MODELLING AND ANALYSIS OF ARTIFICIAL INTELLIGENCE APPROACHES IN ENHANCING THE SPEECH RECOGNITION FOR EFFECTIVE MULTI-FUNCTIONAL MACHINE LEARNING PLATFORM – A MULTI REGRESSION MODELLING APPROACH

DOI : 10.36909/jer.ICMET.17161

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Abstract

Speech is considered as the fundamental aspect of communication between human being, speech recognition is stated as the overall process to convert the sound into corresponding text based on a specific language. The implementation of speech recognition has supported individuals, business and others in order to possess better communication and interaction so as to realise its objectives. This been regarded as the process of collating text message or in some form of meaning based on the input received from voice of another individual. The speech analytics is stated as the key part in the speech recognition as it converts the individual voice into digital form so as to store them and transmit it as and when required using computing equipments.

The speech synthesis is considered as the reversal of speech recognition as they convert the data from the digitised format into voice which supports the users to listen quickly and easily.

The application of speech recognition in organisation is confined in building more interactive virtual assistants, supports the customers in addressing their queries and offer solutions at quick span of time, furthermore organisations can use speech recognition to identify the individuals so that they can access classified information or reset their password etc.

The enhanced development in the technology domain has deepened the importance of artificial intelligence in different areas of work and life, The implementation of AI in speech recognition supports the business and individuals in apprehending better services to the stakeholders and perform the task in an efficient manner. Hence, this study is focused in analysing the key determinates of using AI in speech recognition for effective multifunctional Machine learning platform using regression analysis.

Keywords: Speech recognition, Artificial Intelligence, Machine learning platform, Regression analysis Correlation analysis.

Introduction

It has been regarded that the advancements in speech recognition is one of the innovative approaches in the domain of computing and information technology. The speech recognition is considered as the process of transformation of speech related data into digitised content so that it can be stored, processed and transferred using computing devices. [1]. The speech prevention system consists of various modules covering acoustic model, language-oriented field, decoding the message, extraction, processing and transformation of the modules. The major principle covering the speech recognition is to collate the information in the speech information model, support in training and make it match with the related model.

The application of machine learning approaches has supported in analysing and implementing appropriate systems which will enable in converting the speech into digitised txt and vice versa

in an efficient manner. Through the application of information technology like artificial intelligence, machine learning approaches etc support the business to transform their process through digital network [2]. The application of computing and digitisation has provided the management and individuals to perform their task at ease, support in enhancing the security through voice recognition, understand the customer needs who are located in different geographical boundaries and eliminate any language barrier for performing the task in an efficient manner. The advancements in AI and ML supported in creating higher value to the stakeholders (management, customers, employees, vendors, society etc.) through better collaboration of the available devices and business process. [3]. Many companies in different industries like banking, insurance, retail, Information technology, manufacturing, supply chain etc have demonstrated effectiveness in their business process through speech recognition as it supports in automation of business process, increase security levels and other related aspects.

The current digital economy has forced the management to collate large volume of data and information in different formats so as to understand the market trends, support in creating better products and services, offer enhanced working conditions and environment, collaborate with vendors, suppliers, communities and governments in realising the organisational goals and also adhere to environmental and sustainable goals (ESG). [4]. There are many technological tools currently implemented for faster, efficient and better communication which covers email, social networking, mobile communication, voice message etc. Hence, this information needs to be collated, processed and transformed into digitised content for current and future use. For example, companies in the retail industry focusing in getting feedback and suggesting from the customers on a continuous basis, they source this information through company website, social media site etc. these data need to be collected, stored, transformed into digital content and analysed for effective decision making. [5]. Moreover, the text communicating and other forms are highly advantageous as the information received are first source of data. But if these voice

related information are not stored than the company may miss critical information which are significant for growth and development.

Speech recognition is also referred as the automatic speech understanding which supports in conveying the voice into digital means and vice versa. Business enterprises are now encoding their employees in wrong remote and hence they need to collaborate with other tea members for performing their operations, companies in education, supply chain, healthcare and others need constant interaction with the individuals are required, since face to face interaction is not possible during remote location working, it is critical for the business to gather the communication and store it for future decision making. [6]. Companies uses different forms of AI and Machine learning tools so as to obtain information at different means related to the customers, employees and others. For example, in health care the medical practitioners tend to provide various guidelines and steps to their patients which can be retrieved or converted into speech for storage and processing. [7]. Using vice recognition various activities can be automated which supports in performing routine task at ease at very less or no human involvement.

The speech recognition is also applied in different areas by individuals for easier communication with systems, in banking customers use voice recognition to reset their passwords, get more information related to the queries and get the needed services through efficient operations [8].

