An Survey E-Examination Framework for Visually Challenged People Using a Voice Synthesizer

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Abstract—A Online Exams for the Blind is a software product that allows certain foundations of exam planning, administration, and administration to be done online. Either the Internet or your local network environment can be used for this. The exam software evaluates the answers given and results are available as soon as the exam is completed. The online exam system offers visually impaired students the opportunity to operate the system conveniently. Creating online exams is a big obstacle for individuals who are blind. The initiative created additional features to aid those who are visually challenged in their employment in order to prevent such issues. Here are the two types of languages he has implemented for creating questions. These are Tamil and English. The system allows traversing/navigating the stack of questions, makes it easy to submit answers, and maintains simplicity and confidentiality. Or, if desired, double-check all submitted responses prior to submission and using a voice synthesizer, the system will notify the candidate of the 'time left' increase. There is a lot of noise and confusion for other students when numerous visually impaired individuals take tests at the same time. Such disturbances will be reduced as much as feasible with the support of this project.

Key Words: Visually Challenged, Examination System, Tamil, Traverse/ Navigate, Confidential, Voice synthesizer, Disturbances.

I. INTRODUCTION

Machines can be trained to interpret images in the same way that humans do, and to examine an image's features in greater detail than humans do. Face recognition on mobile phones and other apps to assure high level security, spotting and identifying objects and patterns in photographs and videos, and other modern technologies are all made possible by artificial image processing intelligence. Currently, image processing is widely used in a number of industries, including surveillance, law enforcement, gaming, biometrics, self-driving cars, and medical visualization.

Using visualization, which displays processed data in a way that is understandable to humans, provides visual representations of simple things that aid in decision-making, picture retrieval, which aids in image-based search, and image sharpening and restoration, which raise the caliber of processed images. Object detection, a technique for identifying things in images, Pattern recognition categorizes items, determines where they are located, and recognizes the hidden pattern in an image.

One of the necessities of daily existence is now the internet. The Internet is widely used by all people to access knowledge and information. However, accessing these text resources and using any online service can be challenging for those with visual impairments.

The development of computer-based accessible solutions has greatly expanded the range of opportunities available to those who are blind or visually impaired. The screen readers, an audio feedback- based virtual world, have greatly aided blind individuals in using online apps.
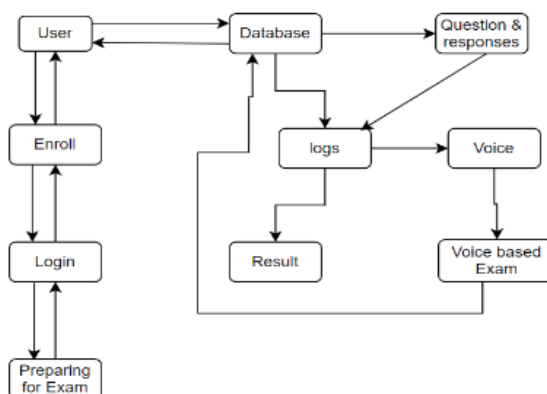

Fig: 1.1 Flow Diagram

The system is attempting to implement an exam system that would be beneficial for those who are visually impaired. It will prompt numerous questions and then obtain the response as the response with the help of keys that are integrated into the system. This will not only help each other to become more independent instead of relying on others' assistance. There are various systems like Voice Synthesizer (text-to-speech), image processing, Machine Learning with python which use the functions of Training Dataset, speech recognition (speech-to-text) and it will be necessary to get input from the students in the form of their voices in order to recognize the images for regulating and sustaining the system's flow. The key advantage of this system is that it only uses the user's voice when absolutely necessary, thus it won't need a strong or constant Internet connection. The user will be given voice prompts from the system asking them to carry out specific actions, and they will comply.

II. LITERATURE REVIEW

The pre-requisites for the proposed system have been predicted using current knowledge or approaches that may be appropriate after reviewing finished and ongoing

research. The descriptions of the research publications would be as follows.

