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Voice Based Email System for Visually Impaired Interactive Voice Response

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Abstract: ***The widespread use of the internet has created many possibilities, but visually impaired individuals face difficulties in accessing essential programs like e-mail. This project aims to provide voice assistance to visually impaired users through personal voice assistants that can perform tasks and provide services based on spoken commands. Voice commands offer a more convenient input method for users and can be particularly beneficial for those with visual impairments who may have difficulty using a keyboard. The project's ultimate goal is to develop a secure voice assistant that can take voice commands, execute desired instructions, and provide output in the form of synthetic speech or other means. Such an assistant would provide visually impaired individuals with a more accessible and independent means of accessing essential programs and services.***
Keywords: Voice Based Email, Visually Impaired, Speech-To-Text, Text-To-Speech, Speech Recognition.

I. INTRODUCTION

This project aims to develop a system which will enable the visually impaired to send and receive e-mails through voice commands. The system is developed on the android platform. The system can have a text-to- speech device that may convert the text in the e-mail into speech. The user is ready to listen to the e-mail and additionally reply to that using voice commands. There is presently no voice-based model for visually impaired folks.

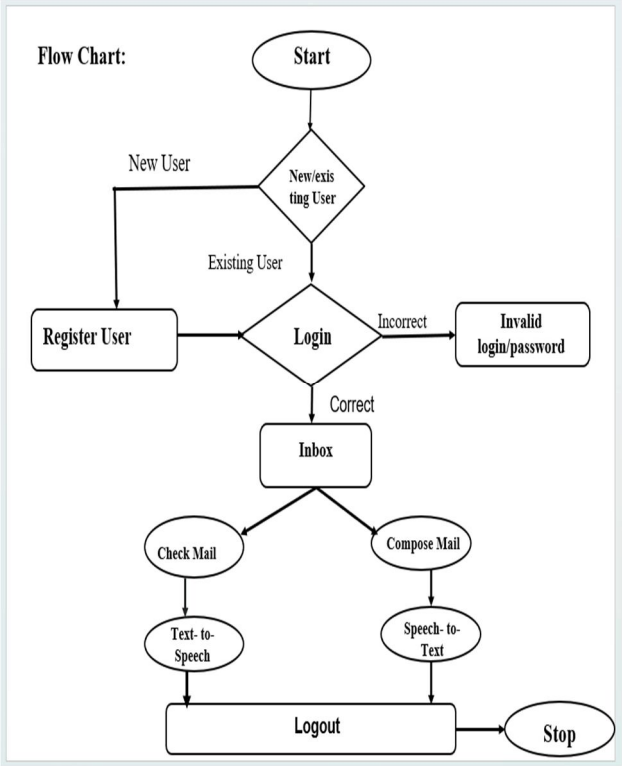


Fig.1.1 Flow chart for Speech Recognition

However, there are a few analyses comes afoot that area unit exploring the practicability of such a model. One such project is that the visual impairment and Blindness empowerment (VIBE) project, which is developing an epitome system that uses voice commands to manage a pc.

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The project remains within the early stages, and it's not clear if or once a voice-based model for visually impaired folks is offered. This paper presents a voice-based model for visually impaired folks. The model consists of a voice input module, a text-to-speech (TTS) module, and a speech recognition module. The voice input module converts the user's speech into text. The TTS module converts the text into speech. The speech recognition module acknowledges the user's speech. The Speech-to-Text additionally referred to as Automatic Speech Recognition converts spoken speech into text, that helps compose emails as a simple task. The Text-to-Speech module provides audio output of the mail received, the sender, the topic and therefore the body of the mail is browsed out by the system.

