Turkish Online Journal of Qualitative Inquiry (TOJQI)
Volume 12, Issue 10, October 2021: 2156-2172

Application Of Speech-To-Text synthesizer by using Natural Language Processing (NLP)

Sameera A'amer Abdul-Kader

University of Diyala/College of Education for Pure Sciences/ Department of Computer

Abstract- Synthetic speech's applications sector is rapidly growing, as well as the quality of TTS systems is continuously improving. Speech synthesis solutions are becoming relatively cheap for average users, making them more appropriate for regular usage, especially as NLP, Machine Learning, and Artificial Intelligence continue to develop where Synthetic speech may also be utilised in a variety of industries, and with effective integration, money can indeed be saved.

Index Terms: Artificial intelligence ,Neural networks, Natural Language Processing, Question Generation, Question Answering, Information Retrieval, Feature Extraction, Conversational Agents.

I. INTRODUCTION

The rapid growth of technology necessitates our awareness of current events and new technology that affects our life. Artificial intelligence and machine learning, as well as their subcategories and technological tools, are perhaps the most prominent features, but the matter is evolving to the point where it may eventually replace humans, necessitating a deep understanding of this technology in order to adapt it to us and prepare the community to receive this kind of change and thus prepare for it, In this paper, we will describe a new advancement in this sector, including its benefits, drawbacks, and challenges arising from it.

II. Artificial intelligence

A. What is *Artificial intelligence* ?

AI (Artificial Intelligence) refers to systems or robots that mimic human intelligence to accomplish tasks and may develop itself over time depending on the data acquired. Artificial intelligence comes in a variety of shapes and sizes. Here are a few examples: Artificial intelligence is used by chatbots to better comprehend consumer concerns and offer more effective responses where Intelligent assistants utilize artificial intelligence (AI) to evaluate crucial facts across big data sets of textual information in order to enhance schedule and provide automatic suggestions Preferences to Users

It has less to do with any structured genre or function but more to do with the capacity to interpret and evaluate data. [1]

B. Beginning of AI :

It was established important groundwork for logic and theoretical computer science in the 1930s where theorems are of specific importance to AI. According to the completeness theorem.

This implies that any true statement that can be expressed in predicate logic can be proven using formal calculus rules. On this basis, fully automated theorem provers might be built as formal calculi implementations in the future. With the inconsistency theorem, Gödel demonstrated that in higher-order logics, true statements are unprovable. He used this to expose the painful limits of formal systems. [2]

for 1950s we notice that Newell and Simon created Logic Theorist, the first automatic theorem prover, demonstrating that machines, which typically only work with numbers, can also handle symbols. At the very same moment, McCarthy introduced LISP, a programming language designed specifically for the processing of symbolic structures. Both of these systems were initiated at the historic Dartmouth Conference in 1956, which is regarded as AI's birth year.

LISP became the most important tool for the execution of symbol-processing AI systems in the United States. Following that, the logical inference rule known as resolving evolved into a full calculus for predicate logic. [3]

As that of the European counterpart to LISP, the logic programming language PROLOG was introduced in the 1970s PROLOG has the benefit of giving direct programming with Horn clauses, which is a subset of predicate logic. PROLOG, like LISP, has data types for easy list processing ,Until well into the 1980s, AI was dominated by a pioneering spirit, particularly among many logicians. This was due to a string of significant accomplishments in symbol processing. The Fifth Generation Computer Systems project in Japan and the ESPRIT program in Europe both invested heavily in the development of smart computer systems For minor issues [4]

After more than 25 years of research on neural networks, scientists may be able to harvest the fruits of their labour . Deep learning networks, for example, can learn to classify images with high accuracy. Because image classification is critical for all types of smart robots, this sparked the AI revolution, which led to smart self-driving cars and service robots.

As in January 2016, AlphaGo by Google DeepMind defeated the European champion 5:0, and in March, it defeated Korean Lee Sedol, one of the world's best Go players, 4:1. This success is due to the use of deep learning methods for pattern recognition, and also reinforcement learning and Monte Carlo tree search. [5]

C. AI moving Fast :

Is artificial intelligence (AI) progressing too quickly? AI was a kind of laboratory inquisitiveness just a decade ago. It is now an unrivalled economic power that can be noticed within us.

The frequency at which AI is being integrated into our lives cannot be overstated. Smartphones took ten years to “eat the world,” as Benedict Evans, an Andreessen Horowitz analyst, put it. The Internet took 20 years to develop. It only took five years for AI to progress from lab obscurity to revolutionary innovation. According to PricewaterhouseCoopers, artificial intelligence contributed $2 trillion to global GDP in 2017 and 2018. [6]

This accelerated timeline has only added to the technology's anxiety. According to a 2019 survey done by consulting firm Edelman and the World Economic Forum, among 54 and 75 percent of the general public believe AI will enhance public isolation, cause a “loss of human intellectual

capabilities," and ultimately harm the poor while benefiting the wealthy. To complicate things worse, 33% of survey respondents believe that deepfakes could spark "an information war, which could lead to a type of war." [7]

D. Implementation of AI in automation:

In an expanding range of jobs and industrial processes, robots and contemporary AI practice are continuing what other automation technologies have done before: utilizing machines and computers to replace human labor.

