product features, while SAS will assess customer satisfaction post-purchase. The data from SAS will be used to improve marketing strategies and customer interactions. By leveraging AI technologies such as clustering algorithms, voice assistants, emotion detection systems, and

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digital marketing communication, B&M retailers can enhance their efficiency, attract more customers, and ensure long-lasting engagement in a competitive market.

Keywords Virtual assistance · Clustering learning · Bot algorithms · Industry market 5.0 · Human-centric learning · Voice assistant · Emotion detection system · Digital transformation

13.1 Introduction

The COVID-19 pandemic significantly impacted many countries, including India. Businesses of all types were affected due to the restrictions imposed by the authorities, precautions advised by the medical organisations, and anxiety about contamination that developed among the people. To survive in that constrained situation, exploring alternative ways was undertaken at all levels to conduct the necessary activities. With the implementation of lockdowns and social distancing procedures, remote work became the standard mode for many sectors, including education, offices, and markets. Physical stores faced the challenge of survival because of loss of sales owing to reduced footfall accompanied by competition from e-commerce as the consumers turned to online shopping, finding it safer in all respects. Customers preferred to buy online to remain safe at home due to fear of the pandemic [7]. Thus, consumer behaviour has been transformed, safety has been prioritised, and contactless online shopping has been practised. Therefore, online buying frequency decreased during COVID-19 [6]. Consequently, the Brick & Mortar (B&M) stores started facing more severe competition from e-commerce. E-commerce operators have already conditioned their customers by offering a comprehensive product range at a competitive price, with the necessary information and convenience of 24 $\times$ 7 shopping. The impact of COVID-19 and offerings of e-commerce together placed a challenge of footfall, revenue, profitability and finally, survival in front of traditional B&M stores. B&M stores must re-establish relevance to today's prospects to survive and thrive in the competition. To support the B&M retailers who have been playing a significant role in society by providing service and generating employment, this paper has proposed a **digital transformation strategy** for these traditional retailers, implementing artificial intelligence (AI)-based tools to blend physical and digital experiences for ensuring an enjoyable and attractive shopping experience to their customers to achieve long-lasting engagement. While digital shift refers to the transition of business processes from traditional methods to digital ones adopting new technologies, digital transformation is a comprehensive process of redesigning the entire operational process and strategies leveraging digital technologies to improve profitability and enhance customer satisfaction through improved competitiveness. It is about a change shaped by developing a new digital business model employing digital technologies, which creates more value for the firm [18].

Objective: To propose a set of artificial intelligence (AI) systems and procedures that can be implemented at retail outlets to transform the B&M store into a preferred destination for today's prospects.

13.2 Review of Literature

13.2.1 With the spread of online, though physical B&M stores have undergone erosion of business, many have shown that combining stationary retail formats with an integrated online channel can be effective [16]. In the prevailing changed market scenario, realising that it would not be feasible for them to compete efficiently on the price or assortment front with online retailers, the retailers focus on customers' experience and engagement achieved because of the same. The authors also mentioned that B&M stores may succeed as a vital interaction point when customers use online and offline in a multichannel decision-making process.

13.2.2 Researchers have emphasised the potential of virtual reality (VR) for adopting this technology in marketing and retail sales. According to them, VR is believed to improve the customers' shopping experience at traditional B&M retail stores. Multiple interactive VR devices make it happen, so the viewers feel like they are navigating in a three-dimensional imaginary environment. To further enhance customers' experience, the authors have suggested deploying sound systems and haptic devices [21].

13.2.3 Researchers have stressed the importance of personalisation at physical stores in three stages: identification, implementation, and interaction. Identification is the starting point; at this stage, customers' preferences will be identified to offer a tailored marketing mix. The authors have recommended the implementation of technology-assisted human interaction with the active involvement of knowledgeable sales personnel, wherein AI can contribute to technology-based personalisation. During the process, the traits of the customers concerning their willingness to participate in personalisation must also be kept in mind [17].

13.2.4 Researchers have clarified that, as COVID-19 has changed multiple market parameters, retailers need to relook at the changed market needs and consider offering a system merging online and offline supported by the combination of cloud platforms and 4th-generation artificial intelligence (AI). According to the authors, this, along with technologies like big data analysis and machine learning, would help collect consumer behaviour data to offer their customers a unique shopping experience [10].

13.2.5 In the case of artificial intelligence (AI)-enabled voice assistant, empathy must be recognised as a core design element because families would respond better to the voice assistant when AI empathy is present. As these empathetic voice assistants are expected to assist prospects in decision-making, the stakeholders of the retail stores implementing them may

hope for higher selling efficiency. The authors have further suggested that AI agents should be enabled to understand users' perspectives when conducting marketing interactions [12].

13.2.6 Researchers have investigated business model innovation (BMI) supported by digital technology triggered by the challenges posed by COVID-19 to retailers operating in the food sectors. Based on digital technology-related activities initiated by Walmart and Carrefour, the authors proposed a BMI model to respond to the crisis and tackle long-term business opportunities. This study shows how innovative digital techniques can be adapted to reconfigure existing businesses in three steps: optimisation, transformation, and extension [11].

