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Voice Controlled News Web Application With Speech Recognition Using Alan Studio

D.Balasubramanian Professor - Department of Master of Computer Application

M.Kumaran Asst. Professor - Department of Computer Science Engineering

V.Seedha Devi Associate Professor, Department of Information Technology

S.Rajendran Professor - Department of Mechanical Engineering.
Jaya Engineering College, Thiruninravur, Tamil Nadu -602024.
balatab3@gmail.com

Abstract
In this paper, a very fascinating proposition is created, a new web-based service that is a fusion of the revolutionary new Alan Studio, News API and React. The proposed idea of the Voice Controlled Web Application provides a simplistic approach and ease to the user. The service provides all the components required for a user to be able to use voice and speech as a medium to find and look for news about his/her choice and the option to go through the news in a very concise or in very detailed manner. A voice-controlled system embedded in a web application can enhance user experience and can provide voice as a means to control the functionality of e-commerce websites. The system also offers the ability to search news on the basis of preferred location, source, theme, and interest. The system provides a very user-friendly, easy to use, dynamic, and informative user experience. The system enables the user to have the ability to not onlystay informed and updated but that too by using one of the most sought-after technologies in the world right now. The system will reduce the amount of human effort required by the user to perform previously and will offer a more exciting way of gettinginformed.Newspapers have been a constant source of news and information for us for about 400 years now. Many technological advancements led to newer ways of delivering news and information about various aspects. Since the advent of technological developments such as Artificial Intelligence, researchers and developers have tried to make use of Artificial Intelligence in various fields. This research paper is an effort to make newsreading more fun and interactive using the ALAN voice assistant.The web app is completely interactive and the user is able to get news from any topic of interest just by speaking. The user can access news by category, popular news channels, by terms, etc. The web app is completely responsive and works well with anydevice such as a laptop, tablet, or mobile phone. The paper is developed using technologies such as (ReactJS, JavaScript, Visual Studio Code, and Alan AI.)

Keywords:

Terms: Artificial Intelligence, Voice Assistants, React, News API, Alan AI Voice

Recognition, Mobile Digital Assistant, Audio Pattern Matching, Audio Control, Mobility.

1.Introduction

With great advancements in AI, have offered an approach for development in the field of news technology. In this paper, we have used Alan AI to help get the user some news[5] that they desire to know about. When a user asks Alan about a topic, the AI synthesizes their speech into commands that can then be used to gather information from [12]various applications. have used ReactJS to develop the front-end of this application andJavaScript for behind-the-scenes operations. Visual Studio Code was our editor of preference. Adding all these technologies together, progressed to building a hands-on paper. Traditional news gathering methods such as newspapers, radios, televisions[5]have been and succeeded for a long time. In modern-day, Weare familiar with the use of smartphones and other types of computers for the same through the use of the internet. Although these methods work well, news gathering has never been fun and much interactive.

2.SystemOverview

To make life easier, advancements are being made in technology, and voice control is one of the leading technologies which are gradually being implemented on more and more devices. Voice control has become one of the most in-demand [7]skills. More and more applications and services provide voice control capabilities. Voice control capabilities provide a very easy and hands-free experience for the user and enables him to use theservice without having to physically use the device with his/her hands.

The modern lifestyles do not allow us to take time from busy schedules to sit down and read newspapers, magazines etc to get us informed about the latest events happening all around the world. With each successive generation, society struggles even more to stay Informed and educated about the world. Reading and attaining the latest news was a well-practiced habit [10]that was followed by a huge part of the society that seems to get forgotten gradually. With the involvement and introduction of technology, it is observed that new ways of news reading are getting replaced with old methods. News is manually customized to grab the attention and notice of its reader and is even available in a short, to the point format.