This study is more focused in analysing the overall determinants of artificial intelligence-based speech recognition for performing critical support to the organisation so as to provide belter services and solutions to different stakeholders. [9]. AI is considered as the most effective means and holistic approach which strengthens the voice recognition practices in the organisation. [10]. The manuscript which has been generated through these technologies

support in analysing different concepts, understand the pattern, recognise them for effective analysis and decision making.

The application of Novel Machine learning and Deep learning methods support in recognising the speech signals in a more accurate manner, support in analysing the signals for making predictive patterns. [11]. This optimises the user experience to a greatest aspect, also the users can use these technologies to enhance the accuracy of various services, expand the overall scope of application. The voice services recognition through these technologies are becoming more popular and support organisation in an effective manner.

Review of Literature

AI is considered as one of the effective tools for decoding data and analyse them for making quick decisions. AI supports in identifying the patterns, use different acoustic approach in order to apprehend the speech recognition. [12]. The AI also uses the available information which are mainly related to linguistic, phonetic etc, based on the approach the AI is supportive in performing various functions related to voice recognition, like designing the overall algorithm related to speech, understand the speech units,

The researchers have mentioned that AI is emerging and is harnessing the available technologies in the computing for converting better speech recognition to text and vice versa, Also they are highly focused in measuring the pattern and offer better inputs to the management for better decision making. [13]. The AI can collaborate with the other systems and engage with the overall behaviour of individuals like employees, suppliers, customers etc.

In this research, the authors have mentioned that the AI supports in collecting raw data from different environments and elegantly applied series of steps in recording, formulating the patterns and present the data in predetermined format to the users. [14]. It has also been

recognised that AI is widely used in different areas covering traffic signals, households, organisation, transportation, security etc.

The artificial intelligence artificial student voice recognition method in the future will refer to the deep neural network algorithm and is closer to the process and how to obtain information, analyze and process information from the human brain and then create a more powerful machine. , which obviously improves perception and cognitive skills. [15]. In the case of perception, in the future it will be possible to collect perceptual information about seeing, hearing and reading and to expand the field of perception. Cognitively, linguistic input assessment will be more accurate, with the help of a strong logical network and reasoning network, scientific decisions can be made, while effective output data can be developed to create advanced human interaction [16]. .

Evaluation of the studies showed that artificial intelligence is currently used in many areas of life, including scientific discovery, remote sensing, transportation, aviation, law, robotics, stock trading, medical diagnostics and even gaming. [17]. However, one of the most notable applications of artificial intelligence is speech recognition. Studies show that the artificial approach is widely used in answering machines in call centers and call centers. In this report, he also notes that voice recognition software enables computers to handle first-level processing in native language processing, word processing, and customer support to facilitate better and improved customer management. therefore, it results in customer satisfaction.

Speech recognition is one of the difficult questions because you need to have very comprehensive and accurate techniques. [18]. Voice recognition problems often occur due to lack of proper vocabulary. Today, the voice recognition method is used in many areas, including automated telephone systems, mobile phones and so on. However, achieving error-free speech recognition, especially for continuous speech, remains a difficult and unsolved

problem. Artificial intelligence has flourished in the last two decades as it has been applied to large areas and areas of life. [19]. In-depth research analyzes showed that artificial intelligence techniques were supported by many developers and researchers. The most common and advanced techniques for artificial intelligence include data mining, fuzzy logic, neural networks and knowledge-based systems. [20]. One of the main goals of this activity was to improve and streamline software development processes to compete with today's fast and changing environment. [21]. The most obvious improvements in artificial intelligence include the development of artificial neural network systems, graphical user interfaces, object-oriented programming, natural language processing, fuzzy logic and rule-based expert systems. for flight, voice recognition, text recognition, robot navigation. , object recognition, smart transport and avoidance of obstacles

Methodology

The main focus of the study is to apprehend the major constraints in analysing the role of AI in enhancing the speech recognition. The researchers are more focused in applying descriptive research design as it enables in analysing the role of AI in speech recognition. [22]. Many businesses across various industries have focused in using the vice recognition for analysing the needs and requirements of customers, vendors, employees, communities etc to realise the overall goals of the organisation. The major determinants considered are AI supports in speech recognition for understanding customer requirements effectively, enable in adding more value to all the stakeholders and achieve sustainable growth and development. [23]. The extent of overall development of AI has enabled in making rapid development n the area of individual and competing interaction, this supported in better voice recognition, understand the patterns and provide suitable guidance for different stakeholders and thereby meet the organisational objectives. [24]. AI supported voice recognition leads to better interaction, enable in integrating

the emotions and feelings of the customers related to the products and services and hence support in realising the goals of the business.