Most industries demand that a variety of activities be completed at the same time. Fabric production, for example, necessitates fiber production, fabric manufacturing, pretreatment bleaching, dyeing and printing, finishing, as well as design, planning, marketing, transportation, and retail where Each of these activities may be completed by human and machine labor, as majority of these jobs were labor-intensive during the start of the British Industrial Revolution, Most of those early developments of that era were targeted at automating spinning and weaving by replacing skilled craftsmen' labor with mechanical processes. [8]

Automation isn't limited to the industrial and agricultural sectors.

A lot of white-collar activities in retail, wholesale, and commercial services have already been mechanized by computer software. Information can now be retrieved, logistics can be coordinated, inventories can be handled, taxes can be prepared, financial services can be provided, complex documents can be translated, business reports can be written, legal briefs can be prepared, and diseases can be diagnosed using software and AI-powered technologies. During the next several years, these technologies will get a lot better at these and other jobs. [9]

E. Implementation of AI in Medicine:

The future of 'standard' medical treatment, in which a patient sees a computer before visiting a doctor, may be closer than we think. With advancements AI , where the days of misinterpretation and symptoms of the problem instead of the root cause of disease look to be numbered. More AI and statistics healthcare solutions are possible because to the gathering of data produced in hospitals and kept in electronic medical records through standard testing and medical imaging. The way doctors and researchers handle clinical problem-solving has evolved and will continue to change as a result of these applications. [10]

Researchers have been investigating the possible uses of intelligent methods in every sector of medicine since the mid-nineteenth century. Gunn was the first to study the use this technology in surgery in 1970s , where using computer analysis to check severe discomfort. Medical AI has witnessed a spike in popularity during the previous two decades.

The task of obtaining, evaluating, and using the vast quantity of knowledge required to solve complicated clinical issues is a difficulty for modern medicine. [11]

The advancement of this technology has been linked to creation of algorithms aimed at assisting clinicians in the formulation of diagnoses, treatment decisions, and outcome prediction. They are

intended to aid healthcare personnel with activities that require the processing of data and expertise on a daily basis. [12]

F. Will AI destroy Job opportunities for Human ?

The World Economic Forum issued a report in January 2016 predicting that Manufacturing will result in the loss of more than 5 million jobs in the incoming 5 years. where prediction unsurprising, given that using machining inside industries, household, and different sectors had resulted in computers, machines, and robots performing ever-increasing amounts of labor. Since around 2010, AI has been one of the most prominent elements in this development.

The bulk of people, presumably, will cheerfully delegate physically demanding, filthy, and unpleasant occupations and chores to robots. [13]

As a result, automation is a full boon to humanity, providing it does not have any negative consequences, including environmental damage, when most of the abovementioned difficult activities might have been done both quickly and efficiently. Machines are more accurate and, above all, less expensive. This appears to be a pattern. [14]

III. Natural Language Processing (NLP)

A. NLP: Definitions and Main Concepts

Language is a means of expressing yourself. Language aids in the comprehension of the world as human gained more knowledge of it. Language allows Humans to general or specific whatever they want. Natural language processing is abbreviated as NLP. Natural language processing encompasses everything a computer requires to comprehend and produce natural language. NLP is branch of CS, AI, and the linguistics that studies how computers interact with human or natural languages. NLP is primarily concerned with human-computer communication. [15]

Natural language processing was also thought to be necessary since there is a large amount of data collected by computers,Books, Media, business and government reports, and scientific studies are continuously being produced, where they are available online or in certain reports where a system that requires a large amount of data should understand the human language in order to access data stored on PCs. NLP is a fascinating as well as challenging subject where we must build, assess, and study concepts of the implementation and thinking. [16]

B. Understanding of NLP :

Any NLP effort must address the critical issue of natural language understanding. The very first involves the thinking activities, the next involves the representation and interpretation of language processing, and the third covers knowledge of the world when developing information systems which grasp natural language. Consequently, an NLP may begin only at level of words, determining crystalline features and nature and then progress to the level of the sentence, determining sentence structure, syntax, as well as the overall meaning of the sentence, and so on, prior to actually relocating on to the framework and the surrounding industry or database. [17]

There are a variety of practical aims for NLP, many of which are connected to the application for which it is being used. An NLP-based IR system, for example, aims to provide more precise, comprehensive information in response to a user's actual information requirement. The objective of the NLP system in this case is to reflect the real meaning and intent of the user's question, which may be communicated in common English as naturally as if they were speaking to a reference librarian. Furthermore, the contents of the articles being examined will be presented at all levels of meaning, allowing for a real match between demand and answer to be identified, regardless of how they are portrayed on the surface.

C. NLP And text manipulation :

Text manipulation has been identified as a key field of research in NLP, whether for information extraction, automated processing, or generating data as you need. This is widely defined referring to the field of NLP of text that permits the structuring of vast amounts of info. Text with the goal of generating specific data or generating procedural data. In general, processing of textual data systems take text input and turn it into a different output type. The translation of ambiguous queries and texts into unambiguous internal representations is the fundamental problem for NLP text systems. [18]

The initial phase of a speech recognition is text treatment system may be morphological research. In order to get the morphological variants of the words involved, stemming of terms is done across both queries and texts. Through use of lexicons to identify phrase characteristics, identification of words and phrases, identifying terms / expressions, including phrase parsing are all examples of syntactical functioning. [19]

NLP has been characterized by basic approaches based on words and POS sequences When used correctly, templates may frequently provide remarkable outcomes.

trained on a vast amount of data a lot of text and emotion classifiers continue to be based primarily onthe many groups of sentences that Without respect to text formatting, texts contain as well as the form or content of the speech Achieving Improvements above these basic baselines are possible.

