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Review of Smart Office Assistant

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Abstract:- AI is playing major role in every field now a days and have become widely accepted in our society than traditional methods. The Smart Office Assistant is an intelligent system made to automate office environment in which employee attendance tracking and visitor management in offices can be done. Using web cam face recognition is done for people entering the office, for employees greeting is done by calling the name also their check in time and attendance is marked. For unrecognized faces it acts as a smart receptionist, which can handle appointment bookings and provide general office information for unfamiliar visitors through a chatbot interface. The Smart Office Assistant is for offices of all sizes and of various fields. Automating the office enhances the overall workplace experience, ensuring secure and efficient interactions for both employees and visitors. It takes more time for employees to manually sign in. Also visitors can easily book meetings or get information without anyone's help using this technology. It helps to reduce administrative workload and staff can focus on more important tasks. To conduct this literature review of papers, we narrowed down the following areas relating AI-driven Smart Office Assistants; face recognition for attendance, Chatbot systems for visitor, integration of Artificial Intelligence in offices. The following databases were used: IEEE Xplore and Google Scholar; keywords included "AI office automation," "face recognition attendance," and "chatbot visitor management."

Keywords:- *Automate, Employee Attendance Tracking, Visitor Management, Facial Recognition, Appointment Booking, Chatbot Interface, Personalized Interaction.*

I. INTRODUCTION

In this digital age, efficient office management has become a top priority for all organizations to improve productivity. Employees, employers, customers, and visitors may enter and leave an office. It is important to keep track of people enteringand leaving the office and to classify how important each per- son is to the organization. Our project 'smart office assistant ' is a system that integrates face recognition technology with an Identify applicable funding agency here. If none, delete this. intelligent chatbot to improve user experience and productivity.This paper focuses on achieving user identification, attendance management, and query handling, offering a personalized and interactive experience for users. Upon arrival at the office, the system detects and recognizes the user's face. If the useris already registered (registered members include employee and employer), the system identifies the user and greets the user by name. It also marks the attendance of entries in the database. If an unfamiliar face is detected, the system will provide a chatbot to tend to users' needs. The chatbot asks queries to the user and books appointments if necessary. When the recognized user exits the office, his/her face isagain detected and recognized to mark attendance of exit. Thisdual functionality ensures personalized service for recognized users and provides support for new or unregistered individuals, creating a smart, responsive office environment. In this paper, we proposed a system that detects the face of the user, and attendance will be marked if recognized, or a chatbot appears, enhancing user interaction. To perform our search, we focused on recent papers within the last 5 to 10 years where most papers should have utilized practical applications and tech- nology. Of the surveyed papers, we focused most attention on those that contained literature reviews or offered an insight into development trends and discussed the deficiencies in the field.In this way, we were confident about the direct relevance of selected papers to Smart Office Assistant context, specifically when focusing on issues such as privacy, scalability or system performance. In the end, we selected papers with a proper methodology and profound contribution as the basis for this review.

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II. LITERATURE SURVEY

The use of chatbots and the face recognition systems havebeen adopted into smart office setting to address the needs of the employees and visitors. Incorporating face detection technology together with the use of virtual agents enables human beings to be identified when they enter a certain area, the virtual agent greets them by their names, and their attendance record is taken. To the guests who are unknown to any of the office personnel, the chatbot serves as the virtual secretary to assist in the appointment booking process and to respond to daily questions and concerns, as well as provide basic office information. In this section, several face detection and chatbot systems applied in smart officemanagement will be introduced, and a comparison of the comprehensive performance of these systems will be made in terms of face recognition rate, greeting system, NLP effect, and user experience.

Research work done by Khondaker A. Mamun [1] in collaboration with Rahad Arman Nabid, Shehan Irteza Pranto, Saniyat Mushrat Lamim, Mohammad Masudur Rahman, Nabeel Mahammed, Mohammad Nurul Huda, Farhana Sarker,and Rubaiya Rahtin Khan addresses the idea of receptionist systems based on AI in the Bangla language. This work pro- poses a new learning-based receptionist framework for Bangla- speaking scenarios. It uses composition like Face Recognition, Speaker Recognition, Automatic Speech Recognition (ASR), Text-to-Speech Synthesis (TTS) and Question-Answering Sys-tem.