13.2.7 The researcher has presented that a "follow the digital" methodology is expected to help us adapt to volatile processes and unpredictable routines involving geographical networks framed by human and non-human agents. As per the author, digital technology has emerged as a critical commodity in contemporary life, impacting entities and their activities in social spaces and changing various things. As a result, digital technologies are constantly getting incorporated into identities and activities in society via interfaces like platforms, software, and hardware [9].

13.2.8 Researchers mentioned that, while COVID-19 had been profoundly impacting people in every activity of life, including working and eating, they conducted qualitative interviews of sixteen individuals in Germany to investigate the influence of the pandemic on food behaviour and understand the role of technology concerning food. It was found that COVID-19 brought changes in eating, too. This was done to understand the changes caused by the pandemic and to tackle human behaviour and normalcy in future pandemics [20].

13.2.9 Researchers revealed Amazon's endeavour in using Soft Innovation Resources (SIRs) for developing Advanced Digital Fashions (ADFs) with AI-oriented R&D. The authors mentioned Amazon's perfect timing of securing digital solutions in developing multiple ADFs, which was possible due to their advanced AI-based institutional system. Such parallel developments have been recommended to resolve the dilemma between the decline in productivity and the expansion of R&D (research and development) [19].

13.2.10 Researchers have explained "Market Shaping", mentioning that market shaping involves purposeful activities and operations competitors undertake to change the market. According to the authors, such market shaping can make the market decline, grow, or cause market resilience. The authors have clarified that it is essential for the competitors to understand the shaping of the market well and collaborate as required with other market players if required at critical times or at times of disturbances [2].

13.3 Methods

The digital transformation strategy proposed in this paper for the B&M stores encompasses artificial intelligence (AI)-based multiple systems along with digital marketing communication processes to attract the prospects to their shop for a novel and interactive shopping experience, which would be appraised by a Satisfaction Assessment System (SAS) for further improvement.

A judicious man–machine blend has been conceived as the theme of the digital transformation strategy for AI-enabled stores. The data about the customers captured and arranged by the store's personnel will be processed by an AI-based system. Interaction between artificial intelligence-based voice assistants (AIVA) will happen with the sales personnel and customers. Capturing human emotion would be done by an AI-based system. In contrast, the stakeholders of B&M stores would act on the result using DMarCom (Digital Marketing Commutation) for continuous improvement. Activities involved in the four processes of the entire system, along with the objective of the respective process, have been mentioned in Table 13.1 and shown in Fig. 13.1

13.3.1 K-Means Clustering

Potential prospects are identified and clustered using AI-powered K-means clustering to address them with appropriate marketing communication to inform them about the products and services available at the B&M store in their neighbourhood so that they are motivated to visit the store.

Details of the Process

Clustering is an unsupervised machine learning (ML) algorithm that organises and classifies different data points or clusters based on similarities or patterns. K-means clustering is used to group data points into clusters based on their features, where each data point belongs to the cluster with the nearest mean. Unsupervised ML teaches the computer to use unlabelled, unclassified data sets and enables its operation on raw data sets without supervision. The goal of clustering is to divide the population or set of data points into several groups so that data points belonging to a particular group are different from those of other data points present in another group, and both are comparable.

13.3.1.1 Algorithm for K-Means Clustering

Starting phase: The kth number of clusters should be selected. The initial centroids (the points that symbolise the centre of each cluster) should be chosen randomly for the kth cluster.

Table 13.1 Processes and the activities

Step	Process	Objective	Activity
13.3.1	K-means Clustering	Identify target segment customers to motivate them to visit the B&M store	Applying AI-powered K-means clustering, potential prospects are identified as target segments and clustered for addressing with appropriate marketing communication to update them about the products and services of the B&M store in their neighbourhood
13.3.2	AIVA	Delight customers by explaining product features in a human voice and responding to their queries	Artificial intelligence-based voice assistant (AIVA) at the B&M store would a) respond to the customers with the latest product information to create the desire to purchase and b) train the sales personnel on details of the products and the services
13.3.3	SAS (Satisfaction Assessment System)	Assessment of customers' satisfaction level based on the shopping experience	AI-based emotion detection system (EDS) would identify customers' emotional condition from the real-time image of the customer's face using DeepFace, a deep learning facial recognition system built on deep convolutional neural network (CNN) architecture. Customers' satisfaction levels will be assessed based on their emotional condition
13.3.4	DMarCom (Digital Marketing Commutation)	Customer engagement through digital marketing: Communicate with the customers before and after purchasing	Communicate with the customers through website, e-mail, phone, and social media as required: a. About products and promotional offers b. Services of AIVA c. According to the SAS output, the number of delighted customers should be maximised