The researchers intend to use both secondary data and primary data, for secondary data the published research journals and dissertations are considered, which will provide a critical insight on the role of AI in the voice recognition and how business enterprises are contemplating in using such technologies for effective multi-functional Machine Learning platform. [26]. The primary source of information is collected using detailed questionnaire shared to the responds who are the employees currently working in different industries. Nearly 200 respondents were chosen for the study using convenience sampling and only 189 responses were received which are used for critical data analysis. [27]. The researchers apply SPSS data tool for performing the critical analysis, the major analysis covers correlation analysis, regression analysis and Analysis of variance (ANOVA) to test the critical constraints set by the researchers for the study.

Setting of critical constraints

There exists no major connotation among AI influenced speech recognition in understanding the customer requirements effectively and creating effective multi-functional Machine Learning platform.

There exists no major connotation among speech recognition to enable in adding more value to all the stakeholders and creating effective multi-functional Machine Learning platform.

There exists no major connotation between speech recognition in realising sustainable growth and development and creating effective multi-functional Machine Learning platform.

Analysis

The next part if the study is involved in performing data analysis which involves in performing critical analysis covering correlation, regression and ANOVA using the demographic variables. The researchers have used SPSS package for conducting the analysis, and results of the findings were discussed.

Table 1: Influence of AI in speech recognition

AI is highly influential in speech recognition	Frequency	Percent
Strongly Disagree	13	6.9
Disagree	10	5.3
Neutral	27	14.3
Agree	50	26.5
Strongly Agree	89	47.1
Total	**189**	**100**

From table 1 analysis, it is regarded that 26.5% of the respondents have agreed to the statement that AI is highly influential in speech recognition and analysis, companies are incorporating such technologies to gather more information and formulate the pattern for making critical decision making, furthermore 47.1% of the respondents have strongly agreed to the statements, hence nearly 73% of them are favouring the statement, whereas 14.3% are neutral, 5.3% have disagreed to the statement and remaining have strongly disagreed.
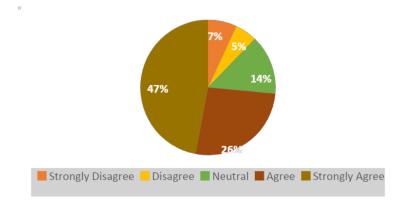

Fig 1: Influence of AI in speech recognition

Table 2: Influence of AI in speech recognition

AI supports in creating more benefits to organisation	Frequency	Percent
Strongly Disagree	13	6.9
Disagree	19	10.1
Neutral	24	12.7
Agree	77	40.7
Strongly Agree	56	29.6
Total	**189**	**100**

From table 2 analysis, it is identified that 40.7% of the respondents have agreed to the statement that AI supports the business in creating more benefit through vice recognition, pattern forecasting etc., furthermore 29.6% of the respondents have strongly agreed to the statements, hence nearly 80% of them are favouring the statement, whereas 12% are neutral, 10.1% have disagreed to the statement and remaining have strongly disagreed.
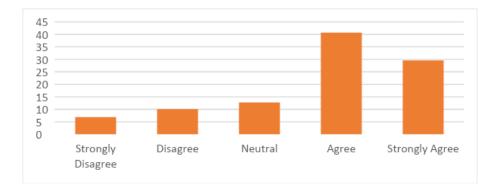

Fig 2: Influence of AI in speech recognition

Correlation analysis

Correlation coefficient supports the researcher in understanding the association between independent variables and dependent variable considered for the study, as stated the coefficient lies between -1 to +1.

Table 3: Correlation Analysis

Correlations	Understanding the customer requirements effectively	Adding more value to all the stakeholders	Realising sustainable growth and development	Creating effective multi-functional Machine

				Learning platform
Understanding the customer requirements effectively	1	.889**	.825**	.862**
Adding more value to all the stakeholders	.889**	1	.855**	.867**
Realising sustainable growth and development	.825**	.855**	1	.827**
Creating effective multi-functional Machine Learning platform	.862**	.867**	.827**	1

From table 3 analysis, the corelation coefficient between Adding more value to all the stakeholders and Creating effective multi-functional Machine Learning platform is at +0.867 hence it can be stated that there exist highest positive correlation between these variables, also the variables Understanding the customer requirements effectively and Creating effective multi-functional Machine Learning platform possess highest positive correlation towards Creating effective multi-functional Machine Learning platform. Hence, concluded that all the independent variables possess greater association towards the dependent variable.

Regression analysis

The regression analysis enables in estimating the associate between the dependent variables towards the independent variables.