[1] **"**University Examination System for Students with Visual Impairments"Konstantinos Papadopoulos, ZisisSimaioforidis, KonstantinosCharitakis,andMarialenaBarouti - University of Macedonia, Thessaloniki, Greece

This paper "University Examination System for Students with Visual Impairments" by Konstantinos Papadopoulos, ZisisSimaioforidis, KonstantinosCharitakis,andMarialenaBarouti in this text is the creation of a web-based application, a complete application for university entrance exams. It is easy to use for visually impaired students and allows them to familiarize themselves with the established examination system with little effort. A user interface for those who are blind or visually impaired is built on the idea of intelligible text that students must read and write for tests. The N-print test dataset was used in this study to test 24 Greek lowercase letters and the numbers 1-9. Character and line breaks were also tested and assessed using it. The heads of 363 individuals were distributed in an unusual pattern and positioned 30 cm away from the screen

Advantages

1. Enables visually challenged pupils to choose from a variety of predefined settings for the presentation of digital text.
2. Depending on your preferences, you can choose what to do before the exam.

Disadvantages

1. Lacks timesaving, auto-tagging and reporting features.
2. A necessary part of rate grading and reporting, but also an administrative burden.

[2] "E-Examination Using Voice Interface for Visually Impaired Students" Aswathy M S, LijiSameulSree Buddha College of Engineering, Ayathil, Elavumthitta, Pathanamthitta, Kerala, India

This paper "E-Examination Using Voice Interface for Visually Impaired Students" is Aswathy M S, LijiSameul. This paper is all about developing an Open Distance Learning voice-based expert system for online tests for visually impaired students. It uses tools and methodology such as Java expert system, Shell, Voice XML, MYSQL, Voice User Interface and Voice Command Device, and K-Means cluster and shuffling Algorithm. Voice Xml is a key component of VUI systems and enables users to navigate a speech system. The database was updated using MySQL

Advantages

1. Accessible to all types of children, regardless of their handicap.

Disadvantages

1. ODL technology is entirely text-based and graphical. Thus, visually impaired individuals cannot do it.

[3] "Voice and Speech Recognition In Tamil Language" R. Kiran, K. Nivedha, S.Pavithra Devi, Subha.T Department of information Technology, Sri Sai Ram Engineering College, Chennai-44, Tamil Nadu.

This paper "Voice and Speech Recognition In Tamil Language" by R.Kirani, K.Nivedha,S.Pavithra Devi, T.Subha is a well-liked technological development that enables user contact with current technologies. It is often referred to as "computer speech recognition," "automatic speech recognition," and "speech to text". Tamil voice and speech recognition on smartphones has not received much attention. Automatic Speech Recognition (ASR) includes Dynamic Time Warping (DTW) Machine Learning techniques,Neural Networks (NN), Support Vector Machines (SVM), and Decision Trees (DT). Statistical Pattern Matching methods are divided into Gaussian Mixture Models (GMM) and Hidden Markov Models (HMM). ASR has achieved the highest word recognition accuracy possible, providing 86.5 and 92% during testing and training processes.

Advantages

1. Text messages make communication simpler for both sender and recipient, and audio data in Tamil is converted into Tamil text by mobiles' voice recognition systems.
2. Tamil is frequently used in speech recognition software, which raises its usage and raises public awareness of it.

Disadvantages

1. Indian smartphone users have found it difficult to use voice recognition software because of the lack of development in local languages. In this technical process, people who feel using these systems in a foreign country can be challenged instead of their own tongue.
2. The language barrier restricts the use of these applications, and there is no flexibility for native users.