Zhaowei Cai, Longyin Wen, Dong Cao, Zhen Lei, Dong Yi and Stan Z. Li [2] from the Center for Biometrics and Security Research and National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences; China Research and Development Center for Internet of Things. Their research is based on a new PS-FT method which includes an off-line face detector, an on-line tracker, and an on-line recognizer based on the complex state of the art techniques including Boosting classifiers, Multi boost Layered Local Binary Pattern (MB-LBP), Haar features, and Canonical Correlation Analysis (CCA) with LASVM to consider every important aspect of face tracking.

The paper [3] proposes a multimodal face recognition algorithm to negotiate the drawbacks of the traditional al-gorithm of 2D face recognition, which is sensitive to the variation in illumination, expression, and views. To improve the recognition rate, the system captures three images of a person's face – front, left, and right. It uses 2DPCA for image features extraction and dimensions elimination, herethe 2D face images, in a direct manner and without loss of structural or geometric facial characteristics, and considerably less computing time than the PCA. The information extracted from all three views are integrated to form the feature matrix. For classification, a Nearest Neighbor Classifier (NNC) isapplied, which is based on the measurement of distances within a dataset and for which the Euclidean distance is employed. When tested for efficiency using the CAS-PEAL face database, the authors proved that this technique provided a better multi-view result of 90.67

The paper [4] describes a system for providing support to persons with impaired vision, identifying people by their faces and using speech, as well as recognizing masked faces. It employs Haar Cascade classifiers for Object detection and Local Binary Patterns Histograms (LBPH) for recognition of faces. For speech detection and recognition, Speech-to-Text(SST) and Text-to-Speech (TTS) algorithms are used to writewords in text and to speak it out loud, respectively. The system incorporates a CNN using Keras for deep learning-based detection which checks whether a person is wearing a mask or not. The identified person's name and mask status(whether themask is present or not) are announced to the user with the help of a virtual assistant. This system helps the visually impaired person to identify the person approaching him, without any physical contact between them, and ensures the user's safety The paper [5] introduces an automated attendance manage- ment system using face recognition to lessen the key concernsof manual attendance marking and proxy attendance. The system works in four phases: it includes database creation, face detection, face recognition, and updating attendance. Database creation involves taking multiple photos of the students andthen processing and storing them in a database. Face Detection is done using the Haar Cascade Classifier, which detects faces in a video feed from a classroom in real-time. Face Recogni- tion implements the LBPH algorithm to search for similarities between newly detected faces and those in the database since histograms of characteristics are built. On completion of an attendance recognition process, the attendance record in an Excel sheet is updated, and the list of absentees is forwarded to the concerned faculty. This system is more effective, is non-contact, and helps eliminate fake attendance.

The project,led by Prahlad Vadakkepat [6] ,titled : "Mul- timodal Approach to Human-Face Detection and Tracking," describes a method of human-face detection and tracking in complex environments. The proposed system is intended to be integrated in mobile robots so that they can interact withthe human by identifying, locating and tracking a particular individual. The appearance of the figure is obtained by fusing the skin-color modeling in Y CrCb and YUV color space with the information from the sonar and tactile sensors, making tracking more robust. The face detection takes place with an SVM for classification of skin and non-skin regions and the tracking mechanism is based on a modified CAMSHIFT algorithm in the HSV color space. This flexible and multiple path mode enables the robot to adapt to different lighting conditions as well as go through natural transformations suc- cessfully including but not limited to rotation and scaling whileat the same time successfully being able to avoid obstacles. The performance of the system as tested is good under various conditions and is, therefore, ideal for real-time applications.

The project led by Ming Zhou [7] ,titled:"SuperAgent:A Customer Service Chatbot for E-commerce Websites" de- scribes a chatbot called

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SuperAgent, which has been developed for answering clients' Frequent Questions (FQs). It utilises the large-scale public data comprises of product details, customer questions and answers, and reviews obtained from websites like Amazon. The chatbot integrates several engines: Include one or more factual-product questions for finding answers, one for FAQ-oriented search, one more for answers obtained from the reviews, and a chatterbot for general conversations.About the idea of SuperAgent it is possible to note the increase in the bargaining power of customers and reception of the work of support service agents, as the last can leave more time on complicated questions, since trivial ones are dealt with by SuperAgent. responses to frequently asked questions on e-commerce platforms.