really challenging Nonetheless, the top performers

Now, advanced ML techniques are used in systems.

and a solid understanding of the structure of the language High-performance methods are already available to identify synthesis and memantine data together with conversation contextual information. For example, Stanford CoreNLP offers a typical NLP processing workflow that comprises POS tagging of named persons such as persons, places and organizations, a scan of sentences within the norms of their syntax, and an increasing number of users among noun phrases. [20]

D. Digital application of NLP :

The Internet and the web have improved our ability to generate, find, and use information significantly. The Internet and digital libraries now provide access to a vast amount of knowledge. However, as a result of these advances, several issues connected to information processing and retrieval have become increasingly apparent. According to a recent survey (Global Reach, 2001), 55

percent of Internet users are non-English speakers, and this number is quickly rising, lowering the number of native English speakers on the internet. [21]

However, English is the language of roughly 80% of today's Internet and digital library materials (Bian, Guo-Wei & Chen, 2000). This necessitates the creation of multilingual information systems and CLIR services as quickly as possible. A key scientific topic is how to manipulate a huge number of multilingual data. Actually, there are a number of concerns at play here. A query translation system must be implemented at the user interface level, which should convert the query from the user's native language to the system's language. For query translation, several methods have been proposed. [22]

A bilingual dictionary is used to translate words from the source language to the target language in a dictionary-based method. The multilingual dictionary's scope and higher is a key concern. The corpus-based technique employs parallel corpora for word selection, however the issue is the corpora's domain and scalability. The implementation of a Chinese-English CLIR platform that combines query translation and document translation addresses a number of issues with machine translation on the web, including the position of HTML tags in translation, the trade-off between quality and efficiency of the translation system, and the format in which the translated information is given where many academics have advocated using the web as a testbed for NLP research due to the large amount of text accessible. Web text, according to Grefenstette (1999), shows language as it is used, and data generated from the web can be useful in many NLP applications. [23]

IV. Question Generation / Question Answering

A. Introduction:

Question answering (QA) and question creation (QG) are two essential methods in the world where linguistic processing Both activities need deductive thinking between a question sequence q and a phrase that answers the inquiry

The QA activity, which is a core QA task that is critical for many organizations Search engines and conversational bots are examples of such applications where QA is a task that requires a question sentence q and a list of possible answers given input, and selects the best possible answer phrases from the candidate list, an appropriate answer sentence The mission

QG is a program that takes a phrase as input and creates a question q is a phrase that can be answered by a where The input and output of these two jobs are obviously (nearly) in reverse, which is Known as duality: duality connects QA and QG, and it may be able to aid in the improvement of both activities. [24]

B. Orgins of QG:

Eager producers of questions that constantly auto-control ongoing training are the common features of excellent learners. They acknowledge their own deficiencies in expertise, pose questions focused on such shortcomings, then respond to the inquiries by consulting trustworthy information sources. Unfortunately, most learners have difficulty detecting their own knowledge deficiencies, thus this utopian notion of intelligent inquiry is rarely realized. Advanced technology such as smart teaching systems and research-based setups where questioning and question generation (QG)

According to available research, humans aren't particularly adept at asking good questions. As a result, automated QG solutions would be beneficial in assisting them in achieving their enquiry demands. [25]

C. QG in todays world:

Researchers have recently focused their attention on QG in computer linguistics. Twenty years ago, searching through materials in a library might ages to answers the same queries. Electronic textbooks and information sources will become commonplace in the future, looking forward to be complemented with hard question-and-answer capabilities. For example , the Google generation thought to be far from inquisitive than previous Versions that depended on passive reading and libraries where we could notice that In past years, new concerns about auto-questioning creation have emerged. They presented a template-based technique for generating queries about four different sorts of things in. To tackle the challenge of presenting students with dynamically created browser-based examinations with considerable engineering mathematical content, the authors utilized (WTML) an HTML extension . They automatically developed the questions on the basis of question templates generated by learning in several professional sources, In, an intriguing method for automatically generating vocabulary evaluation questions was revealed. [26]

D. Example of QG model:

Shiyue Zhang and Mohit Bansal suggest two semantics-enhanced incentives to solve the problem displayed in Figure 1. Which called (semantic drift) to make the generating more consistent to concentrate on creating questions that are semantically correct To cope with the problem of "exposure bias," an issue, many prior efforts utilized it straight as a reward for final assessment metrics As a reward, give paraphrasing probability where it Question paraphrases are treated more equitably. As a result, we must first train a QPC.

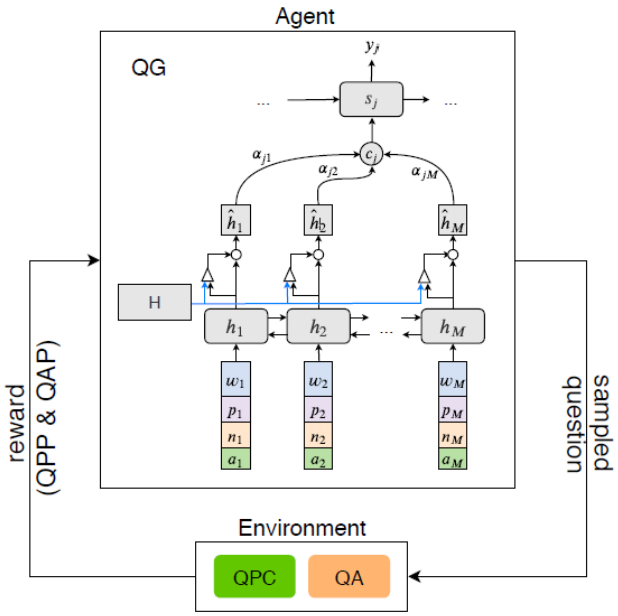

Figure 1: semantics-reinforced QG model architecture.