There are various major, big news apps that give e-papers and a gist of news as notifications or updates for their readers and users. With every new story or article that is read, the reader gains knowledge about the events taking place across the globe. News reading is the quickest and most effective way to gather knowledge about state and global news. Since news agencies cover all subjects of interest like Fashion, Lifestyle, Fashion,

Politics, Sports, Entertainment, and more, the reader is constantly updated about all thesefacts.The traditional methods of data entry fail [15]the requirements to support all types of users. Thus, it is necessary to develop systems and applications with enhanced usability for all users. Most of the current applications lack the accessibility features that may hinder some users for example the visually impaired users.

The hands-free approach provided by the system goes to a great length and makes the user

interact more often as the user usually prefers to use voice commands rather than giving commands by typing. One of the biggest advantages of the proposed system is that the voice recognition is not limited to just mobile phones, laptops or computers but voice recognition[19] is being installed in all types of devices that users interact with like smart televisions, smart watches etc.Voice recognition is also being installed[18]in vehicles. Cars and other automobiles are finding the benefits of voice recognition and voice command. The system is very easy to use, very user friendly and the user has the choice of language he wants to interact with the system.

The voice control technology is reaching new levels day by day and the system will also help in tackling one other problem that the normal user faces every day. Apart from some, most people face trouble while typing in a regional language. Most keyboards do not provide enough compatibility and comfort while typing in a [4]regional language. By using the system, the user has the free choice of using the language he prefers. This helpsin faster result searching, better user experience and better user satisfaction.

The system also takes care of the user's privacy. The system does not get activated on its own and only gets activated when it gets prompted by the user. The privacy of the user's data is one of the key concerns. The data stored in the system is entirely safe; it only records the news sources, news type etc, only to make the system [21]feel more personal and more customized to the needs and liking of the user. After the development of the proposed idea, the user will be able to tackle the above-mentioned problems and would also be able to get the benefits from one of the fastest developing technologies in the technical industry at this moment of time.

According to various research groups and studies, 2019 saw about 111.8 million people using the voice assistant at least one time in a month in the USA alone. The papered figure of the number of people using voice assistants in the USA by 2021 is around 132 million. The ever-increasing number of people using this technology just gives us the advantage and also a need for the likes of the proposed system. Web apps equipped with voice [18]enabled systems can provide flexibility in terms of users' choice of webinteraction and can also increase the usability of the app for the general users when they are unable to interact with the system in the traditional methods.

3.LiteratureReview

Technically speaking, speech recognition goes way back to 1877 when Thomas Edison invented the phonograph, the first device to record and reproduce sound. Voice Recognition is used by everyone using a smartphone or a smart device. It has limitless scope and can be used in different ways.

- Design of an Intelligent Voice Controlled Home Automation System by SonaliSen, ShamikChakrabarty, RaghavToshniwal, AnkitaBhaumik.
- Voice controlled surgical suite by David F. McCall, Leslie M. Logue, Francis J. Zelina, Matthew V. Sendak, Julie R. Hinson,Ward.
- Preventing false wake word detections with a voice controlled device by Ian W. Freed,

William Folwell Barton, RohitPrasad.

- Voice controlled wireless communication device system by Stephen S. Burns, Mickey W.Kowitz.

The above stated improvements show the ability and future of voice recognition and control. In the proposed system, voice recognition is used in another field and it stretches its scope into a new dimension. The proposed system takes a set of well-established and new upcoming technologies and it enables users to set up a combination that provides a useful, exciting and user-friendly experience which helpsusers save time as well as physical work.

The idea of the voice operated browser was extended by Han et al such that it could be used in a smart TV. The research focused on navigating and controlling a dynamically generated hierarchical menu on a webpage with voice keywords. Sagaret al. proposed an application where email services are combined with speech to text services and text to speech thus enabling users to write, send, and read their emails.

4.ExistingSystem

There are limitations to speech recognition software. It does not always work across all operating systems. Noisy environments, accents and multiple speakers may degrade results. Also, regular voice recognition software can lack integration with other key services.drawbacks or disadvantages of Text to Speech Conversion: The system is very time consuming as it requires huge databases and hard-coding of combinations to form these words. As a result, speech synthesis consumes more processing power. The resulting speech is less than natural and emotionless.