The project led by Hrushikesh Koundinya [8] titled 'Smart College Chatbot using ML and Python': aims at proposing a chatbot system specifically for Matrusri Engineering College. The chatbot is based on AI, ML and NLP to answer users' questions and engage with them regarding various collegiate activities including admissions, academics and events.The chatbot takes the inputs from the users, converts them into text and Process them using WordNet and Porter Stemmer and then generate results from a database.If a response is not available the admin is immediately informed to include the answer in the database for future use.It has a user interface where the users can login, ask queries, get reply, and even give feedback.This is not the case with the chatbot, where the admin is in charge of erasing its data base and going through the remarks left on it in order to alter the chatterbot's behaviour over time.To conclude, the paper demonstrates the development of an AI and ML-based college chatbot system that has improved the expertise of a user in querying and reduces the time taken to respond to them.

The project, led by Dr. K. Velmurugan [9] ,titled: "Chatbot for Mental Health Treatment using Face Detection" is to discuss use of artificial intelligence and chatbots in the sphere of mental health. This talked on how chatbots create a means by which therapy can be complemented, made more accessible and individualised as well as increasing its capacity. The chatbot that is discussed in the paper uses machine learning, natural language processing, and face detection to evaluate a user's mental status, communicate with the user and report the user's condition. Quizzes and face recognition are also integrated in the system architecture to determine the user's emotional state and to recommend immediate actions.In the paper, the author focuses and highlights on the significance and possibility of chatbot during which getting a quick medical consultation is not possible. However, it also present some issue concerning to ethics like the role of chatbots expert in crisis event. The chatbot is capable of performing a sentiment analysis and facial recognition that can label the client ashappy, sad, angry or the like, calling for a particular treatment in line with the emotions displayed. The system's purpose is to help users lower their stress, and maintain a positive emotional condition.Altogether, the authors posit that AI chatbots have the potential to give the much-needed boost to mental health care by offering access to a modality of continuing support outside regular therapy.

The project,led by Maggie C.M. Lee [10],titled : An in- telligent, Knowledge Based Chatbot System to improve the client service in e-commerce using the support of NLP, Web Crawling and other related techniques. The concepts were piloted in a women's apparel company where, for instance, the number of customer queries that could be addressed and disposed without recourse to personnel was increased by 87 percentage and response times also benefited. The system's architecture includes a knowledge base that delivers a dynamic conversation with customers and transfers them to human operators in case of increased complexity. However, there are some challenges such as guaranteeing high quality of data and managing change to new technologies as this study confirms that such chatbots positively impact customer satisfaction, distribution of resources and efficiency of service delivery.

The project,led by Eugene Kharitonov [11] ,titled "Speak, Read and Prompt: High-Fidelity Text-to-Speech with Minimal Supervision", the authors propose a new multi-speaker TTS system, named SPEAR-TTS. It utilizes discrete speech rep- resentations and models the TTS problem as a composition of two tasks: decoding written text into high-level semantic representations known as reading and coding meaning into low acoustic features known as speaking. This decoupled mechanism enable the speaking module to be trained from large amount of audio only data and the reading module to exploit back translation and pretraining to minimise the demand of parallel text and audio data. SPEAR-TTS trained from only 3 seconds of a new speaker's support for this study without explicit speaker labels generated speech that is highly competitive with current state of the art systems in terms of CER, as well as matched the ground truth for that speaker for naturalness and perceived acoustic quality

The project, led by Warihana Gumah [12] , titled zer0Clock: A General Internet Mobile Appointment Reservation System for the Elimination of Queues in Ghana , aims in developing a solution as a means of dealing with problems associated with long queues, especially in hospitals and offices. This service is that the registered users can make an appointment on a certain mobile application, modify, or cancel it by creatingan event and a calendar entry. Users are expected to meet their appointments, and thus reminders are sent half an hour to the time of the appointment. Also, option to display the location on Google Maps is provided to help clients find places they do not recognize. There are ways that administrative user can modify the look of the company's website and can observably scrutinize the booking statistics and feedback to improve services. In the longer run, the system seeks to enhance the organisational hurdles, waiting lists and therefore the appointment solutions in different sectors in Ghana by decreasing the queues.