II. LITERATURE SURVEY

In this section, we tend to supply the elaborated literature survey of the current similar techniques. This creates a practical and natural manner for the system to convey the message. The system uses movie voice feedback to interact with users and doesn't use keywords. this can be done through text-to-speech and automatic speech recognition. this can be a program that provides the user email management over the voice instead of bit management. This uses voice feedback to speak with the user. once a user interacts with the system it'll generate action words mechanically. during this program solely click operations are performed to start out tasks [1]. In paper [2], a voice based mostly email design is planned which is able to facilitate blind individuals to access email. the present system isn't user friendly for blind folks because it doesn't provide any audio feedback to readout contents for them. The planned system makes use of Speech Recognition, Interactive Voice Response and click events. Also, for extra security functions voice recognition is employed for user verification. during this system, Registration is that the 1st module. This module can collect complete info of the user by prompting the user to what details ought to be entered. The second module is that the login module during which the system can raise the user to produce user name and positive identification. this can be done through voice commands.

Another voice sample is asked for activity the voice verification. Then the user is redirected to the inbox page once login is completed. when login, users will perform traditional operations of a mailing system. System choices are: Compose, Inbox, Sent Mail, Trash. The user will switch between these victimization voice commands.

In paper [3], planned the system that depends on a voice command primarily based system not like the prevailing mail system. the whole system is based on speech to text commands. Once mistreatment this methodthe applying is going to be prompting the user to talk specific commands to avail several services and if the user desires to access the several services the user has to speak that command. This application makes use of IMAP (Internet Message Access Protocol). It is an online customary protocol employed by email purchasers to retrieve purchasers to retrieve email messages from a mail server over a TCP/IP association. the most activity Screen are going to be the primary screen to be displayed on begin of the app. This screen waits for the user to press the button so the system can begin acceptive voice commands. And this {can be} a full-sized button in order that they can press anyplace on the screen. Then mistreatment Voice commands users will send, browse emails.

In paper [4], the system uses principally 3 technologies:

1) Speech to text
2) Text to Speech
3) Interactive Voice Response.

When the user visits the positioning for the primary time, he/she would want to register through voice commands. conjointly when registration, the user's voice will be recorded and hold on within the info. and therefore, the user can get associate degree Id and watchword. when login, the user will access the mail choice during this system. The programme is meant mistreatment Adobe Dreamweaver CS3. the whole web site principally focuses on potency in understanding. conjointly there's a contact U.S. page wherever the user will counsel any suggestion or any facilitate if they have. In paper [5], have planned associate degree email system which may be accessed simply by blind folks. the utilization of Speech to Text device, Text to speech device and Viterbi algorithmic rule square measure taken into thought.

The rule works with the technique that the system detects the foremost acceptable word once the user spells it thus matches the word that is guessed with the actual word that is pronounced.

The user has to register to the web site once they visit the positioning for the primary time. this method reduces some drawbacks of the prevailing system. the disadvantage of this method is that the potency of the Viterbi algorithmic rule decreases because the variety of errors will increase yet becauseit needs more room [5]. Saurabh Sawant et.al in paper [6] proposes a system for visually impaired and illiterate folks for rising their interaction with the e-mail system. this method eliminates use of IVR Technology that used Screen Readers and Braille Keyboard.

There, have used Speech to text and Text to speech conversion. conjointly for alternative operations voice commands. For registration, used email id and watchword. For the practicality, use a feature of PHP that's PHP mailer. it's a library which may be accustomed send email. so as to fetch the user's mail from the IMAP server. Here, Knuth-Morris-Pratt algorithmic rule is employed for looking out mail in inboxes. To conclude, the system setting is only voice primarily based driven with correct feedback from the system at each stage. the disadvantage of this method is that it uses Gmail as a bunch server thus we have a tendency to cannot use alternative email services like Yahoo etc. [6]. Payal Dudhbale et.al. [6] planned Voice primarily based System in Desktop and Mobile Devices for Blind folks. the main elements of the planned system during this paper [7] square measure mentioned below.
G-mail System reads messages on recipient mailbox.