4.1.Disadvantage

Inconsistent reproduction. Typical one day exposure. Clutter (untidy state) Lack of movement and sound. May be limited to black and white. Readership declining andproduction cost increasing. Poor photo reproduction limits creativity.

4.2 ProposedSystem

The Proposed system enables a wide range of users to stay informed and update while using as less time as possible. It makes getting informed and knowledgeable easy and very interesting. People with limited time now can easily get up to date just with the help of a few vocal commands.It also helps physically challenged people to make use of the latest advancements in the technical fields and enables them to stay updated and informed without their health condition hampering them.The proposed system is a fine example of how one of the most sought-after features of the modern device can make our lives much easier and help us save both time and the physical work to stay informed.

4.3Advantage

Newspapers carry the news of the world. Newspapers provide information and general knowledge. Newspapers provide news about a country's economic situation, sports, games, entertainment, trade, and commerce. Reading newspapers will improve your knowledge in general and it will be easy for you to relate to other people who often talk about current

events and politics.

5.Development environment

5.1AlanStudio

Alan adds an entire server less environment to construct complex and trustworthy in-app voice assistants and chat bots. Alan studio is a great tool that helps in seamless voice recognition. There is no need to make spoken language models, train the speech recognition software, launch and host voice parts the Alan AI backend does the most of the work. The voice experience for any app can be constructed and made by asingledeveloper, rather than a team of Machine Lear

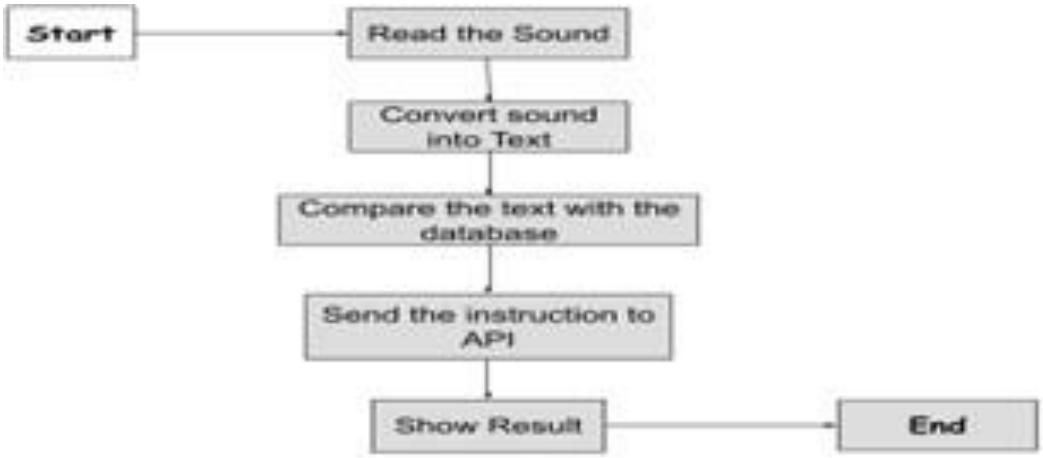


Figure 1. Working of Alan Studio

With Alan, you can go beyond the abilities of touch and type interfaces and voice enable any complex workflow or function in any app. Voice scripts are constructed in JavaScript, which makes them heavily modifiable and flexible. The following flowchart depicts how Alan Studio works.

The performance of a SRS depends on the size of the vocabulary it supports for a certain level of accuracy, complexity, and information processing rate. Alan Studio has a very large sized vocabulary and thus STT and TTS generate great results. The otherimportant aspect of a great SRS is that it is speaker independent, that is the application can support voices and the pronunciation of words on a global level thus making it useful for a greater range of audiences. The speaker's independent recognition is more difficult because the internal representation of the speech must be global so that it can cover all types of voices and all possible ways of voice pronunciation and yet specific enough to find the differences between variouswords.