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III. METHODOLOGY

- *Smart reception: An artificial intelligence driven bangla language based receptionist system employing speech, speaker, and face recognition for automating reception services*

Most of these reception tasks are automated by the inte- grated AI system proposed by the authors for the Bangla lan- guage using various methodologies and algorithms. Regarding face recognition, it deploys ArcFace algorithm which relies on deep learning models, trained on large sets to offer optimal identification. Speaker recognition is caused by the help of different techniques of machine learning like spectral analysis and neural networks to recognize voice features. The ASR component is based on deep learning models that, depending on the situation, may to include RNNs or Transformers, in or- der to translate Bengali to text from diverse examples of audiodata. In TTS, neural models thereof generate continuous and natural speech from text and place importance on phoneme- to-phoneme and prosodic similarity. Finally, the question-reply option may use the transformer architecture, similar to BERT or GPT, for the analysis of the context to obtain an answer from extensive Question-Answer sets.

- *Person-Specific Face Tracking with Online Recognition*

The proposed system comprises an off-line face detector,an on-line tracker, and an on-line recognizer for capturingface from any environment durably and efficiently. For face detection and tracking, Haar-like features together with a Boosting classifier are employed and for pose variations, an on-line recognizer uses CCA and LASVM based on incrementally trained SVM for continuous identity recognition. This guarantees that right face is followed even with intimations, occlusion, or contrasting face, making the face tracking stable and versatile.

- *Research and Implementation of of Multi model face recognition*

In Image Data Acquisition, facial images are obtained in real time, with the help of camera . Moreover, the system is intended to operate based on the different situations like lighting, angle of view, and facial expressions. Real time face detection is done using Haar Cascade algorithm The system uses the Haar Cascade algorithm to detect the ROI of the face from the image/ video. If a face is detected Principal Component Analysis (PCA) and two dimensional Principal Component Analysis (2DPCA) are then used to render the facial image data dimensional. This step is important to eliminate time wastage which maybe enjoyed by the pixel resolution method by using important features only. Feature extraction and recognition is an apparent category of signal processing tasks of interest. Local Binary Patterns Histograms (LBPH) are used to extract textures from grayscale imagesso that the system will be able to identify different attributes from each face. LBPH identifies or verifies that an individual present in the scene of the video.

- *Person Identification Using Detection Face and Speech Recognition for Visually Challenged with Mask detection*

The concept involves capturing the user's surrounding audio and video data, applying one or more machine learning models on this data and feeding back information through an interactive virtual assistant. Live video feeds of the user through a USB webcam are preprocessed to perform face and mask detection. Haar Cascade Classifier identifies faces on an image based on edges and textures. It then analyses the input image and identifies areas that are most probably to contain face features. LBPH is used for face recognition. This one decodes an image into binary values based on how every pixel of the image compares with its neighboring pixels in the image. This is useful for the matching of patterns on an image in the system database to the input image. The STT module performs the function of converting audio signals for thusconverting them to text which is then analyzed using methods that match samples of voice with that of the person in question.A general type of built-in microphone gathers the voice signals and then the computer examines them for speech. The results are delivered to the user through the smartphone to generate text to speech (TTS). The smartphone obtains messages from the system and voices them through a virtual assistant. For the mask detection, the CNN is developed under the reinforcement of Keras framework to determine if the person is wearing a mask or not. It takes input images of chemical and trying pattern for the network to learn the difference of masked and unmasked faces.

- *Face recognition based Attendance Management System*

First, the system creates a face database of students using a webcam. Many pictures are taken for each student, not only with different facial expressions, also with the different sides of the face turned to the camera. The images are cropped to bring the Region of Interest (ROI), and the color image is con- verted to a gray image and then these images are reshaped. The images which have been pre-processed in this step are then put into the database under different names for each student. Haar- Cascade Classifier algorithm is a pattern recognition method in which the classifier is trained to detect the human face by dissecting certain features such as edges lines and so on.For real-time face detection, the detectMultiScale argument from the OpenCV is used to detect multiple faces. scaleFactor (1.3) and minNeighbors (5) were selected for face detection based on the fact that high values will reduce the detection accuracy but take less time while low values of it will take a lot of time to discover the face but with a high degree of accuracy. The classifier employs face images encoded in an XML file called, haarcascade and attendance is marked in excel sheet.