1) RSS-Real easy syndication for news
2) Song-listing, being attentive to songs
3) Book reader-system., read book
4) Drive browser-To search drives

He designs is employed by blind individuals to access Email and transmission functions of the OS simply. TheGUI style will be accessed exploitation voice commands and mouse clicks eliminating the utilization of a keyboard. beside email, conjointly developed RSS that is very straightforward Syndication that may be a thanksto distribute an inventory of headlines, update notices. conjointly developed a mobile application for a similar. beside email different applications may also be accessed through voice commands [7].
In [8] paper, the authors have planned characin Mail, a usable blind-friendly email shopper to beat the challenges touching on the accessibility and usefulness of email-related activities on a smartphone.
Results: The results mirror that characin Mail may be a higher different for blind users thanks to its consistent and blind-friendly interface style. The results of this epitome implementation show associate improved user expertise, accuracy in task completion, and higher management over bit screen interfaces in acting basic activities of managing emails. The results demonstrate that characin Mail is associate accessibility-inclusive email shopper sanctionative blind individuals to own an improved user interaction expertise and bottom psychological feature overload in managing emails. {the solution|the associateswer} is tested through an empirical study. Results showed that this email shopper helps blind individuals to send and receive emails with comfort and ease. [8]

A. Advantages of The Above Surveyed Techniques

In most of the papers, it is seen that the entire method of speech-to-text and text-to speech makes it additional interactive and straightforward for the visually impaired individuals. this technique makes the disabled individuals desire traditional users. Also, voice based mostly is helpful for disabled and illiterate individuals. Automatic-speech recognizer is of the foremost blessings. we will see a discount in psychological feature load taken by blind to recollect and kind characters employing a keyboard. Voice based mostly email system could be a easy system.

B. Limitations of The Above Surveyed Techniques

In most the papers, it is often seen that there's use of mouse clicks for several tasks. It gets tough for visually impaired individuals.
Also, the Indian landmass isn't benefited by this as there are such a large number of languages and speech acknowledgers cannot recognize these languages. principally English is most well-liked.

III. RELATED WORKS

A. Voice-Based Email System

The planned system is going to be via email to be offered for individuals with poor sight and serving to the community. The authors instructed that it's getting to be simple for any of the prevailing folks during this system. it's same that a close application may be a fully-accessible, despite wherever it's employed in human vision, and ineffective. As a critic of the present system, they might like the benefit of use of ancient users because the system's options, the eye for easy use by all kinds of individuals, the standard folks and also the visually impaired, and also the in Africa. This system prompts the utilizer to perform some action for the use of the services, and if the user has access to a range of services, they'll got to perform this action. First, the user can register for the applying via the registration type. Through the employment of voice commands and every one of the desired fields, the user should be stuffed out, and it'll be scanned in from to the site; as presently because the user is speaking, it'll be recorded mechanically.
After the user has logged in, the system can provoke the user's name and parole, which can convert audio into text, and so the user is going to be licensed by checking the database's credentials.

B. Speech-To-Text-With Artificial Intelligence

To show off the sound and text will be remodeled into a light-weight, easy-to-use API for robust, up-to-date, and neural network models, that the Google Cloud Speech-to-Text package developers give. The API is accessible in 100 and twenty languages, supporting a worldwide user base. you'll be able to amendment your voice and also the sound of the transcript of the center's call, and then rather more. sadly, this can be a daily stream or pre- recorded audio, that may be a poorly-handled by Google's machine learning strategies [4].

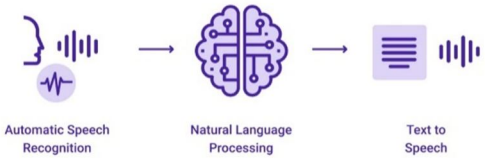


Fig 3.1 STT with AI & NLP

1) Text To Speech Unification

It's associate degree automatic text-to-speech. this system is extremely just likea personality's verbalizer, to mention that it is a text. TTS (text-to-speech) may be a technology that allows moveable computers to speak with you. Here square measure some nice samples of the text-to-speech engine used for primary, text-processing, and synthesis. The engine can sometimes trigger the sound-and-audio format, the output management.