QG modeling was used using the Quora Question Pairs dataset will interact with it during training in order to determine the likelihood the ground truth and the produced question As a reward, the question is paraphrased. [27]

V. Information Retrieval

A. Introduction:

The Sumerians established dedicated locations to preserve clay tablets with cuneiform writings approximately 3000 BC, which began the practice of archiving written material. The Sumerians knew this even back then that effective information usage necessitated adequate structure and access to archives They progressed. Every tablet and its content is assigned a unique categorization where over decades, the necessity to preserve and retrieve written knowledge has grown in importance, particularly in the United States. Humans understood the concept where computers might be used for storing and retrieving enormous quantities of data soon after they were developed. [28]

Vannevar Bush wrote a seminal paper in 1945, which was the reason of rising of automated access to huge volumes of stored knowledge. This concept evolved into more precise explanations of how text archives could be automatically searched in the 1950s. Several publications appeared in the mid-1950s that expanded on the fundamental concept of using a computer to search text. H.P. Bland described one of the most influential approaches. [29]

Many advancements were made in the 1970s and 1980s, based on 1960s inventions. When the document retrieval stamps have been created, where progress has been achieved in all aspects of the retrieval process where these novel models/techniques were tested on tiny text sets which was ready to access and found to be successful. The question of whether these models and approaches will it fits a bigger set of data and information which need advanced technology to deal with. [30]

In 1992, this was changed mostly with creation of both the Text Retrieval Conferences, or TREC. TREC is a set of NIST evaluation workshops and funded by several US government organizations with the goal of stimulating IR research using huge text collections. [31]

Many existing approaches were adapted, and many new ways were invented (and are still being developed) to conduct successful retrieval over huge collections as a result of the availability of massive text collections under TREC,which has also expanded IR into adjacent but essential domains such as retrieval of spoken information, retrieval of non-English languages, information filtering, user interactions with retrieval systems, and so on. From 1996 to 1998, the IR algorithms developed which had been used for searching the internet. [32]

B. IR model and component:

An Information Retrieval (IR) model chooses and ranks the material that the user needs or has requested in the form of a query. A screening method that provides a recovery status value between each element in the database can formalize the content selection and sorting. since the documents and queries are represented similarly. Many Information Retrieval systems describe document content using a collection of descriptors called words that are part of a vocabulary V. The query-document matching function is determined by an IR model in one of four ways.

- Acquisition: In this stage, documents and other objects are chosen from a variety of web domains that include text-based content. Web crawlers acquire the necessary information and store it in a database.
- Representation: It entails indexing, which includes free-text words, regulated vocabulary, as well as human and automatic approaches. Abstracting, for example, includes summarizing and a bibliographic description that includes the author's name, title, sources, data, and metadata.
- File Organization: There are two different ways to organize your files. i.e. Sequential: It stores documents according to their data. Inverted: It provides a list of records under each phrase, term by term. A combination of the two.
- Query: When inserting or generating a query, an IR process begins. Queries, such as what had been used in web search engines, are explicit assertions of information demands. Whenever it comes to information gathering, a query somehow doesn't recognize only one item in either a set or data. Rather, a number of items may match the query, with varying degrees of relevance. [33]

VI. Feature Extraction

Dimensionality reduction is a common method in high-dimensional data analysis, visualization and simulation. Using Feature selection is among the simplest methods to reduce dimension, selecting just the input dimensions which include the essential data for dealing with the problem. Feature Extraction is a broader technique that entails trying to convert the input space into a small subset which preserves most of the essential data. The purpose of extracting and selecting features is to boost productivity including such anticipated reliability, visualization and understanding of learning information. [34]

Attributes are mostly vital, useless or generally repetitive. Only for training algorithm method only during function identification process, a subset of data sources is selected. The smallest thread along with the most accurate training is the ideal place for The advantage of selecting features would be that crucial data about something like a value cannot be wasted, however since only a small set of attributes are needed as well as the original features are increasingly variable, the danger is that some elements will be misplaced as they'd be removed. On the other hand, the situation is rather different. [35]

Given the large variety of available models and algorithms, it's important to have parameters to rely on when deciding which approach to utilize in certain scenarios. A quick survey is carried out to assess the appropriateness of different selections of characteristics and extraction procedures for certain circumstances experiments conducted by researchers to determine how these technologies help to improve classification algorithm forecasting ability and it’s found that it’s extremely important to work in such an environment with these advanced features and technologies which could lead to development in all of our aspects of life. [36]

VII. Machine Learning

Machine learning is an advanced programming method which automates the creation of analytical models and allows programs, without being explicitly coded, to do certain jobs more effectively. Machine learning enables the system to learn and enhance task accuracy via experience automatically.

As we see ML is an AI subsidiary that enables machines to understand and evolve independently sans explicit programming. ML focuses on developing pcs systems which acquire and acquire data by themselves.