- *Multimodal Approach to Human-Face Detection and Tracking*

The implementation of the paper employs the combination of algorithms, hardware, and software technology as well as the use of real-time technology in order to detectand track human-face in complex and

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challenging circumstances. The skin and non-skin regions are discriminated using color models such as Y CrCb and YUV for face detection and a new modified CAMSHIFT is implemented in the HSV color space for face tracking. The system described employs a Magellan Pro mobile robot to which sonar and tactile sensors for Can through obstacles and a Sony EVI-D30 pan-tilt camera for vision-image. The robot control and camera are operated through an onboard Pentium II computer running on Red Hat Linux. Software incorporates the implementation of image processing methods and real-time tracking sensor data for improved resistance to changes in lighting and movement of persons. This concept integrates visual information with such other modalities as acoustic and haptic to enable face identification and tracking besides avoiding obstacles.

- *Super Agent: A Customer Service Chatbot for E-commerce Websites*

The use of NLP and machine learning in chatbot known as "SuperAgent" facilitating customer service inquiries in e- commerce organisations. It takes data from product specific pages, to include product descriptions, product FAQs and customers' reviews to respond to users' questions. The system employs attribute matching through deep semantic similarity models (DSSM), ranking of FAQ through regression models and mining of customer opinions through sentiment analysis. It also utilises what is known as the Seq2Seq model for con- versational responses. SuperAgent runs as a browser plug-in, thus improving the online shopping experience by answering multiple queries on the fly using big, openly available data.

- *Smart College Chatbot using ML and Python*

The flow of the study for the "Smart College Chatbot using ML and Python" comprises of using different approaches in machine learning as well as natural language processing to develop an intelligent Chat- bot. User queries are processed in tokens and lemmatize that refer to the textual input of the chatbot and the word forms. From it, it uses the WordNet algorithm to search for keyword and request a response from a knowledge base which has been set in advance. Python is used as the scripting language and for this conversational analysis, Natural Language Toolkit (NLTK) is used and for structuring the conversational logic AIML (Artificial Intelligence Markup Language) is used. The system also updates itself over time through the use of machine learning and responds to college related queries in real-time by means of a friendly user web interface.

- *Chatbot for Mental Health Treatment using Face Detection*

The method adopted in the paper focuses on creating an AI-based chatbot for mental treatment and Face detection and sentiment analysis methods. The system features AIML templates for standard mental health questions, and imple- ments Machine and Deep learning for increased precision in its answers employing Deep Q Learning (DQN). Natural Language Processing (NLP) is used in the system for the text input but to cater video input, it utilises a facial emotion recognition system. It also has a quiz to follow up on theuser's mental health and all data provided is for generating the correct mental health solutions.

- *An Intelligent Knowledge-based Chatbot for Customer Ser-vice*

The methodology aims at development of an intelligent chatbot system which can be based on a combination of AI-algorithms,technologies,hw and sw. Intent classification and BILOU tagged entity recognition using DIET Transformer is used to process customer inquiries differently. Thus thesystem uses web crawlers running on virtual PC farms by updating the knowledge base (KB) to gather information from the internet. The chatbot communicates with customers through Facebook Messenger and Instagram and using naturallanguage processing, draws information from the KB and ifthe circumstances demand so, transfer the conversation to human agents. This way, the efficiency of the chatbot to deal with customers independently is provided and the external intervention is minimized.

- *Speak, Read and Prompt: High-Fidelity Text-to-Speech with Minimal Supervision*

The paper introduces SPEAR-TTS, a multi-speaker text- to-speech (TTS) system that decouples the TTS task into two sequence-to-sequence tasks: attempts to recognize bidirec- tional conversion: reading text into high level semantic tokens and speaking those tokens into low level acoustic tokens. In this way, by using self-supervised models such as w2v- BERT and SoundStream, it can mainly rely on vast amounts of PBS unlabeled audio data, which are highly efficient and have few requirements for parallel text-audio datasets. The system uses Transformers for both tasks and combines BART- style pretraining with backtranslation to reduce supervision even more. Further, in terms of synthesis, it transduces into new speakers with just a short voice sample through zero- shot learning, which means that, for instance, better speech synthesis can be achieved with little amount of data.