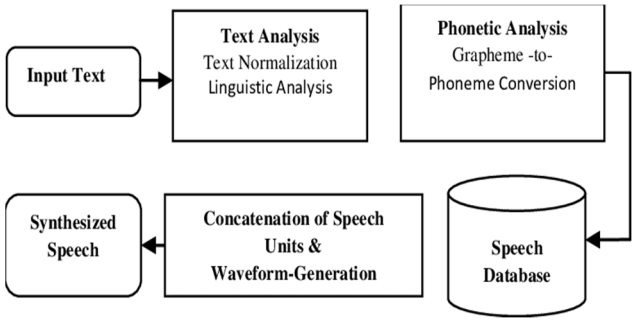


Fig 3.2 TTS Unification Process

2) Structure Of A Text-To-Speech Unification System

The stages included in producing the synthesis of the text are perceived to be TTS and reviews to turn the tide, speak with an accent, and create prosody. You can do with prosody at that time. Apparently, according to the information currently available on the market, it will be the one ring. With the unity of the periodic structure, the synthesis can be reduced to its most important modules.

3) Processing of Language Processing

At the facet of prosody, it generates a written language of the scanned text.

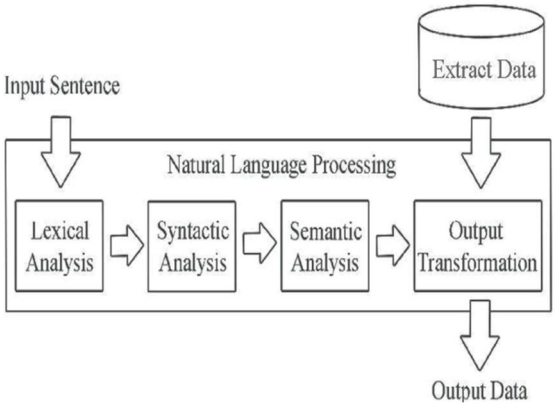


Fig 3.3 Natural Language Processing

4) Digital Signal module processing

It converts representative knowledge from information processing into speech that may be detected and understood.

5) Eye Assistant

We have used 2 options for the applying. A user will acknowledge object and may hear any text over voice. So, for these 2 options we've used associate degree open supply machine-learning framework, that helps to find any object and google text to speech API to acknowledge text.

C. Object Detection

In this case, once a user needs to find what object is it or what's the name of a specific object the user must opencamera. For this, we tend to used google camera API that may find camera hardware info and eventually open the camera. For displaying any object texture read category is employed to require frame. Later by victimization TensorFlow machine learning framework we've trained our dataset and so foreign the trained dataset. For detection object our formula take input by victimization camera and feed the input to the formula then communicate with trained model and eventually create the prediction. Figure three represents however formula truly works to find object.

D. Recognize Text

Optical Character Recognition (OCR) offers a machine power to scan any text. OCR is that the best thanks to acknowledge any text that create visually impaired user ready to hear text aloud. Camera takes individual frame victimization find strategies and Text Recognizer. To scan any text straight from camera, once any texts become offered, we've enforced processor in OcrDetectorProcessor that handle all the detections. From Text Recognizer Receive Detections can receive text blocks once text becomes offered. For this, Text Recognizer is employed to find image associate degreed method the image that determines what text seems among the image and eventually create an audio artificial voice victimization text to speech API to administer output. Figure four illustrates however the text to speech API works therein application.

E. Voice Email Based On SMTP

The present planned system is totally supported the user's accessibility and easiness of the e-mail system. it's fully helpful for each style of folks whether or not they square measure ready or disable. the present system isn't offered for each style of folks within the market. this method is concentrated on the user's behavior and their perspective read. it's accessible to all or any styles of folks together with illiterate folks and even new users. The system uses IVR (interactive voice response) so as to act with the users. It makes the system realistic and natural thanks to impart the messages and feelings. When the users act with the system it'll mechanically generate the voices to try to the actions. there's a step-by-step method to perform the actions. The users have to be compelled to hear the voices and respond for the specified actions. the most advantage of the system is that there's no application of keywords, only 1 push operation is needed at the start. Once the system is started each step is voiced primarily based the users have to be compelled to wait and respond for the specified actions. The users don't have to be compelled to worry to own the mouse operations. each practicality is voiced primarily based if one action is performed it conveys the message of completion to the users. whether or not it's prospering or not it'll tell everything justifiably.