5.2 React

React is a JavaScript library for developing user interfaces. React makes it effortless to create responsive UIs. Design basic views for every state in any application, and React will accurately update and render just the correct parts when the user's data updates. React enables users to construct encapsulated parts that manage their own state, and then combine them to make dynamic UIs. Since component logic is constructed in JavaScript instead of templates, you can easily pass detailed data to any app and keep state out of the DOM. React

has been made from the start for continuous adoption, and you can use as few or as much React as you need. Whether you want to get a gist of Reactor include some features to a basic HTML page, or start a React-powered app, the links in this section will help you start.

5.3 NewsAPI

News API is a basic HTTP REST API for finding and collecting live articles from all over the web. It can help any simple queries like:

- What famous stories are TechCrunchcurrently?
- What latest articles were published about the next iPhone?
- Has my company or product been mentioned or reviewed by any blogs recently?

We can find articles with any combination of the following criteria:

- Keyword or phrase. Eg: find all articles containing the word 'Apple'.
- Date published. Eg: find every article published today.
- Source name. Eg: find every article by 'Mi'.
- Source domain name. Eg: find every article published on thenextweb.com.
- Language. Eg: find every article written in English.

We can sort the results in the followingorders:

- Date published
- Relation to search keyword
- Popularity of source

The Application Programming Interface, API is a messenger that takes requests and tells the system what the user wants and then returns the response hence it is software that provides a foundation for connection between two applications. This connection is used to send a request and return a response to the user. An API is the real backend connectivity engine between various other applications. Two APIs are used in this paper. Each web app has its API which connects with another application. The two APIs were from news API and ALAN AI's API. One can search and find news across the globe using news APIs. A lot of query searches are available, you can retrieve news by country, accident, and pandemic or on games according to developer choice.

6.Systemarchitecture

The user provides a voice input to the web app. The app sends the signal to the Speech to text service. The STT service converts the voice signal and converts it into text which is then sent for the keyword matching. If the keywords are matched then the functionality that the keyword is related to is performed but if the keyword is not matched then an error message is sent to the web app and then to the user. After the task is performed, the results are then shared to the web app which then replies to the user with a voice reply.