The phase started using observational data, e.g. as direct experience or directives, therefore we are able to look for training datasets and judge on the basis of our example in the future. [37]

A. Evolution of ML :

Because of improvements in computer hardware, machine learning is no longer the same as it was in the past. The concept that machines may train without training to perform particular tasks was prompted by pattern recognition and artificially intelligent scientists were attempting to determine if the computer trained from data. The iterative component of machine learning is crucial, since algorithms may independently respond to new information. Previous calculations are used to provide consistent, recurring judgements and results. It is not a real technology, but fresh thrust is emerging. [38]

Whereas many ML techniques were known for a long time, the capacity to automatically apply difficult mathematical computations to enormous quantities of data — again and over, faster and quicker — is a relatively new phenomena. To get you started, here are several well-known examples of ML applications:

- How about the much-hyped self-driving Google car? Machine learning at its most basic level.
- Online recommendation services like Amazon's and Netflix's? Applications of machine learning in everyday life.
- Knowing what your consumers are saying on Twitter about you? Combining machine learning with the development of language rules.
- Is it possible to identify fraud? One of the more apparent and essential applications in today's society. [39]

B. Obstacles that Faces ML:

There are different Obstacles that will Faces ML and it would be a challenge to get over and we will state some and we will offer some solutions :

1. **Lingo**. This problem affects all types of specialized research. Our ML lexicon is so well-known that it's impossible to tell when we're using a specialized word. Consider the terms "feature extraction," "bias-variance tradeoff," "ensemble techniques," "cross-validation," "low-dimensional manifold," "regularization," "mutual information," and "kernel approaches," to name a few. These are all core ML ideas that, when used glibly to communicate with others, create conceptual obstacles. Vocabulary can act as a barrier not just between subject specialists and the general public, but also between areas that are closely related, such as machine learning and statistics.

Sol. . We should investigate and discover new ways to communicate the same concepts in different ways more broad words, or even better, in terms that have already been established the audience is familiar with For instance, "feature extraction" is a term that is used to describe the process of extracting can be referred to as "representation;" "Instability" is a type of "variance." "cross-

validation" Outside of ML, it's also known as "rotation estimation." "Simplifying" might be defined as "regularization." a variety of models;" and so forth. These terms aren't as exact as others ,However, it is more likely to be understood, from which a dialogue might emerge. It's possible that further nuances will emerge as a result of this.

2. **Risk**. Even if a machine learning system is no more or no less prone to mistake than a human performing the same task, Using a computer for a task might feel riskier because
   It gives rise to new issues. When mistakes are made, where do they occur?
   Do we apportion blame? What is your degree of long-term commitment? what options do the designers of machine learning systems have for making changes?
   What about updates and maintenance? These are my concerns. are particularly severe in sectors such as medicine, spacecraft, and aerospace. finance, as well as real-time systems, or more precisely those circumstances with the potential for a big effect An increase in the Naturally, the sphere of impact expands. linked danger.

Sol. If we wish to incorporate machine learning into actual systems, we must solve these problems (via technology, education, and assistance).

3. **Sophistication**. Despite the development of machine learning toolboxes and libraries, the discipline has not yet developed to the point where researchers from other fields can simply apply machine learning to any issue (as they do with approaches from physics, arithmetic, mechanical engineering, and so on). Attempts to do so frequently fail owing to a lack of understanding of how to frame the problem, which features to utilize, how to search across parameters, and so on. As a result, it's been claimed that ML solutions come "wrapped in a Ph.D."; that is, to properly deploy ML to address actual issues, you'll need the expertise of a graduate student or beyond—and that same Ph.D.

Sol. After the system has been deployed, it will need to be maintained and updated ,This method clearly does not scale to achieve the aim of widespread ML effect. Though it is an abstract process, simplifying, maturing, and robusting ML algorithms and tools can assist to reduce this barrier and allow for more autonomous uses of ML. [40]

VIII. Conversational Systems/Conversational Agents.

For several reasons both academic and industrial research have lately been the main focus of conversational interfaces, including:

1. . the growth of digital assistants, such as Amazon Alexa, Cortana and Siri.
2. the availability of universal chat systems with social bots, such as Google Allo and Facebook Messenger .
3. advancements in machine learning and natural language understanding (NLU) systems, and 4. the introduction of o "Chatbots" are one type of conversational interface that has no specific goal other than to engage the other person in an engaging or amusing dialogue. [41]

While modern chatbots have come a long way since ELIZA, they are still a long way from being able to hold logical, genuine conversations with people. The Alexa Prize was created to enhance the

state of the art in this field and bring cutting-edge research to a production setting with hundreds of thousands of users.

Where some of the significant problems for researchers is the absence of a reliable technique for measuring effectiveness in open domain dialogues owing to a lack of clear objectives. The Turing Exam is a well-known test that might be used to evaluate chatbots. [42]

A. Conversational agents in modern days :

Conversational agents (CAs) have become more prevalent in everyday life during the last four years. Apple, Microsoft, Amazon, Google, and Facebook have all integrated proprietary CAs into their software, and communication is quickly becoming a crucial method of human-computer interaction. While we have long been aware of the concept of machines that talk.

Where The major added values of innovation in the relationship between the customer, the user, and the brand are service improvement and brand image enhancement where this invention come with other several benefits as :

1. the development of AI, which enables far greater customization of interactions (natural/human language understanding, contextualization, machine learning...)
2. Changes in client usage and behavior (digitalization, social networks, instant messaging, etc.) are also taking place where examples include searching for your train timetable, tracking your delivery, and reviewing the most recent health recommendations, all of which are now available.
3. Brands recognize the benefits (automation of replies to the most frequent and/or non-value-added inquiries, cost savings, unclogging of pending contacts, and so on).
4. Finally, the holy grail: improving consumer happiness by addressing the desire for immediacy and autonomy.