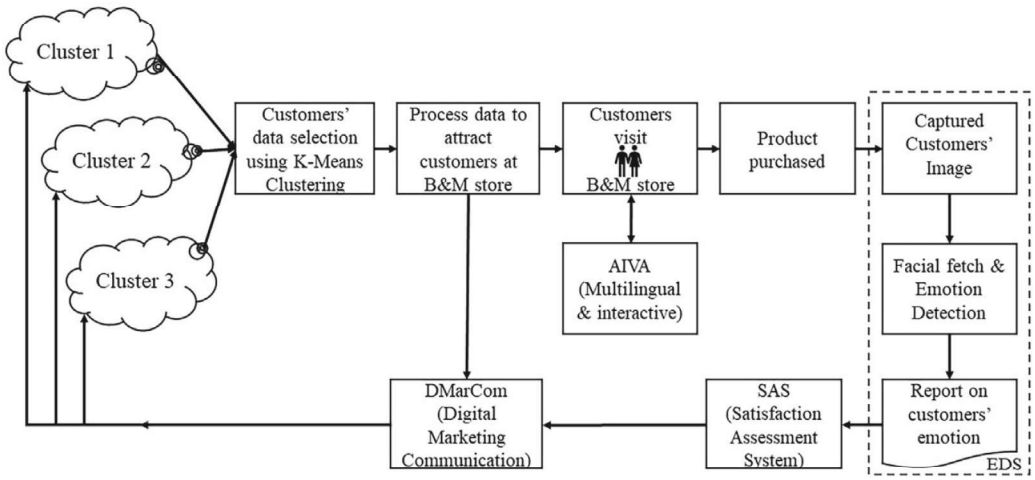

Fig. 13.1 Full system with AI-based processes and DMarCom

Centroid selection: Each data point should be assigned to the closest centroid. Thus, kth clusters are produced.

Update: The cluster centroids can be recalculated by finding the meaning of all the data points assigned to each centroid.

Iteration: The assignment and update processes will be repeated, and the centroid positions will be adjusted until they no longer undergo significant changes, or the allotted number of iterations is reached.

Finishing phase: The algorithm causes the clusters to stabilise when they converge, and no further changes occur in the assignments.

The Euclidean distance is used to measure similarity, and the algorithm categorises items into kth groups or clusters based on this measurement:

13.3.1.2 Implementation of K-Means Clustering in Python

```
Import numpy as np.
Import matplotlib. pyplot as plt
From sklearn. Datasets import make_ blobs
X,y = make_ blobs(n_ samples = 500, n_ features = 2,centers =
3, random_ state = 23)
fig = plt. Figure (0)
plt. grid(True)
plt. scatter(x[:, 0], x[:, 1])
plt. show()
```

With the help of the K-means unsupervised learning algorithm as above, the data on customers' details with their location will be analysed to create a graphical representation of their relative location around the B&M store.

13.3.2 Artificial Intelligence-Based Voice Assistant (AIVA) Would Receive the Requirements from Customers Directly as They Speak on a Microphone

AI-based automatic speech recognition (ASR) would convert speech to text and process the requirements to provide the output as shown in the Fig. 13.2. AIVA would be updated 24 × 7 through the cloud platform with the latest product information to be enabled to suggest the product that matches customers' requirements and explain its features, highlighting the specifications to create further interest driving toward conversion. The salesperson will give a live demonstration of the features narrated by AIVA, offering a close "Touch and feel" of the product to maximise the desire to purchase.

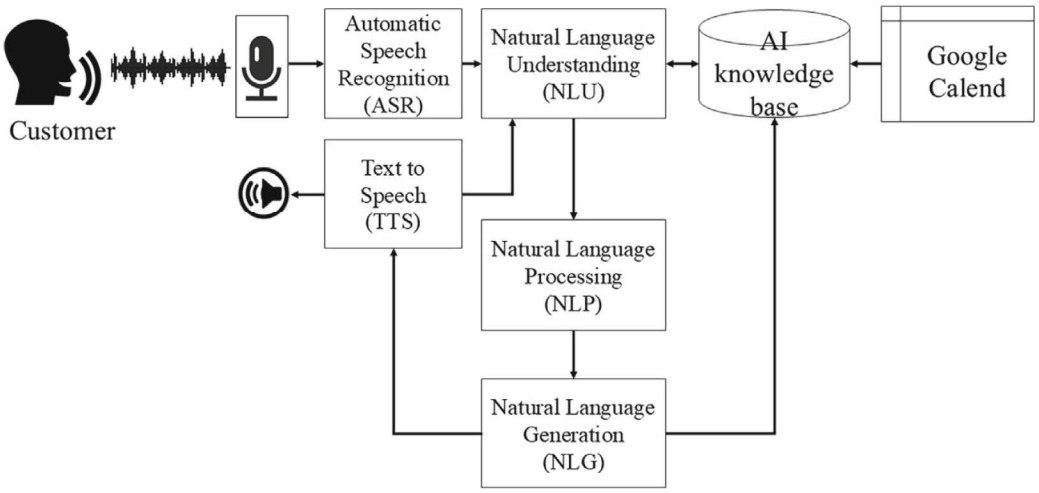

Fig. 13.2 Artificial intelligence-based voice assistant (AIVA)

The details of the AIVA methodology as follows:

13.3.2.1 Gathering and preparing data: To train models on various accents, tones, and speech patterns, then collect multiple voice samples. It can generate training datasets and translate customers' voice data into text. The data labels are normalised per the requirements and variety of customers. It follows entity extraction or intent recognition from the data.

13.3.2.2 Speech Recognition: It uses the technology of transformer-based architectures or Deep Neural Networks (DNN) to translate spoken language into text which can handle background noise, standardise audio signals, and accommodate various speaking enunciations.

13.3.2.3 Natural Language Understanding: Using the text as input from input device would ascertain the user's intention through intent recognition such as names, dates, and locations are to be recognised and taken from the text. To give logical answers, the context must be consistent across several exchanges.