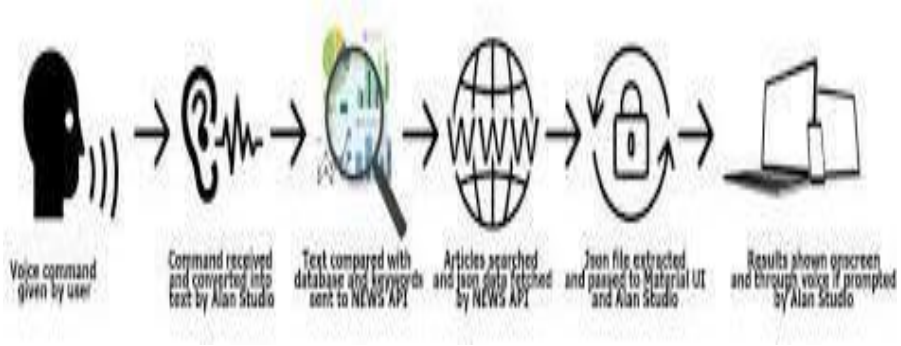


Figure 2. Working Diagram of theSystem

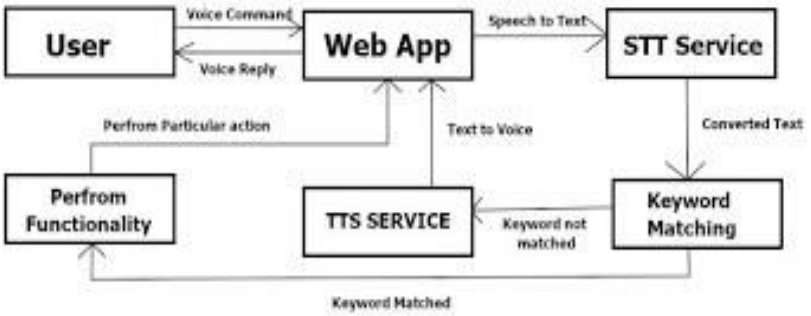


Figure 3 Architecture of WebApplication

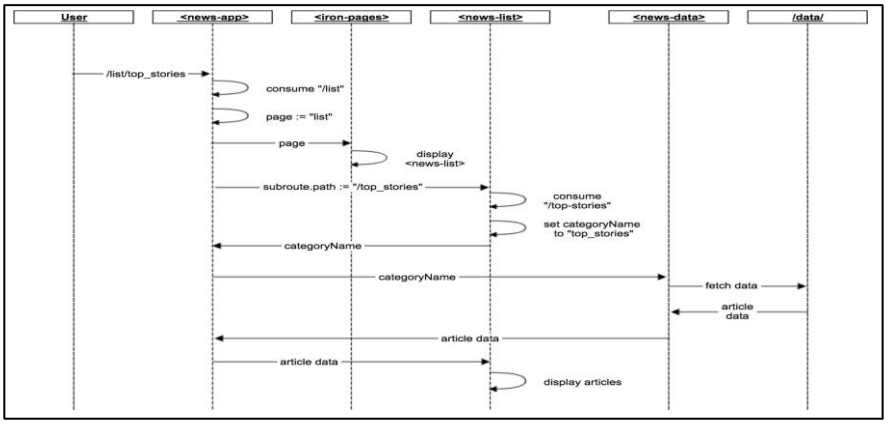


Figure 4SequenceDiagram

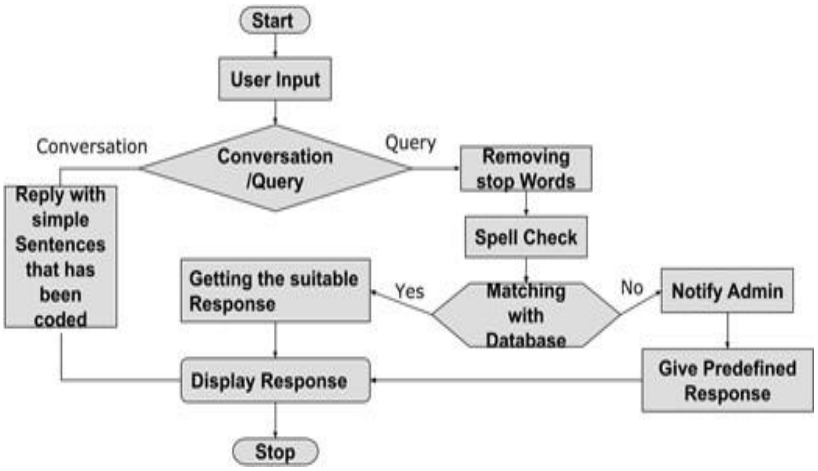


Figure 5. Activity Diagram

7.Implementation

The paper implementation can be divided into three parts which are Frontend development, API connections with frontend, and ALAN AI Studio Backend programming.