[4] "Voice-based Online Examination System for Visually Impaired" ThajunNajaah, Samsudeen, ThowfeekAhamed Digital Mobility Solutions Lanka (Pvt) Ltd, Sri Lanka Institute of Advanced Technological Education (SLIATE) - 2021

This paper "Voice-based Online Examination System for Visually Impaired" by ThajunNajaah, Shamsuddin, ThowfeekAhamed is about information technology that has a great impact and life is easier in the development of fast-expanding technologies and applications. Voice-based online test systems enable students to take exams online using speech synthesis and speech recognition. This helps visually impaired people with developing their careers. The methodology used is the Correlation coefficient, which reduces the difficulty and increases the irony between visually impaired education and establishes the societal environment. The correction of spelling from the student answers is done using the generation of a word set together along with the production of raw and semantic vectors. The correction of spelling from the student answers is done using the generation of a word set together along with the production of raw and semantic vectors.

$$Vi = Si*\mathrm{I}(mi)*\mathrm{I}(ni)$$

mi - a word in a word set ni - the generation word in answers. I (mi) and I (ni) are the information content of mi and ni, respectively.

Advantages

1. It enables the student to attend the exams without disturbance from their surroundings. It is fully controlled by voice commands.

2. They can check for the answered and not answered questions.

Disadvantages

1. No noise filtering technique is added to this system.

2. Applicable only to the English language, not to other languages.

[5] "Development of an Examination Based System for the Visually Impaired Persons" Chukwuemeka[1], Ituma[2], Oyiga[3], Samson[4], Ebere[5], Department of Computer Science, Ebonyi State University, Abakaliki, Nigeria,Enugu State Polytechnic Iwollo, Enugu, Nigeria, Destinet Smart Technologies, New layout, Enugu, Nigeria

This paper, "Development of an Examination Based System for the Visually Impaired Persons" by Chukwuemeka, Ituma, Oyiga, Samson, Ebere, the main motive behind this paper is to make it easier for those who are blind or visually impaired to access high-quality education and in order to remove the barriers. The applications using this system are Examination Registration, Admin Registration, Training, Speech Recognition, Results. The dataset used here is the MySQL dataset and techniques like filters, photonic analyzers and voice synthesizers were used to achieve this. These were developed using universal modelling diagrams, and their implementation required MySQL and a Visual Studio Tool. Background noise hindered the overall system performance when it was examined. This performance is made possible by using an earpiece and mouthpiece to cancel out outside sounds. This resulted in students to able to successfully participate in the exam and getting the final score.

Advantages

1. The performance was hampered by background noise, but an ear and mouthpiece were employed to cut down on it while maintaining a high level of performance.

Disadvantages

1. Lack of independence.

2. Lacking the ability to compute results in real time, findings may be manipulated as a result of delays.

3. Lack of intellect or social skills to instruct the blind students on how to proceed, hence the mentor must be present during the exam to assist the student.

[6] "Online Examination System for Visually Challenged" MukulChowdary, ReshmaPriyanka, Srinivas, Rajesh, N. Leelavathy - Student, Professor, Department of Computer Science and Engineering, Godavari Institute of Engineering & Technology, Rajahmundry, AP

This paper "Online Examination System for Visually Challenged" - MukulChowdary, ReshmaPriyanka, Srinivas, Rajesh, N. Leelavathy is feasible on a local network or on the internet. The results are made accessible right away once the student submits their answers to the inquiries on their examination using a computer. This helps them to easily interact with the online system because of its accessibility features. For internet connection problems, this system has a feature which helps them to prevent them. Although it is possible to convert speech into text and convert text into speech, the capability currently available might be enhanced. Without the internet, this system's accuracy would be substantially lower. In this system, particular keys are employed to keep system flow in check. The student's voice should be given as input and that uses speech to text to sustain system flow. The system can navigate through the question stack and submit the answer with ease by integrating the keys, retaining simplicity and secrecy and students can relist to the question, alert the answers as needed using the designated keys. The tools and methodologies have the capacity to translate voice to text, and the ability to translate text to speech is constructed with the aid of libraries in Python to provide them with greater functional support. The applications included in this system are use of the keyboards and prompting the microphones.

Advantages

1. At the result of the test, the user may easily review all the questions they have already answered as well as any ones they haven't.