13.3.2.4 Dialogue Management Policy: A subsequent course of action will depend on user input and context by creating rules or utilising machine learning. The conversation's status must be monitored to give pertinent answers and reminders.

13.3.2.5 Natural Language Generation: The system, i.e., NLG, generates natural language responses that resemble a human. The answers must be adapted according to the user's preferences and past exchanges.

13.3.2.6 Text-to-Speech (TTS): The system would interface with an American English text-to-speech engine. It is intended to develop engines that can convert across languages in future to increase the accessibility of text-to-speech systems, which can be further improved to make it a web-based real-time synthesis system models such as WaveNet or Tacotron must be used to translate written responses into spoken language. The voice

characteristics (such as pitch and tone) must be modified to fit various uses [14].

13.3.2.7 Coordination and Implementation: API Development: APIs to be provided to allow voice help to be integrated into other platforms and applications. The user interfaces that enable seamless voice interactions will be created. It must be ensured that the system is accurate, natural, and meets user needs by continuously testing and improving it.

13.3.2.8 Privacy and Ethics-Data Security: Ensure user information is safeguarded, and privacy issues are handled.

In the Fig. 13.3 the study has shown the mechanism of the model for AIVA. The operational procedure as below has been recommended-

13.3.2.9 Importing necessary Python Libraries: It has been used for speech recognition, text-to-speech conversion, playing songs on YouTube, to get the current time and fetching information from Wikipedia.

13.3.2.10 Initializing Speech Recognizer and Text-to-Speech Engine: It initializes a speech recognizer and a text-to-speech engine ('engine') using 'pyttsx3'. It also sets the voice for the assistant.

13.3.2.11 Defining Functions: A function that speaks the provided text using the text-to-speech engine to capture the voice input from the user using a microphone and returns the recognized command. The primary function processes the user's voice command and performs actions based on the recognized commands.

13.3.2.12 Voice Input Processing: It would be capturing voice input using the microphone. It uses to listen and recognize the voice using Google's speech recognition. The function would process the command and perform actions based on specific keywords in the command. If the command contains 'play,' it assumes the user wants to play a song on YouTube. If the command contains 'time,' it fetches the current time using 'datetime.' If the command contains 'what is,' it fetches information about the specified topic using Wikipedia.

13.3.2.13 Main Execution: The main block initializes the assistant by greeting the user and continuously listens for the user's commands using a 'while' loop which processes each command and takes appropriate actions.

13.3.3 Satisfaction Assessment System (SAS)

Assessment of customers' satisfaction level is essential in any business to ensure continuous improvement. B&M stores are being recommended to improve-related and service-related attributes, which is expected to impact customer satisfaction positively [5]. Enhanced customer satisfaction can lead to customer retention through repeat purchases [1]. A decent in-shop experience, even without conversion, sows the seed of desire for future purchase. Hence, it would be prudent to assess the level of satisfaction and utilise the feedback information for further improvement.