- *ZER0CLOCK: An Online Appointment Booking System*

The ZER0CLOCK Online Appointment Booking System is going to be built using Agile model as iterations will be prefer- able for feedback and.bedside tables will be beneficial for PHP and MySQL for back end and HTML, CSS, JavaScript for front end. Some of the algorithms include scheduling to time slots and conflict check during bookings and Short Message Service notification for bookings. The previous experience also shows that the system will use Google Maps API for location services and SMS Gateway API, which will make the service straightforward and easy for management and consumers.

IV. FINDINGS

- *Comparison of Face Recognition:*

In Table 1 presented below, the author has made comparisons of six different research papers in the area of face recognition, tracking and smart reception systems. Each paper's primary focus is com- pared with its constructive and implementational procedures as well as with other

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methods, and the constraints identified during their application are considered as well. It compares the methods used for face detection, recognition, and real-time tracking and demonstrate that while earlier methods such as Haar Cascade and LBPH were effective, currently deep learning methods such as ArcFace and CNNs can be used for the same purpose. It also provides the essence of the systems that is, the specifications of specific features such as multi modality integration, speech recognition and so on with the negative aspect arising from it like computation time and de- pendency on hardware. This comparison acts as a roadmap in determining the optimal algorithms for the application in smart office systems including attendance tracking of employees and visitor's tracking.

Table 1 Comparison of Face Recognition

Reference	Comparison with Others	Drawbacks
[1]	It performs face, speech, and speaker recognitionin the Bangla language. Compared to single modality systems, it hasa more comprehensiveapproach to realizing an AI-based receptionist.	Limited to Bangla language. Large computational com plexity required to achieve real-time processing formultimodal data.
[2]	Reporting a high emphasis on steady tracking while occlusion and pose changes remain the critical features in the experiment. High end in trackingand might not be as good as systems that use deep learning for recognition.	Possibly does not perform well in varying settings. Reliance on pose/occlusion variations may significantly hamper the performance in real- time environments.
[3]	Realtime, highly accurate based on facial geometri- cal appearance as well as the facials textures.Each level depends on the otherand less complex than other categories like CNNor deep learning models.	Meantime, it could be observed that, by using both PCA and 2DPCA, facialdetails may significantly be lost. LBPH was limited in addressing various environmental conditions such as lighting and expressions.
[4]	Designed for detecting face and mask particularlyin physically demanding situations such as helping the blind. A slightly different concept fromother systems that combine both face detection and mask detection.	CNN-based mask detection might beresource-intensive. Dependency on external devices (smartphones) for feedback could introduce latency.
[5]	Same as other systems employing Haar Cascadeand LBPH with extra abil-ity to automate attendancewith an Excel sheet andemails.	The management of attendance data is done externally and commonly through Microsoft Excel. The performance ofLBPH can be worse in conditions, with complex or less light conditions or with different expressions on the face.
[6]	Not limited to vision as most other systems do with face detection/tracking butincludes also acoustic andhaptic feedback. Works inSystems. Able to operate in dynamic environments with multiple obstacles.	Hardware dependent (Magellan Pro robot) and expensive With multiple types of sensors there are possible issues concerning real-time processing as well as implementation of some of the strategies mentioned above.

➢ *Chatbot Technologies in Different Fields:*

When com- paring the four distinct chatbot systems presented in Table 2, it is noticeable that they were all was implemented across four different fields of application, starting with e-commerce, edu- cation, mental health, and customer relations. All the applied chatbots utilize NLP, ML, and various domain solutions to accommodate the users' requirements. Although these systemsshow advances like DSSM, facial emotion recognition, and using web crawlers for knowledge update, they imply specific restrictions. These limitations can be as foundational as useof static knowledge sources and fixed response libraries up to more recent issues with video analysis and privacy to inability to coordinate multiple dialog turn and handle multiple layers of conversation on their own. Awareness of these strengthsand weaknesses is important to continue the extension of the chatbot process and to make the existing models for really useful for the modern industries.