2. There is no need for a recorder during the examination

Disadvantages

1. No offline packages are available.

2. Users can't choose between the different sections - what they prefer to do.

[7] "Voice Operated Tool- Examination Portal for Blind Persons" - Akriti Vats, - Tandon, - Sinha, 2016

This paper ""Voice Operated Tool- Examination Portal for Blind Persons" by Akriti Vats, Tandon that the usefulness of speech recognition software is increasing these days. There are numerous interactive speech-aware programs. The need for embedded systems demands is growing, making the voice recognition system accessible on future embedded systems effective. In order to avoid the need for any support when administering a multiple-choice question test, the program for desktop computers is called the Examination Portal for Blind Persons. This system is a Web- based application and mobile application which is for native users. These system tools and methodology include computer speech recognition, Automatic speech recognition and the methodologies include Voice operated tool, Google voice and Siri. These applications include uplifting of blind users, handling different modules - question bank, candidate details, result analysis and the intelligence of blind people.

Advantages

1. One may simply control a computer network by speaking commands rather than clicking keys on keyboards.

2. The people who can't use their hands or can't seem to give exams by just using their voices.

Disadvantages

1. No recognition of voice and speech is widespread as more and more applications are now being made using speech recognition tools.

[8] "A Voice-based E-examination Framework for Visually Impaired Students in Open And Distance Learning" Dr. Ambrose Azeta, ItorobongInam, Dr. OlawandeDaramola Department Of Information Technology Cape Peninsula University Of Technology Cape Town, South Africa

This paper "A Voice-based E-examination Framework for Visually Impaired Students in Open and Distance Learning" - Dr. Ambrose Azeta, Itorobong Inam, Dr. OlawandeDaramola. This system is a user's voice-based system that can access internet information through a voice interface. This Open Distance Learning e-examination system employs a speech interface but does not provide evidence of an intelligent type of evaluation. The framework that will guide the development of an ODL voice-based e-examination expert draws on the achievements of prior research. In order to determine the system's level of usefulness, this system is tested using datasets like user satisfaction survey questions, which is developed using a variety of technologies including rule-based reasoning, server-side scripting, voice-based system development, data administration, and system design. The algorithms include Fisher yates Shuffling and UML diagrams and the validation tools are Voxeo Prophecy - Speech Engine and HTTP Service. According to the usability test findings, the application achieved an overall usability rating of 3. 48 out of 5. This shows that perhaps the voice-based e-examination system may enhance the present web-based online assessment technique and provide them with considerable benefits with regard to distance.

Advantages

1. How to Create a Voice-Based App as a Verification Guide.
2. Enhance Examination Connectivity for Individuals with Visual Impairment Participating in Distance Learning.

Disadvantages

1. The program was not properly secured, and caller encryption using an email address and passcode was not used.
2. It lacks the capability of user voice recognition access control.

[9] "Online Examination System" Muna R. Hameed, Firas. A. Abdullatif Information Technology and Communication, Baghdad, Iraq International Advanced Research Journal in Science, Engineering and Technology (ISO 3297:2007 Certified Vol. 4, Issue 3, March 2017)

This paper "Online Examination System" Muna R. Hameed, Firas. A. Abdullatif is one that uses a computer system to administer exams online, either over an intranet or the internet. The benefit of this online test system is to thoroughly and efficiently evaluate the student using a fully automated method that not only cuts down on the required time but also produces results that are quick and precise.

It is a web- based application that uses web-based online applications like CBTS - Computer Based Text System and executed with inbuilt PHP packages and database. It also includes Student Management, Question Addition and Question deletion.

Advantages

1. More secure and more flexibility.
2. Demonstrating each system to overcome challenges framing the conduct of examination and to support the examination process.

Disadvantages

1. Each subsystem can't be handled separately without an influence on other systems.
2. It required more time to be programmed.