B. Challenges faces Conversational agents :

Where the CA's capacity or functioning was perceived to be unknown, the question of confidence arose. Apart from the two most regular users, who likely to be more experimental and forgiving, all of those asked cited trust as a barrier to the duties they would delegate to their CA. For example, after numerous efforts, Allan had failed to persuade Siri to buy movie tickets and had given up asking for assistance with this activity. As with other users, if Siri failed after many efforts, he felt obliged to quit the work and now employs it.

While when it comes to understanding emotions, we still have a long way to go. Not just what is said, but also how it is conveyed, is crucial in effective communication.

To overcome this issue, digital conversational agents must be educated with a wide range of human voices so that they can learn to recognize conflicting feelings and respond appropriately. [43]

Adding to that Conversations in languages other than English will be a difficulty for voice assistants. The ability to converse with a voice assistant in your native language is critical for quickly reaching out to more people and establishing trust. Different regional dialects, as well as cultural variations, must be addressed , and a lot other challenges we will discover it while we are using this technology in the future.

A great deal of growth is still required to become really "conversational." There are critical issues to address in the domains of security and communication behavior, These are necessary in order to earn the trust of the general public and to enable a connection that seems like a genuine discussion.

However, if these hurdles are overcome, Conversational AI and voice assistants will soon expand in both the private and corporate sectors, becoming an indispensable part of our daily lives. [44]

v. Research Methodology

A functional schematic of a really generic TTS can be seen in Figure 2. In the case of human reading, a natural language processing (NLP) unit is able to produce auditory transcription of textual content with appropriate tone rhythm (commonly referred to as display), and a of unit (DSP) turns the conceptual data it receives onto voice. However, rigorous and commonly used methods can reduce some processing stages owing to programmers' intelligent use of math and linguistic expertise.

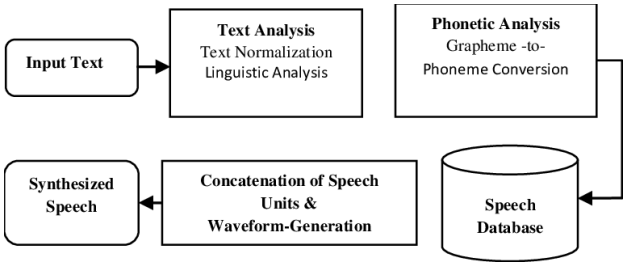

Figure 2: Simple Text to speech synthesizer

The generic language programming framework for TTS is shown in Figure 3.

It was clear right away it had a morphology grammar analyst adding to that the character-to-speech basic components, implying the necessity for such syntactic treatment in a high-quality TTS system. In reality, the capacity to simplify a phrase to expose its inner pattern of a grammar structure is necessary for at least two major:

1. Precise pronunciation transcription is possible when words that are linked to the words are accessible, like in the case of urinating in successive words.

2. Syntax has a big role in genuine intonation.

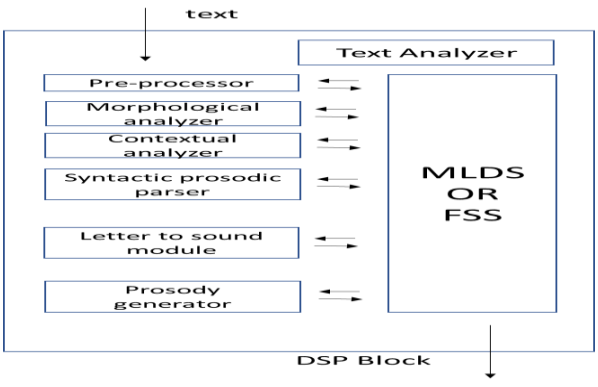

Figure 3: NLP module Text-to -Speech System

Before the combination can make its first vocalisation, it must go through a number of preliminary steps. Clips are chosen at first to avoid future sequencing issues.

One of most frequent transformations and expresses are included in a group of speakers (i.e. units that begin in the midst of the steady position of the phone and terminate in the center of another phase), partial syllable, and triplexes (which vary form divots in that they will have a complete centre telephone).

Whenever a complete list of syllable occurs, the set of words for such a syllable is meticulously supplied such that another syllable appears once (we prefer twice for assurance).

Undesirable situations are removed, including such emphasized inner syllables or circumstances that are substantially reduced (i.e. overly articulated). A mixture would then be digitally captured & saved, the chosen pieces are watched, whether automatically or manually using signals visualization tools or hash function, and choices are made, Items are interactively analyzed and identified.

Such findings, in the shape of segment names, waveforms, durations, and inner divisions, are eventually centralized in the fragmentary database. The location of the boundary among telephones, for instance, must be recorded in the case of speaker so that we may modify the length of one side of a telephone without impacting the length of the other, check figure 4 .