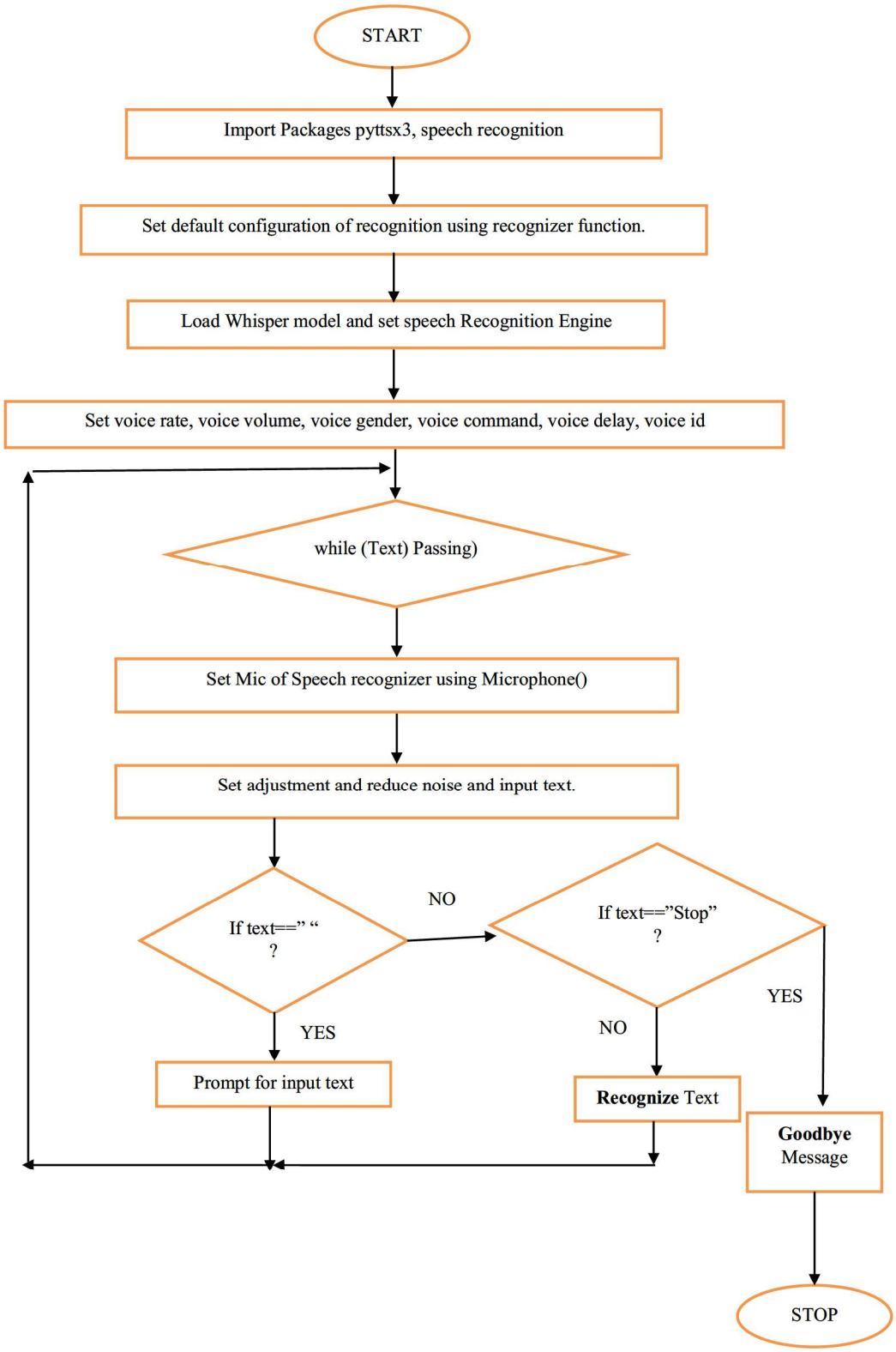

Fig. 13.3 Flow chart of the model for AIVA

Traditional practices of assessment of customers' satisfaction involved interaction over the phone and e-mail. But in the case of communication made by human beings, only 7% is conveyed by uttered words, 38% by voice intonation, and a significant 55% gets communicated by facial expression [13]. That is why an AI-based emotion detection system (EDS) has been proposed for the B&M retailers in this paper, wherein customers' real-time emotional condition while leaving the store would be ascertained by the system, which will indicate the level of satisfaction attained by the customer through the in-shop experience. The effect of satisfaction on a human being is expected to reflect on the face. That is why the facial image of the customer would be captured to identify the emotional condition and, thereby, the customer's satisfaction level. Taking the image of the face as an input, emotion would be detected by deploying machine learning with a Python programming model using Google Colaboratory. The system would consider the parameters below to ascertain the emotional states-

a. Facial expressions.
b. Eyebrow shape detection.
c. Shape of eye blob detection.
d. Shape of mouth blob detection.
e. Forehead's folds detection.
f. Dispersion of different face components.

The model proposed would point at one of the following seven emotional states of the customer to indicate the emotional condition depending on the parameters above–

i. Neutral
ii. Happy
iii. Surprise
iv. Disgust
v. Fear
vi. Anger
vii. Sad

DeepFace, a facial recognition system originated by Meta, would be deployed based on Convolutional Neural Networks (CNN) architecture. For the classification of images, Convolutional Neural Networks (CNN) are among the algorithms that are mainly used [4] Click or tap here to enter text.

The steps recommended for EDS are as follows:

Step I: Import all dependencies to make the real-life application. "DeepFace" is the lightweight main framework for face recognition and facial attribute analysis. Its accuracy level is approximately 97%. The two most significant imported library files are:

The "OpenCV" library is used for image processing and finally.

"Matplotlib" is used for data visualisation and graphical plotting.

Step II: Import the "IPython.display" module, which is used to write JavaScript to get permission for the camera from the browser. An alert box will appear, asking for permission from the user to access the device camera.

Step III: Import the "google. colab. output" module, which is used for interacting with the output interface of the colab cell.
Step IV: Import "base64" to encode binary files, such as images, videos, etc., within the scripts.
Step V: The model has to ask for the user's permission to take the user's image, which will be saved for further analysis in Google Colaboratory.
Step VI: The captured image can be processed and converted into BGR or RGB using OpenCV's cv2 module.
Step VII: The image must be plotted using the matplotlib library to use in DeepFace for further facial analytical functionalities.
Step VIII: The image must be analysed using the DeepFace pre-trained model to get emotional analytics using the abovementioned seven parameters. Only the dominant or the highest-scored emotional parameter will be considered the current user's emotional state.

13.3.4 Digital Marketing Communication (DMarCom)

B&M retailers need to have a digital face for their customers to match the consumer behaviour modified by the digital shift. Therefore, as a part of the "Digital Transformation Strategy", the B&M stores need to adopt "Digital Marketing" involving the actions recommended below-

a. Website—to be launched offering virtual visits to the stores covering product and service details.
b. E-mail marketing: E-mails should be sent to the
    I. Prospective target segment customers identified through K-means clustering to create awareness about AI-based services like AIVA along with the details of products, their prices and related promotional offers.
    II. Customers found to be 'Happy' in SAS are congratulated for enrolling them in loyalty programs.
    III. For customers not found as 'Happy' in SAS, the reason for dissatisfaction is to be identified as offering a product or service through special offers.
c. Content Marketing: Contents depicting AIVA in action should be uploaded to YouTube.
d. Social Media Marketing (SMM): Synergy of Integrated Marketing Communication (IMC) should be achieved by spreading selected content through social media.
e. WhatsApp: The concise version of e-mail should be sent to customers by WhatsApp for faster response regarding promotional offers and customer feedback.