[10] "VQA-Machine: Learning How to Use Existing Vision Algorithms to Answer New Questions" Author: Anton van den Hengel, ChunhuaShen, Peng Wang, Qi Wu Year: 2017

This paper "VQA - Machine: Learning how to use Existing Vision Algorithms to Answer New Questions" by ChunhuaShen, Peng Wang, Qi Wu. In light of this, it is suggested that the latest VQA model expands the cross system to a higher level that can handle questions, visuals, and facts simultaneously. It has the capacity to flexibly combine a wide range of commercial CV techniques to get answers. Using these CV algorithms on the image, we can produce a range of data that we refer to as image facts. Naturally, a large portion of this data would not apply to the specific topic posed. This is implemented using VQA Visual Genome Dataset, which uses algorithms like Artificial Intelligence, Computer Vision and Natural Processing Language and Methodologies like Neural Turing Machine (NTM) and Validation tools like Joint Embedding and Modular Architecture with Memory Networks and these applications like Answer Prediction and Reason Generation.

Advantages

1. Even though the model is based on many data sources and activities, it advantages from employing a variety of off-the-shelf CV approaches.
2. The system functions better when more information is provided. It can use a CNN model that has already been built.

Disadvantages

1. By comparing the user factors with the prototype factors, the human approvals are calculated.
2. Only the best reason connected to the question being answered had to be chosen. They were instructed. Any of the reasons mentioned here may turn out to be helpful.

[11] "Cross-Modal Attention with Semantic Consistence for Image-Text Matching" - Author: Tan Wang, Xing Xu, YangYang Year: 2020

This paper "Cross-Modal Attention with Semantic Consistence for Image-Text Matching" - Author: Tan Wang, Xing Xu, Yang Yang is one that uses Flickr30k and Microsoft COCO (MSCOCO). The benefit of this paper is that this online system is thorough and effective in the proposed CASC in preserving global semantic consistence along with local alignment.

And the datasets used here are two different datasets to do CASC. This is implemented using the Flickr 30 software, where it is a web-based application where it uses the application of Cross-modal attention for local alignment and multi-label prediction for global semantic consistence.

Advantages

1. It immediately extracts semantic labels from available sentences.
2. It also adds a global similarity constraint.

Disadvantages

1. Two datasets were the only ones used to test CASC. It was not tested whether CASC could operate with various datasets.
2. The key challenge in image-sentence retrieval is how to precisely gauge the semantic similarity between visual and textual input.

[12] "Embodied Question Answering"- AbhishekDas, SamyakDatta, Georgia Gkioxari[2], Stefan Lee, Devi Parikh, DhruvBatra

This paper "Embodied Question Answering" - AbhishekDas, SamyakDatta, Georgia Gkioxari, Stefan Lee, Devi Parikh, DhruvBatra, talks about an agent is randomly placed in a 3D environment and is then prompted with the question "What color is the car?" The agent must ask the question ('orange') and then intelligently navigate to explore the environment and gather data using egocentric first-person vision.

This is implemented using the algorithm of AI Skills – active perception, language understanding, goal-driven navigation, common sense reasoning, and grounding of language into actions. The dataset used is the EQA dataset. The applications used here are Question Answer Accuracy and Navigation Accuracy. It is used to construct the Embodied QA environments, end-to-end trained reinforcement learning agents, and evaluation protocols.

Advantages

1. The navigator (PACMAN+Q) suggested by the model performs best when compared to other baseline models by achieving
2. The smallest distance to target at termination (dT), which causes the model to achieve the highest answering accuracy.

Disadvantages

1. Most possible Embodied QA questions do not require a natural or "correct" navigation path to be answered.
2. The agent moves further away from the target than they did at the beginning. This demonstrates that Embodied QA is a challenging issue.