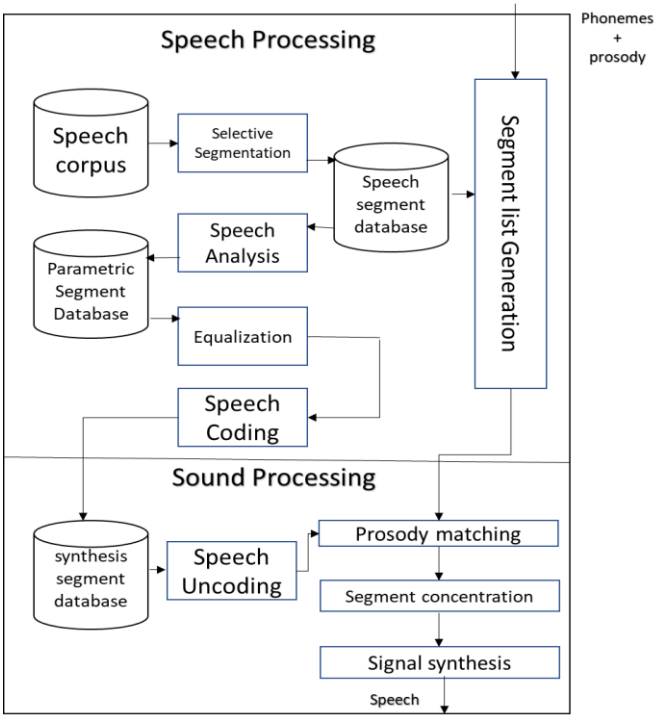

Figure 4: General Concentration Based synthesizer

VI. Results

Matter of fact, the synthesizer's primary goal is to generate an appropriate sequence of convolutional sections in real time out of its parametric section directory, as for prosody adapted from ones input value. Which a result, when incoming sections are given in a format that permits simple adjustment

of its pitch, length, and spectrum envelopes, as is rarely true with crude waveform sampling, the respective roles of the prosody matching and segments concatenation units are much reduced.

Speech synthesis can be utilized in any human-machine interaction. , for particular, may be utilized in alert and security systems to provide more precise information about the present condition. Utilizing voice rather than hazard flashers or alarms allows you to access the alert from a separate location, for instance. Some desktop notifications from a pc, such as printing activities or receiving e-mail, can also be received via a speech synthesizer.

VII. Conclusion and Future Work

Synthesized speech might be utilized in linguistic translators or a variety of many other communications systems in the future, such as videophones, conferencing, or talking mobile phones, if speech recognition methods improve to a sufficient degree. It's indeed feasible to significantly improve accessibility with talking mobile phones, for instance, for visually challenged people or in circumstances when visual information is hard or even dangerous to obtain. While driving a car, for instance, it is apparent that listening becomes less risky than reading the data from a smartphone which leads us to believe that Artificial Intelligence and Machine Learning, as well as the other topics we examined, are both scientific and mythical creations. The notion that robots can think and accomplish tasks in the same way that humans do dates back thousands of years. It would be preferable to think of these technologies as the engineering application of significant and long-established cognitive concepts.

REFERENCES

[1] Russell, S. and Norvig, P., 2002. Artificial intelligence: a modern approach.

[2] K. Gödel, Diskussion zur Grundlegung der Mathematik, Erkenntnis 2. Monatsheft für Mathematik und Physik 32(1), 147–148 (1931).

[3] Russell, S. and Norvig, P., 2002. Artificial intelligence: a modern approach.

[4] Intelligence, A., 2010. A Modern Approach (the 3rd edition), Stuart Jonathan Russell, Peter Norvig.

[5] Silver, D., Huang, A., Maddison, C.J., Guez, A., Sifre, L., Van Den Driessche, G., Schrittwieser, J., Antonoglou, I., Panneershelvam, V., Lanctot, M. and Dieleman, S., 2016. Mastering the game of Go with deep neural networks and tree search. nature, 529(7587), pp.484-489.

[6] Benjamin M. , Is AI Development Moving Too Fast?, JANUARY 15, 2020, https://www.dogtownmedia.com/is-ai-development-moving-too-fast/

[7] Brougham, D. and Haar, J., 2018. Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. Journal of Management & Organization, 24(2), pp.239-257.

[8] Acemoglu, D. and Restrepo, P., 2018. Artificial Intelligence, Automation and Work, NBER Working Paper No. 24196.

[9] Brynjolfsson, E. and McAfee, A., 2014. The second machine age: Work, progress, and prosperity in a time of brilliant technologies. WW Norton & Company.

[10] Ledley, R.S. and Lusted, L.B., 1959. Reasoning foundations of medical diagnosis. Science, 130(3366), pp.9-21.

[11] Gunn, A.A., 1976. The diagnosis of acute abdominal pain with computer analysis. Journal of the Royal College of Surgeons of Edinburgh, 21(3), pp.170-172.

[12] Greenfield, D., 2019. Artificial intelligence in medicine: Applications, implications and limitations. Retrieved from Harvard University at http://sitn. hms. harvard. edu/flash/2019/artificial-intelligence-inmedicine-applications-implications-andlimitations.