F. Android Application For The Visually Impaired

The planned resolution to tackle the matter same is to develop associate degree application which can follow the rules as mentioned in [1].

The planned resolution through our application can house Voice Navigation UI with regular checkpoints for users to explore. each screen of the applying are going to be explained to the user by speaking out tips. The usermust say "Guide" to own Vision scan out tips regarding the actual module.

1) *Object Detection:* This screen of the application will house the TensorFlow Object Detection API capable of identifying 80 odd objects presently.
2) *Navigation:* This screen of the application will host Google Maps navigation to saved locations and will provide turn-by-turn navigation.
3) *Newsreader:* This screen will read out the latest news of the day which are taken out of RSS feeds of popular news outlets.

4) Alarm and Remainder: This module will help the user set alarms and reminders for important dates andtimings.

IV. ARCHITECTURE

In Bayesian scheme is applied during a rippling domain to separate the speech and noise parts during a planned unvarying speech sweetening formula. This planned methodology is developed within the rippling domain to take advantage of the chosen options within the time frequency area illustration.

It involves 2 stages:

1) Noise Estimate Stage

2) Signal Separation Stage

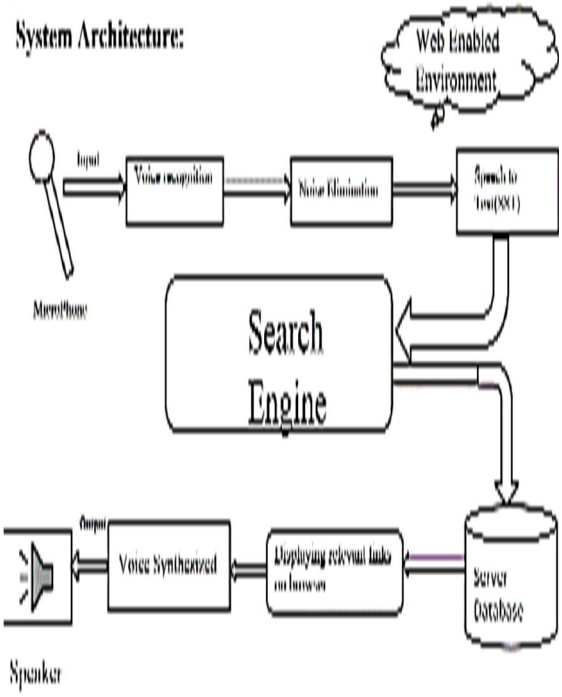


Fig 4.1 Voice command-based search Engine

The navigation system utilizes Text-to-Speech (TTS) for visual disorder to deliver voice navigation operations. The advised system is often downloaded and put in on a blind person's smartphone for an inexpensive worth as a standalone programme. This permit facilitating programme access for blind individuals. In more studies, technology is being used to help blind persons in absorbent into the broader atmosphere.

V. CONCLUSION

This paper is that the planned Voice based totally e-mail device for visually impaired folks, that is advanced as associate utility that helps the blind and disabled humans to access mails delicately and properly. It provides a voice based totally mailing supplier whereby the visually impaired character might want to review and send mail by means of their terribly own without the assist of others. It concerns straightforward statistics more or less keyboard shortcuts. system has eliminated plenty of those standards and conquer all difficulties faced by the visually impaired. It uses a speech quality software system that provides associate inexperienced voice enter technique for mailing gadgets for blind. it's additionally helpful for disabled and illiterate humans. In future, we have a tendency to arrange to build the system keyboard loose and fully voice primarily based. Therefore, it's clean for the visually impaired humans to access the offerings. The device advanced now's operating handiest on computers.