[13] "Learning Rich Image Region Representation for Visual Question Answering" Author: Bei Liu, Jianlong Fu, Zhicheng Huang, ZhaoyangZeng, Zheyu Chen Year: 2019

This paper "Learning Rich Image Region Representation for Visual Question Answering" Author: Bei Liu, Jianlong Fu, Zhicheng Huang, ZhaoyangZeng, Zheyu Chen to improve the representational capacity of both visual and text features as well as the ensemble of models in order to increase VQA by utilizing more potent feature extractors. Some detection methods are used for visual features to enhance the detector. We use BERT as the language model for the text feature and find that it can significantly enhance VQA performance.

The dataset used is Visual Genome as Object Detection, which uses the algorithm or validation tools known as NLP, BERT, GPT, ELMO& VQA Model. And the applications used here are Ablation Experiments and Comparison with Others and this requires that, using the input image, our model responds to.

Advantages

1. A single model is accurate to 72.79% on the test-dev split, and the ensemble of 20 models is accurate to 74.71% and 74.89% on the VQA test-dev.

Disadvantages

1. Performance is impacted by training large-scale datasets for feature extraction on object detectors.

[14] "Is an Image Worth Five Sentences? A New Look into Semantics for Image-Text Matching" Author: Ali FurkanBiten, Andres Mafla, Lluis Gomez Year: 2021

This paper "Is an Image Worth Five Sentences? A New Look into Semantics for Image-Text Matching" Author: Ali FurkanBiten, Andres Mafla, Lluis Gomez is about image-text matching. Representations from various modalities are mapped onto a single joint visual-textual embedding. The datasets used here are MSCOCO and Flickr30K are actually image captioning datasets that provide only a very small number of ground-truth and notations for relationships.

And the algorithms used here are Semantic Adaptive Margin (SAM) formulation and image captioning metric. Applications used here are the process of Effect of Temperature and Samplings. When using the entire training set, the performance on the annotated image-caption pairs is maintained while improving on other non-annotated relevant items. We'll release the code containing our metrics and our adaptive margin formulation.

Advantages

1. Evaluation of an item's semantic relevance is done separately from its annotated binary relevance.

Disadvantages

1. Image-text matching task is lacking in annotations. Only one image was deemed appropriate given a sentence query.
2. It's possible that the dataset also contains a large number of additional pertinent pictures or captions.

3. The performance and efficiency are a little bit distorted because of the increased dataset requirement.

[15] "Roses Are Red, Violets Are Blue. But Should VQA Expect Them To? "- Author: Christian Wolf, CorentinKervadec, GrigoryAntipov, MoezBaccouche 13 Year: 2021

This paper "Roses Are Red, Violets Are Blue... But Should VQA Expect Them To?" - Author: Christian Wolf, CorentinKervadec, GrigoryAntipov, MoezBaccouche. It introduces distributional shifts in the test and validation splits that are specific to each question because they are based on question groups. We carried out large-scale research and we experimentally showed that a number of cutting-edge VQA models, even those created especially. This is done with the dataset known as GQA-OOD Training Dataset and the algorithm used here is LXMERT pre-training, LM hyper-parameters, Visual Studio. And it is used to train hyper-parameters, Question Diversity, Prediction.

Advantages

1. The advantages of the questions' synthetic nature far outweigh their drawbacks.

2. This specifically provides better control over the data and eliminates unmodelled external knowledge, which improves

Disadvantages

1. The proposed benchmark is based on the GQA dataset, whose questions were generated automatically.

2. As a result, the GQA dataset has a constrained vocabulary (covering only 70% of VQA2 answers), and it use synthetic syntax.

III. DRAWBACKS OF EXISTING SYSTEM

1. **Time delay** - Cased using speech-to-text for answering questions.

2. **Minimal accuracy**

3. A **Manual Monitoringprocess** is necessary.

4. **Independently** - Students who are blind must rely on others to acquire resources.

5. **Long word** - the student's long word is muted by noise suppression.

6. The voice entered in a seamless manner; these can be **discrepancies.**

7. They might not feel comfortable with the **assistance** of the blind people if they speak a unique language rather than English.