Digital transformation that the traditional B&M stores are recommended to undergo needs to be customer-oriented, for which the digital payment system using a Unified

Payments Interface, i.e., UPI, should be implemented. UPI payment has become a common feature of B&M stores in India and is expected to overtake cards and internet banking in future [8]. The availability of the QR code (or Quick Response code) in the store for payment shows the "Digital Literacy" of the store authority, indicating that they understand and acknowledge the prevailing digital awareness in society. UPI payment system, therefore, must be made available at the B&M stores along with card payment so that the customers who have already gotten tuned to online payment post-COVID-19 period are encouraged to visit.

13.4 Result and Discussion

13.4.1 Result-K-Means Clustering

Customer locations are graphically represented in the scatter plot using Euclidean distance, showing the clustering of customers by location around the centroid.

Figure 13.4 shows the cluster formation of data from the imported dataset, for which the following algorithm has been used.

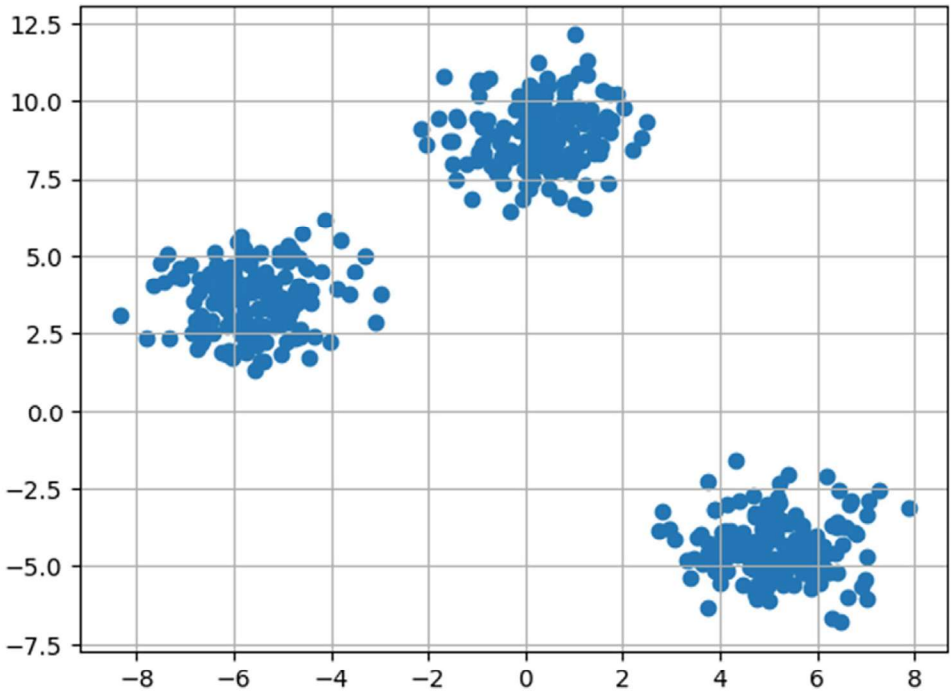

Fig. 13.4 Cluster form of customer segmentation data using K-means

Fig. 13.5 Cluster form of customer segmentation data with centroid using K-means

```
kmeans=KMeans(n_clusters = 3)
kmeans.fit(x)
y_kmeans = kmeans.predict(x)
plt. grid(True)
plt. scatter(x[: , 0], x[: , 1],c=y_kmeans,cmap='viridis')
centers = kmeans.cluster_centers_
plt.     scatter(centers[:     ,     0],     centers[:     ,
1],c='black',alpha=0.5)
plt. show()
```

In Fig. 13.5, centroids of each cluster are shown by which the model would predict the concentration of willing **customers of the products.**

13.4.2 Result-AIVA

AIVA would provide results in the following areas:

a. **Responding to customers**: Reply in human voice with the latest updates to the voiced queries of the customers visiting the store.
b. **Support salespersons** during product demonstration: Salespersons could utilise AIVA output to endorse their explanation during in-shop demonstrations to convince their prospects of efficient conversion.

c. **Digitally empowered**: Influenced by the COVID-19-triggered "Digital shift" of consumer behaviour, many of today's customers prefer to interact with technically updated entities. B&M stores, in the presence of AIVA, would potentially be their preferred destination.
d. **Reply to the competition of e-commerce**: AIVA would be a reply on behalf of B&M retailers to the information availability at e-commerce sites.
e. **Product training of the sales personnel**: The sales personnel can be done efficiently utilising the AI-enabled exhaustive knowledge base of AIVA and its ability to provide voiced responses to the questions asked. The training activity can be scheduled during off-peak hours and weekly holidays or according to the availability of salespersons. The quality of content and delivery will remain at its best. The absenteeism and turnover of trained salespersons, which have been an operational challenge for the stores for ages, could be mainly mitigated by implementing AIVA.
f. **Enhance footfall** of prospects and customers: B&M stores could position AIVA as a point of attraction for the prospects and a USP (Unique Selling Proposition) for the store.