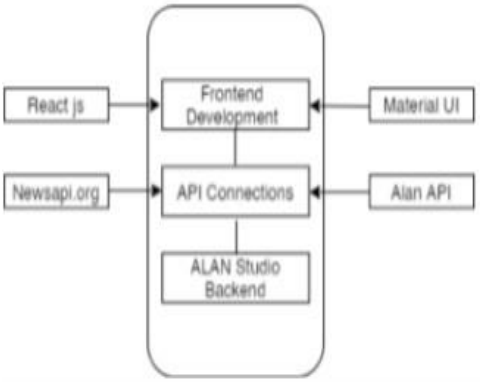


Figure 6. Overall Implementation Structure

The front-end part of the paper was implemented using ReactJS [1] and Material UI [2]. As mentioned above, ReactJS is an Open Source JavaScript library maintained and developed by Facebook, it is used for the development purpose of User Interface Components. The components can be reused as many times as a developer desires. React can be used with various frameworks on the server-side and as well as the client-side. The main reason for choosing React for frontend was that it allows us to create a web application with large data and also the changing of data doesn't require us to reload the page. The rendering process of React is done by using the Virtual DOM which is fast.This fast rendering was required in a paper like this where the user is interacting with the web app using the actual voice. Material UI on the other hand is a popular React UI framework. It allows the developer for quick development by providing various components. Some of the components [3] used for this paper were Card, Card Actions, Card Action Area, Card Content, Card Media, Button, andTypography.

The Application Programming Interface, API is a messenger that takes requests and tells a system what the user wants and then returns the response. Hence it is a software that provides a foundation for connection between two applications. This connection is then used to send requests from one application to another and get a response in return. An API is the real backend connectivity engine between various otherapplications.

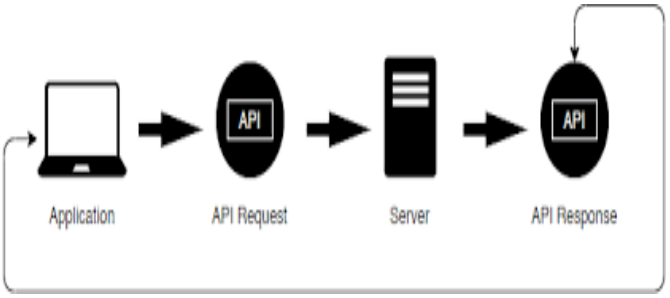


Figure 7. API Architecture

In this paper, I have used two APIs. Every application has its API key to connect with your application. The two keys were from News API and Alan AI. Using the News API [4], one can search and retrieve accurate and current ongoing news across the globe. A lot of query sets are available, one can search and retrieve news by terms, category, or by any news sources. The developer can customize the query for the particular regions for the news. This HTTP REST API allows the developer to access quick news as per the request. The frontend was developed according to the features of this API as there are cards according to the news by terms, category, or by any news sources. Some query setavailable in the paper are:

1. **News by terms**
   `https://newsapi.org/v2/everything?apiKey=${API_KEY}`
2. **News bysources**
   `https://newsapi.org/v2/topheadlines?apiKey=${API_KEY}`
3. **News by category**
   `https://newsapi.org/v2/topheadlines?country=in&apiKey=${API_KEY} &category=${YOUR-VALUE}`

Alan Conversational Platform lends strong support for your app by providing it's easy to integrate SDK, JavaScript scripting Alan Studio to customize Alan according to our application. The Alan Studio provides a testing tool where the developer can debug the JavaScript commands. The Alan button doesn't interfere with the User Interface of the application and can be placed anywhere dynamically just by swiping or moving it using the mouse. The cloud handling makes it even more powerful as it is managed by Alan Studio itself. The developer doesn't need to work on the data security and isolation as the cloud handles it with ease.

The simple integration of Alan SDK lets the developer use it with various technologies such as Web, iOS, Android, Ionic, Flutter, Electron, Angular, React, Vue, Ember, and Vanilla JS. The scripting for this paper was based on the news requirement. Commands like "Give me the latest news from BBC'', "What's up with COVID 19", and more were scripted. The voice assistant is completely scripted to read out all the headlines of the news that the user searched for.

While reading the article headlines, the frontend of the paperhighlights thearticle by a blue bar below it. The user can ask to open any article to read in depth about that article. The paper redirects to the news article when the user asks to open an article of their choice. The paper gives Alan some more added functionalities like small talk and mathematical calculations.