[13] Zhang, G., Patuwo, B.E. and Hu, M.Y., 1998. Forecasting with artificial neural networks:: The state of the art. International journal of forecasting, 14(1), pp.35-62.
Chopra, A., Prashar, A. and Sain, C., 2013. Natural language processing. International journal of technology enhancements and emerging engineering research, 1(4), pp.131-134.
[14] Lewis, D.D. and Jones, K.S., 1996. Natural language processing for information retrieval. Communications of the ACM, 39(1), pp.92-101.
[15] Liddy, E.D., 1998. Enhanced text retrieval using natural language processing. Bulletin of the American Society for Information Science and Technology, 24(4), pp.14-16.
[16] Liddy, E.D., Diamond, T. and McKenna, M., 2000. DR-link in tipster III. Information Retrieval, 3(4), pp.291-311.
[17] Liddy, E.D., 1998. Enhanced text retrieval using natural language processing. Bulletin of the American Society for Information Science and Technology, 24(4), pp.14-16.
[18] Kapukaranov, B. and Nakov, P., 2015, September. Fine-grained sentiment analysis for movie reviews in Bulgarian. In Proceedings of the International Conference Recent Advances in Natural Language Processing (pp. 266-274).
[19] Kapukaranov, B. and Nakov, P., 2015, September. Fine-grained sentiment analysis for movie reviews in Bulgarian. In Proceedings of the International Conference Recent Advances in Natural Language Processing (pp. 266-274).
[20] Bian, G.W. and Chen, H.H., 2000. Cross-language information access to multilingual collections on the internet. Journal of the American Society for Information Science, 51(3), pp.281-296.
[21] Carrick, C. and Watters, C., 1997. Automatic association of news items. Information Processing & Management, 33(5), pp.615-632.
[22] Grefenstette, G., 1999, November. The World Wide Web as a resource for example-based machine translation tasks. In Proceedings of the ASLIB Conference on Translating and the Computer (Vol. 21, pp. 517-520).
[23] Liddy, E.D., 2001. Natural language processing.
[24] Meng, F., Lu, Z., Wang, M., Li, H., Jiang, W. and Liu, Q., 2015. Encoding source language with convolutional neural network for machine translation. arXiv preprint arXiv:1503.01838.
[25] Ali, H., Chali, Y. and Hasan, S.A., 2010, July. Automatic question generation from sentences. In Actes de la 17e conférence sur le Traitement Automatique des Langues Naturelles. Articles courts (pp. 213-218).
[26] Brown, J., Frishkoff, G. and Eskenazi, M., 2005, October. Automatic question generation for vocabulary assessment. In Proceedings of Human Language Technology Conference and Conference on Empirical Methods in Natural Language Processing (pp. 819-826).
[27] Zhang, S. and Bansal, M., 2019. Addressing semantic drift in question generation for semi-supervised question answering. arXiv preprint arXiv:1909.06356.
[28] Belkin, N.J. and Croft, W.B., 1992. Information filtering and information retrieval: Two sides of the same coin?. Communications of the ACM, 35(12), pp.29-38.
[29] Griffiths, A., Luckhurst, H.C. and Willett, P., 1986. Using interdocument similarity information in document retrieval systems. Journal of the American Society for Information Science, 37(1), pp.3-11.
[30] Jones, G.J., Foote, J.T., Jones, K.S. and Young, S.J., 1996, August. Retrieving spoken documents by combining multiple index sources. In Proceedings of the 19th annual international ACM SIGIR conference on Research and development in information retrieval (pp. 30-38).
[31] Buckley, C., Salton, G. and Allan, J., 1993, March. Automatic retrieval with locality information using SMART. In Proceedings of the First Text REtrieval Conference TREC-1 (pp. 59-72).
[32] Buckley, C., Salton, G., Allan, J. and Singhal, A., 1995. Automatic query expansion using SMART: TREC 3. NIST special publication sp, pp.69-69.
[33] Salleh, M.C.M. and Nor, R.M., 2021. PROPOSING AN INTELLIGENT INFORMATION RETRIEVAL (IIR) FRAMEWORK FOR SHARIAH SOURCES RETRIEVAL IN ISLAMIC FINANCIAL INDUSTRY. TIJARI International Journal of Islamic Economics, Bussiness and Entrepreneurship, 1(1), pp.57-70.
[34] Chumerin, N. and Van Hulle, M.M., 2006, September. Comparison of two feature extraction methods based on maximization of mutual information. In 2006 16th IEEE signal processing society workshop on machine learning for signal processing (pp. 343-348). IEEE.
[35] Ladha, L. and Deepa, T., 2011. Feature selection methods and algorithms. International journal on computer science and engineering, 3(5), pp.1787-1797.

[36] Janecek, A., Gansterer, W., Demel, M. and Ecker, G., 2008, September. On the relationship between feature selection and classification accuracy. In New challenges for feature selection in data mining and knowledge discovery (pp. 90-105). PMLR.

[37] S Paruchuri, H., 2020. The Impact of Machine Learning on the Future of Insurance Industry. American Journal of Trade and Policy, 7(3), pp.85-90.

[38] Manikonda, L., Dudley, C. and Kambhampati, S., 2017. Tweeting AI: perceptions of ai-tweeters (AIT) vs expert ai-tweeters (EAIT). arXiv preprint arXiv:1704.08389.

[39] Wagstaff, K., 2012. Machine learning that matters. arXiv preprint arXiv:1206.4656.

[40] Weizenbaum, J., 1966. ELIZA—a computer program for the study of natural language communication between man and machine. Communications of the ACM, 9(1), pp.36-45.

[41] Levesque, H.J., 2017. Common sense, the Turing test, and the quest for real AI. Mit Press.

[42] Luger, E. and Sellen, A., 2016, May. " Like Having a Really Bad PA" The Gulf between User Expectation and Experience of Conversational Agents. In Proceedings of the 2016 CHI conference on human factors in computing systems (pp. 5286-5297).

[43] Activeo, Conversational agents: Why such a craze?, 1 June 2021, https://www.activeo.com/en/non-classe-en/2021/conversational-agents-why-such-a-craze/

[44] Stephanie, Conversational AI: Challenges and Opportunities, September 19th, 2019, https://onlim.com/en/conversational-ai-challenges-and-opportunities/