13.4.3 Result-Satisfaction Assessment System (SAS)

The AI-powered emotion detection system (EDS) model proposed for the B&M stores would ascertain the satisfaction level of the customers from their facial image captured on the verge of leaving the store. AI-based analysis of the captured face image would reveal the customer's feelings. By focusing on customers' real-time [4] emotions resulting from in-shop experience, the B&M store authority could project a "Human Face" on behalf of the store. Such an approach of expressing concern for the customers' feelings, which is missing in the case of e-commerce retailers, would provide a competitive edge for the B&M retailers. EDS would identify the dominant emotion in the customer's face and point at one of the seven emotional states, i.e., Neutral, Happy, Surprise, Disgust, Fear, Anger, and Sad, that the AI-based system can reveal.

Actions recommended for the B&M stores for customers with different emotional states, i.e., Neutral, Happy, Surprise, Disgust, Fear, Anger, and Sad, as detected by EDS, have been mentioned in Table 13.2. Considering the level of satisfaction or dissatisfaction that might have caused the emotion, scores ranging from 1 to 7 on the Likert scale have been assigned to each emotion type for the Satisfaction Assessment System (SAS). The Likert scale is a functional tool for studying emotions [15]. In the Likert scale used for SAS, seven would indicate the highest satisfaction corresponding to the emotional status 'Happy ', and one would indicate maximum dissatisfaction corresponding to the emotional status 'Disgust'. Customers flagged with emotion type "Neutral' would be considered neither satisfied nor dissatisfied and therefore assigned a score of 3. Mapping of balance emotional conditions,

i.e., 'Surprise,' 'Anger,' 'Fear', and 'Sad' with the scores have been mentioned in Table 13.2.

Happy customers are the strength of any store, and these customers need to be consistently approached with attractive offers to ensure repeat purchases. Customers recorded with the emotions' Surprise,' 'Fear', and 'Neutral' are considered opportunities. Hence, their needs are to be explored to offer an appropriate value proposition to engage them. Cases flagged with emotion type' Anger' are to be treated as 'threat' as these customers might shift to other retailers. They are to be contacted with care to understand the reason for their anger and resolve it to their satisfaction. Similar would be the situation for customers flagged with emotion types 'Disgust' and 'Sad' whose perception is the result of weakness of the B&M store. For these cases, a detailed "Root cause analysis" involving the customers would be necessary, and a personalised service with suitable promotional offers will be provided as a retention measure.

13.4.4 Result-Digital Marketing Communication (DMarCom)

DMarCom would be working toward customer engagement in two stages, as shown in Fig. 13.1. In the first stage, the result achieved by DMarCom can be assessed by the count of footfall that could be generated by the marketing communication sent to the target segment about products details and usage of AIVA. In the second stage, DMarCom is utilised to communicate with customers with different emotions, thereby contrasting satisfaction levels to create and maintain the bonds for maximising retention. While the B&M retailers would communicate with the customers through e-mail, WhatsApp or SMS, and social media, inviting them to the stores with personalised promotional offers, they would also draw their customers' attention toward the "Digital Maturity" they attained. Digital maturity evaluates an organisation's ability toward creating value by implementing digital technology [3]. As digital consumer behaviour was found to be a result of the COVID-19 digital shift, the "Digital Maturity" shown by modernised B&M stores are likely to be appreciated by today's customers.

13.5 Conclusion

E-commerce sites offer information and convenience to draw customers. AI-powered B&M stores would provide information through AIVA in a human–machine-blended mode and the opportunity to "Touch and feel" the products. The explanation and personalised advice of experienced salespersons will further support this. The synergistic effect of all these facilities is expected to create an environment conducive

Table 13.2 Actions recommended based on emotions detected

Emotion detected	Emotion type	Score assigned	Flag	Approach	Action required
Happy	Completely satisfied	7	Strength	Congratulate	Offer enrolment in the loyalty programme and invite attendees to events, such as gift/free home delivery of high-value orders
Surprise	Mostly satisfied	6	Opportunity	Explore	Communicate over E-mail & WhatsApp to understand what was liked most and what needs to be done to make that even better
Fear	Somewhat satisfied	5	Opportunity	Explore	Communicate over E-mail, WhatsApp, or SMS, seeking suggestions to improve
Neutral	Neither satisfied nor dissatisfied	4	Opportunity	Explore	Contact over WhatsApp/SMS to understand the areas of likes and dislikes
Anger	Somewhat dissatisfied	3	Threat	Explore	Discuss in person over the phone to understand the details of experience and offer promotional benefits like discount or free WhatsApp order delivery

(continued)

Table 13.2 (continued)

Emotion detected	Emotion type	Score assigned	Flag	Approach	Action required
Sad	Mostly dissatisfied	2	Weakness	Root cause analysis	Discuss in person over the phone to understand the details of experience and offer promotional benefits like discount or free WhatsApp order delivery
Disgust	Completely dissatisfied	1	Weakness	Root cause analysis	Call to reconfirm the feeling and promise to offer escorted shopping on the next visit

enough for making purchase decisions. Thus, K-means clustering, AIVA, and SAS are expected to trigger a reverse churn that would motivate customers to move toward B&M stores, again turning away from e-commerce. Customers are to be informed about capturing their image and the reason for the same assuring them about privacy. With the implementation of AI-based systems proposed in this paper along with digital marketing communication, the Brick-and-Mortar stores are expected to effectively draw the attention of today's prospects, many of whom have undergone a change in consumer behaviour owing to the "Digital Shift" triggered by COVID-19.