IV. PROPOSED SYSTEM

The database network and Speech-To-Text conversions for this technology would be made feasible via internet access. With the support of text-to-speech, this approach was only recommended in order to lessen the pressure placed on the visually impaired students when writing an exam. Every component of the system has been integrated with it, and students can easily navigate through it with the help of the buttons and can choose their preferred language

(Tamil or English) and even the codeword is provided to do the authentication process before the exam starts. The system also provides time alerts for students who want the most flexibility possible when taking exams.

V. ARCHITECTURAL DIAGRAM
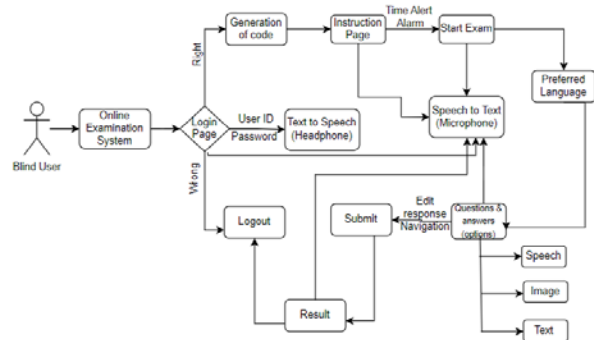
Fig. 2. Architectural Diagram

VI. EXPERIMENTAL RESULTS & OUTPUT

6.1 Authentication

Fig. 3. Home Page

Login Page   *Codeword*
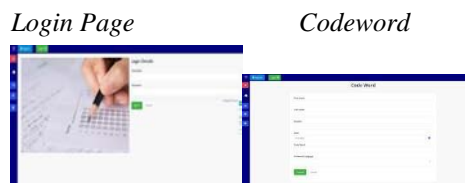
Fig 3. Login &Codeword Page

Buttons
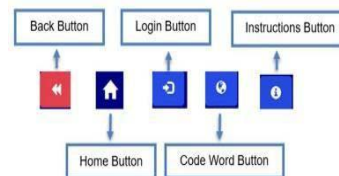
Fig. 4. Button description

6.2 Google to Text Speech
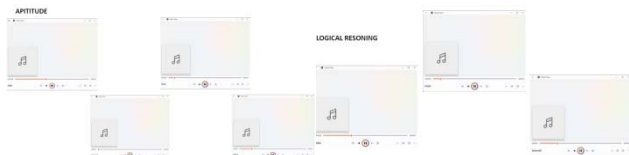
Code

Fig. 5. Text to speech code

Output

Fig. 6. Text to speech – output

6.3 Speech Recognition

Code


```
import speech_recognition as sr


def main():
    r = sr.Recognizer()
    with sr.Microphone() as source:
        r.adjust_for_ambient_noise(source)
        print("Please say something...")
        audio = r.listen(source)

    try:
        print("You have said : \n " + r.recognize_google(audio) )

    except Exception as e:
        print("Error : " + str(e))


if __name__ == "__main__":
    main()
```

Fig. 7. Speech to text code

Output

Fig. 8. Speech to text - output

VII. CONCLUSION

In this paper, we discussed how people who have trouble seeing could put in extra effort to test their internal aptitudes via a web exam. Navigating the question stack as the user interface for individual users. The initiative makes it possible for visually impaired people without any assistance of human intervention. It completely avoids voice synthesis, speech issues with recognition, noise suppression and mismatch errors. This system reduces ambiguity which

prompts a given microphone. The user can hear alert messages that indicate "how much time is remaining" to submit the exam and can be easily navigable by users.

Before finishing the test, the users have the same access to all of the answered and unanswered questions that humans have. Due to the combination of activities offered by all of them, a blind person may now take a virtual test to determine their own skills.

The main goal of this project is to give users complete usability, supportability, profitability and feasibility to take an online test as a regular person. A person with a disability is permitted to take part in any competitions held by organizations through the internet. This could help to improve the percentage of visually impaired people who participate in any test that is competitive. Therefore, visually challenged impaired people can take exams just like any other person without any problem.

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