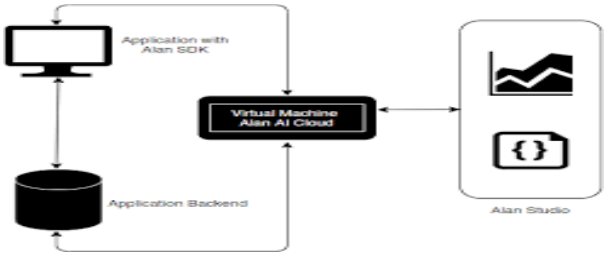


Figure 8. Application Interaction with Alan

8.DesignImplementation

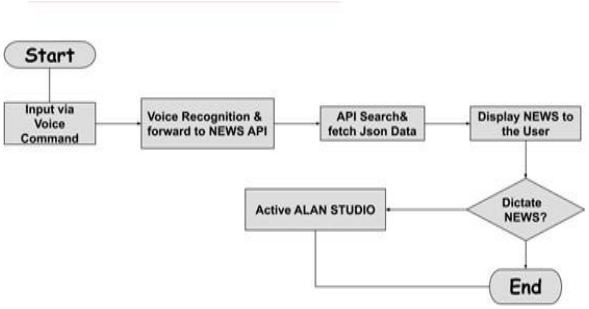
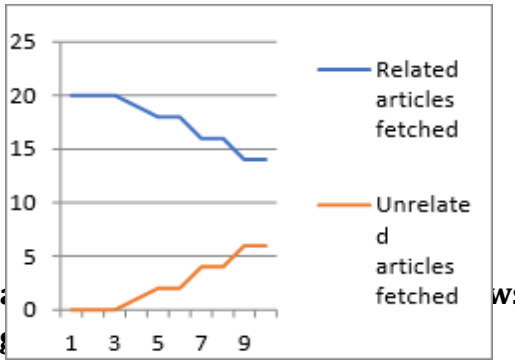


Figure 9. Design &Implementation

The above-mentioned technologies combine together and offer the user a perfectly working system that enables him to search and browse through the latest updates, news and articles from various sources, locations and topics. The system works very precisely, offering the user news from the most reliable and trusted sources. Alan studio offers the voice recognition and delivery capabilities and analyses the vocal instructions provided by the user and identifies the keywords and the task that the user has asked.

The selected keywords are passed through to the NEWS API that searches for the news articles about the selected keyword and returns the JSON file containing all the textual data that the articles contain.The Material UI helps to extract the data from the JSON file and it passes the extracted data to the Alan studio which once again reads and analyses the data and converts into voice and reads the articles to the user.The proposed paper offers a new, faster, reliable, easy to use and a user-friendly experience that helps the user to stay informed and stay updated with the events happening around the world. The system is able to identify between the various keywords being said by the user and thus able to return the news according to the query provided by the user. The system distinguishes various sources, locations, topics and themes of the news that might be interesting for the user.

The above-mentioned data showcases how the system performs when various lengths of search



quires put into the system. The system identifies number of keywords and shows the results according to the keyword identified.As the number of words increase the number of keywords also increases and the system also fetches news articles according to the keywords. Thus, a variety of news articles are fetched which may not be related to the overall search query but

Figure 10. Articles status

related to theparticular keyword identified by the system. But still the system manages to fetch agreater number of related articles as compared to the number of unrelated articles fetched.

The above graph also indicates that despite the number of related articles decreasing slightly as the user increases the number of words searched and keywords identified by the system, the number of related articles fetched by the system is more than the number of un-related articles fetched by the system.

9.Conclusion

Reading newspapers takes up a lot of time and the reader usually spends reading about articles in which they are not interested. By using this paper, the user can get to hear about all the important headlines of their chosen topic on the go, in just 5 minutes.

The paper is capable of reading all the headlines of the news articles and can open the source article for more in-depth reading if required by the user.Alan voice assistant can be integrated into many more applications in the field of health-care, business, banking, and e-commerce applications. As far as news applications are concerned, I suggest that the integration of voice assistants in news applications will not only enhance the user experience but also make news more engaging in the near future. Hereby have successfully completed our paper and concluded our research.