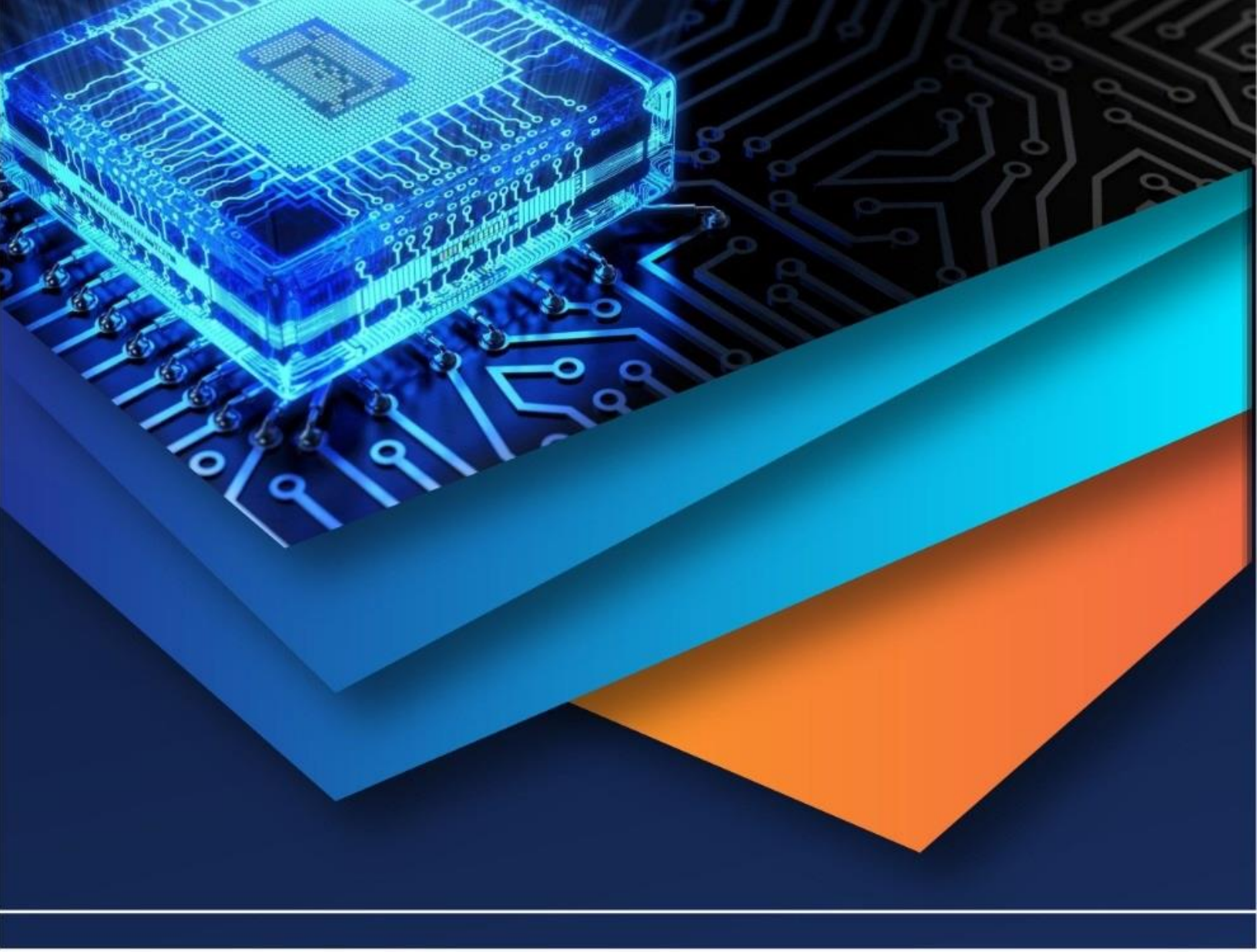
As use of cell telephones is rising as a fashion these days, there's a scope to comprise this facility as associate application in cellular phones in addition. in addition, security measures to beenforced for the period of the login section is also revised to form the gismo safer.

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