Table 2 Comparison of Chatbot

Reference	Comparison with Others	Drawbacks
[7]	Utilises on Natural Language Processing, DSSM,regression models, senti-ment analysis. Collects in-formation from product pages (frequently askedquestions, customers' re-views). It uses Seq2Seq model for the conversa- tional responses. Runs asa browser plug-in.	This characteristic makes it lacking in personaliza- tion when approaching the users. Limited to the here-and-now of Product-Page data. May find it challeng-ing to understand when the users have unclear questions.
[8]	Uses ML, NLP, NLTK, and AIML. To make pro- cesses for the queriesit uses tokens lemmati- zation and WordNet. It gives answers associatedwith responses within the knowledge base. Python- based system. Progresses together with the experi-	Restrictions given by the format to predefined questionsin the knowledge base. Non-ideal for usagepurposes which involvefast changing keyword sets. Sometimes have problems with more than two

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	ence, as after all it is pos- sible to learn in the help ofML in the given dataset.	step or contextual dialogues.
[9]	Uses NLP and face detection. Video input Stream Sentiment score. EmploysDQN and AIML. Incorpo-rates facial emotion recog-nition for video. Contains information on a mental health test.	In other word wholly dependent on FER while often FER is not wellcorrelated with the fine-grained mental state. Challenges related toprivacy in video-based analysis. Must be updated frequently as it is with other mental health practices in the field.
[10]	DIET Transformer, intent classification,BILOU tagging are integrated together. Presents knowledgerepositories to be updated through web crawlers.Industrial sociology – Integrated with social media platforms. Can go up to human agents.	Enduring dependence on the periodic update of the knowledge base. Integra-tion with Social networks may be a privacy issue. Web crawling is restrictedby the amount and type of data that is available publicly of the websites and their permission. It of may not necessarilyprocess highly complexqueries independently.

V. ILLUSTRATION

➢ *Correlation between Algorithm Accuracy and algorithm Complexity in the Face Recognition Systems:*

Graph provided above shows the link between accuracy of the algorithmand complexity of the approaches to face recognition adopted in smart offices system. Each point on the graph is a unique algorithm; the horizontal axis shows the complexity, starting with low and ranging to high, and the vertical axis depicts the accuracy percentage attained by every algorithm. For instance,ArcFace and CNN based approaches have high accuracy but come with the added complexity making them well suited for precision-based uses such as employee attendance tracking. Still, we have less accurate algorithms such as Haar Cascade and LBPH that can be more suitable for real-time use dueto their less computational complexity of the implementation. This visualization helps to track changes in the handle between the required accuracy and the need for additional computations when selecting the right algorithm for smart office applications.