References

1. Aityassine, F. L. Y. (2022). Customer satisfaction, customer delight, customer retention and customer loyalty: Borderlines and insights. *Uncertain Supply Chain Management, 10*(3). https://doi.org/10.5267/j.uscm.2022.3.005
2. Beninger, S., & Francis, J. N. P. (2021). Collective market shaping by competitors and its contribution to market resilience. *Journal of Business Research, 122*. https://doi.org/10.1016/j.jbusres.2020.09.005
3. Boston Consultancy Group. (2024). *Digital Maturity*. Digital, Technology, and Data. https://www.bcg.com/capabilities/digital-technology-data/digital-maturity
4. Chiurco, A., Frangella, J., Longo, F., Nicoletti, L., Padovano, A., Solina, V., Mirabelli, G., & Citraro, C. (2022). Real-time Detection of Worker's Emotions for Advanced Human-Robot Interaction during Collaborative Tasks in Smart Factories. *Procedia Computer Science, 200*. https://doi.org/10.1016/j.procs.2022.01.388

5. Daultani, Y., Goyal, K., & Pratap, S. (2021). An empirical investigation of the relationship between store attributes and customer satisfaction: A retail operations perspective. *Operations and Supply Chain Management, 14*(1). https://doi.org/10.31387/oscm0440289
6. Dinesh, S., & MuniRaju, Y. (2021). Scalability of e-commerce in the covid-19 era. *International Journal of Research -Granthaalayah, 9*(1). https://doi.org/10.29121/granthaalayah.v9.i1.2021.3032
7. Jílková, P., & Králová, P. (2021). Digital consumer behaviour and eCommerce trends during the COVID-19 Crisis. In *International Advances in Economic Research, 27* (1). https://doi.org/10.1007/s11294-021-09817-4
8. Kumar, A., Choudhary, Kumar, R., Mishra, S. K., Kar, S. K., & Bansal, R. (2022). The growth trajectory of UPI-based mobile payments in India: enablers and inhibitors. *Indian Journal of Finance and Banking*. https://doi.org/10.46281/ijfb.v11i1.1855
9. Liu, C. (2024). Follow the digital: Methodological thoughts on doing everyday geographies in a digital world. *Digital Geography and Society, 6*. https://doi.org/10.1016/j.diggeo.2024.100079
10. Lu, H. P., Cheng, H. L., Tzou, J. C., & Chen, C. S. (2023). Technology roadmap of AI applications in the retail industry. In *Technological forecasting and social change* (Vol. 195). https://doi.org/10.1016/j.techfore.2023.122778
11. Mancuso, I., Messeni Petruzzelli, A., & Panniello, U. (2023). Innovating agri-food business models after the Covid-19 pandemic: The impact of digital technologies on the value creation and value capture mechanisms. *Technological Forecasting and Social Change, 190*. https://doi.org/10.1016/j.techfore.2023.122404
12. Mari, A., Mandelli, A., & Algesheimer, R. (2024). Empathic voice assistants: Enhancing consumer responses in voice commerce. *Journal of Business Research, 175*. https://doi.org/10.1016/j.jbusres.2024.114566
13. Mehrabian, A. (2017). Communication without words. In *Communication Theory: Second Edition*. https://doi.org/10.4324/9781315080918-15
14. Mukherjee, P., Santra, S., Bhowmick, S., Paul, A., Chatterjee, P., & Deyasi, A. (2018). Development of GUI for text-to-speech recognition using natural language processing. *2018 2nd International Conference on Electronics, Materials Engineering and Nano-Technology, IEMENTech 2018*. https://doi.org/10.1109/IEMENTECH.2018.8465238
15. Nicoara, N. D., Varga, D., Voita-Mekeres, F., Galea-Holhos, L.-B., Andreescu, G., & Costas, L. (2023). Study of basic emotions in the general population using the likert scale. *Pharmacophore, 14*(4). https://doi.org/10.51847/tjyoah1vwm
16. Reinartz, W., Wiegand, N., & Imschloss, M. (2019). The impact of digital transformation on the retailing value chain. *International Journal of Research in Marketing, 36*(3). https://doi.org/10.1016/j.ijresmar.2018.12.002
17. Scholdra, T. P., Wichmann, J. R. K., & Reinartz, W. J. (2023). Reimagining personalization in the physical store. *Journal of Retailing, 99*(4). https://doi.org/10.1016/j.jretai.2023.11.001
18. Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research, 122*. https://doi.org/10.1016/j.jbusres.2019.09.022
19. Watanabe, C., Akhtar, W., Tou, Y., & Neittaanmäki, P. (2021). Amazon's initiative transforming a non-contact society - Digital disruption leads the way to stakeholder capitalization. *Technology in Society, 65*. https://doi.org/10.1016/j.techsoc.2021.101596
20. Weber, P., Ludwig, T., & Michel, L. K. (2023). The role of technology use in food practices during the COVID-19 pandemic. *International Journal of Gastronomy and Food Science, 31*. https://doi.org/10.1016/j.ijgfs.2023.100687
21. Xi, N., & Hamari, J. (2021). Shopping in virtual reality: A literature review and future agenda. *Journal of Business Research, 134*. https://doi.org/10.1016/j.jbus

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