The system also enables users to listen to the articles that grab our interests and those that it thinks are important for the user to know. The proposed system is a fine example of how one of the most sought-after features of the modern device can make our lives much easier and help us save both time and the physical work to stay informed.

The system will continue to develop and more and more functionalities can be added to it. The number of efforts going into the development of voice recognition and voice command adding with the continuously increasing demand of the users, the system will never get outdated. The system is flexible, user interactive and compatible with almost every device that has the ability of voice command.

10.Futureenhancement

When voice recognition began to emerge in the early 2010's with the introduction of what now is one of most recognized devices, Siri, no one was expecting this would become such a driving force for future technical innovations.It is estimated that 1/6th of the United States' population now owns a smart speaker. This just gives us a mere glimpse of the reach of this technology and the vast land of opportunity the system has.The system would support a greater number of languages supported by the system, thus adding even more comfort and

ease for our user.The system would also become more and more user friendly while keeping track of the most favoured news source and newscategory.The technology is emerging all over the world and in the coming years, voice recognition is expected to grow and will create enormous revenues. As the system is working on most of the requirements for now, the system will be added number of functionalities and capabilities.

11. Implementation

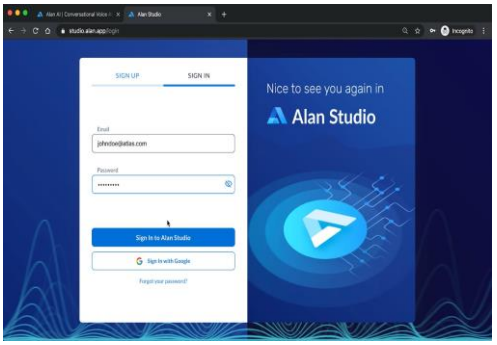
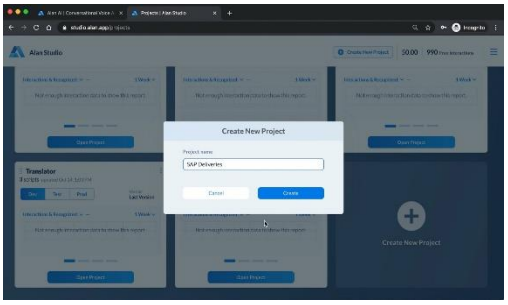


Figure 11. Paper MainPage Figure 12Alan Studio Login



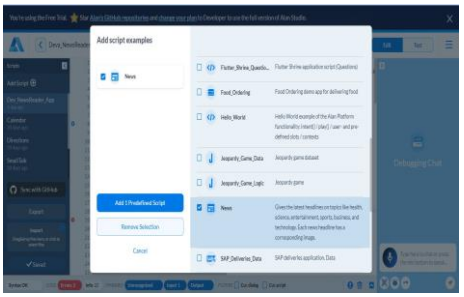
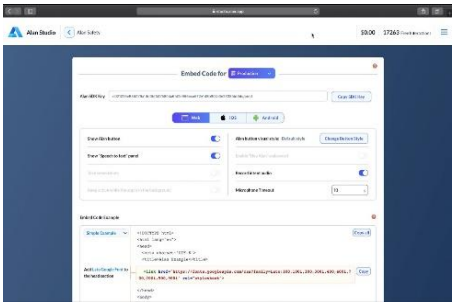
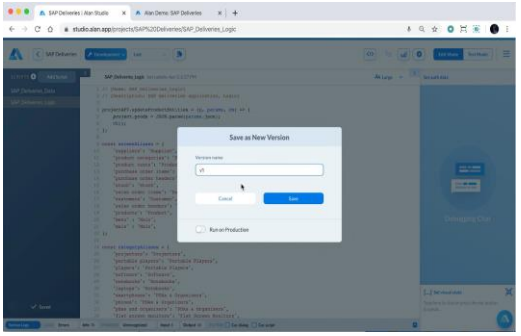


Figure 13Create NewPaperFigure 14 Create NewPaper Figure





14Add Sample Script Save as New Version

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