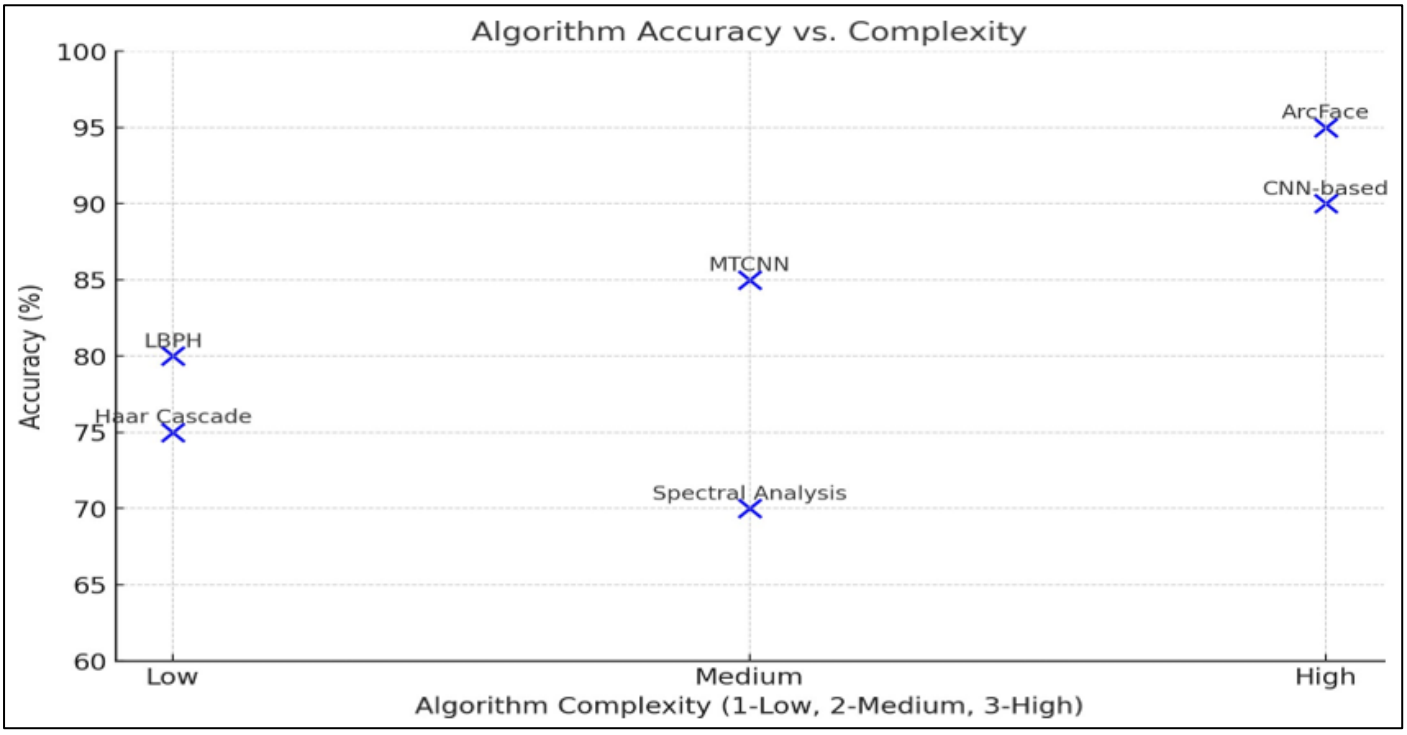

Fig 1 Algorithm Accuracy vs Algorithm Complexity.

VI. SYNTHESIS

A significant rationale for adopting the discussed technolo- gies is noted from the reviewed literature highlighting the in- creasing version of AI technologies such as facial recognition and chatbots in automating offices. Different papers show how such technologies have developed over time when it comes to receiving visitors and handling employee absenteeism. Algo- rithms for face recognition, including ArcFace and LBPH, can be commonplace or high-precision to implement. Some algo-rithms are fast and not complex such as LBPH while others are slower, sizeable, and accurate in preference such as ArcFace, which is preferable where high precision such as attendance registration is required. The incorporation of chatbot systems helps improve office automation for visitors

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because they offer services like appointment-making and answering general ques-tions. Hypotheses presented via case studies about chatbots used in customer relations and mental health indicate how NLP and machine learning allow users to interact in a more contextualized and immediate manner. One common concept found in all these papers is the possibility of utilizing facial identification and chatbot technologies to manage the office. When integrating these tools, the functionality improves the office environment security and organizational performance in reducing the time consumed by the human resources for administrative responsibilities of the building whereas the user experience of employees and guests also enhances. There are some limitations left though, where privacy is concerned, system performance, and its ability to function accurately under various circumstances, including changes in lighting and face mask that many people wear nowadays. Nonetheless, the current body of literature shows that AI-driven office assistants have the potential to revolutionize office engagements and increase efficiency. Integrating knowledge from the prior stud- ies, this synthesis demonstrates how these two complementary components of facial recognition and chatbot systems benefit the creation of a smarter office environment.

VII. CONCLUSION

In this paper, the literature has examined different ways of implementing AI in the office, paying particular attention to the SmartOffice assistants that perform employee attendance and visitor identification through face recognition and chatbot systems. The research results reveal that AI developments such as ArcFace, Chatbots, and multimodal recognition systems improve office efficiency and offer appealing user interfaces and experiences. When integrated properly such systems di- minish the rate of administration while enhancing the flow of workplace systems. The relevance of these findings is easily seen as they can revolutionalize the contemporary offic imagery. Organizational flow increases with regard to both security and practical visitor and employee interaction through face recognition features and use of AI-based virtual assistants. These innovations also anticipate future prospects for new types of office automation, which can free up time for more important tasks in such organizations. Nevertheless, as far as the advantages are concerned, as for the drawbacks, issues like privacy violation, lack of relative development of the solutions, and system reliability in different environmental situations, including wearing masks and different brightness of lights, deserves discussing. There are few areas that need further attention in the coming research to enhance these systems for better performance, flexibility, and applicability. Finally, the decision to incorporate these SmartOffice assistants powered by AI algorithms demonstrate a new wave of office automation with the potential to redefine the new face of office work as well as its visitors. Further development and solving present issues will guarantee the effective application of the described systems in various offices.

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