Table 4: Regression Analysis

Regressions	B	t	P
(Constant)	0.319	2.245	0.026
Understanding the customer requirements effectively	0.36	4.956	0
Adding more value to all the stakeholders	0.318	4.289	0
Realising sustainable growth and development	0.224	3.533	0.001
R Sqd	0.804		

Sig			0.00		

From tale 5, the R squared value is 0.804 hence it is regarded that the model is a best fit and can be used for further analysis, Moreover the p-value of all independent variables are less than 0.05 hence they are statistically significant towards the dependent variable. Hence, the regression equation is formulated as

Creating effective multi-functional Machine Learning platform = 0.319 (Constant) + 0.36 x Understanding the customer requirements effectively + 0.318 x Adding more value to all the stakeholders + 0.224 x Realising sustainable growth and development

ANOVA of independent variables and demographic data

One way ANOVA is a statistical tool which enables the researchers to compare the sample of means to test if there are significantly different. The analysis supports in analysing whether there are any differences between two or more independent groups.

Table 5: Analysis of Variance

Demographic	Independent variables	Groups	Mean Square	F	Sig.
Gender	Understanding the customer requirements effectively	Between Groups	0.071	0.056	0.813
		Within Groups	1.264		
	Adding more value to all the stakeholders	Between Groups	0.669	0.467	0.495
		Within Groups	1.433		
	Realising sustainable growth and development	Between Groups	1.471	1.135	0.288
		Within Groups	1.296		
Age	Understanding the customer requirements effectively	Between Groups	1.436	1.144	0.333
		Within Groups	1.255		
	Adding more value to all the stakeholders	Between Groups	0.714	0.495	0.686
		Within Groups	1.44		

	Realising sustainable growth and development	Between Groups	0.859	0.658	0.579
		Within Groups	1.305		
Nature of Industry	Understanding the customer requirements effectively	Between Groups	3.861	3.138	0.046
		Within Groups	1.23		
	Adding more value to all the stakeholders	Between Groups	4.326	3.096	0.048
		Within Groups	1.397		
	Realising sustainable growth and development	Between Groups	4.061	3.204	0.043
		Within Groups	1.268		
City	Understanding the customer requirements effectively	Between Groups	6.232	5.061	0.026
		Within Groups	1.231		
	Adding more value to all the stakeholders	Between Groups	5.425	3.855	0.051
		Within Groups	1.407		
	Realising sustainable growth and development	Between Groups	3.623	2.819	0.095
		Within Groups	1.285		
Management level	Understanding the customer requirements effectively	Between Groups	2.157	1.734	0.161
		Within Groups	1.244		
	Adding more value to all the stakeholders	Between Groups	2.857	2.033	0.111
		Within Groups	1.405		
	Realising sustainable growth and development	Between Groups	2.127	1.657	0.178
		Within Groups	1.284		
Work experience	Understanding the customer requirements effectively	Between Groups	1.339	1.066	0.375
		Within Groups	1.256		
	Adding more value to all the stakeholders	Between Groups	1.569	1.1	0.358
		Within Groups	1.426		
	Realising sustainable growth and development	Between Groups	1.506	1.165	0.328
		Within Groups	1.293		

Based on the above analysis it can be stated that the mean variances of demographic variables are statistically different towards the independent variables. Hence, it can be stated that the null hypothesis is rejected and alternate hypothesis are accepted

Discussion and findings

Based on the overall analysis it is noted that the key variables possess significant association with the dependent variables, hence it is concluded that Artificial Intelligence approaches support in enhancing the Speech Recognition for effective multi-functional platform. [28]. The business enterprises need to focus on the critical aspect of understanding the speech recognition of their employees, customers, vendors etc so as to collate and formulate them in order to make effective decisions. [29]. Furthermore, the implementation of AI methods supports in reducing the human intervention related to speech and other aspects.

The researchers said that artificial intelligence is emerging and uses technology available in computers to translate better speech recognition into text and vice versa. Artificial intelligence can interact with other systems and interact with the general behavior of individuals, such as employees, suppliers, customers and so on. [30]. The use of machine learning methods made it possible to analyze and implement appropriate systems that efficiently convert speech to txt format. [31]. Information technologies such as artificial intelligence, machine learning methods, etc. help your business transform its processes through a digital network. identify, understand the needs of customers within different geographical boundaries and remove language barriers to work effectively. Voice recognition is also used by people in various fields to facilitate communication with systems, and banks reset their voice recognition passwords, get more information on issues and access the services they need through efficient resources.

Conclusion

Speech is seen as an essential aspect of communication between people, and speech recognition is defined as the general process of translating sound into an appropriate text based on a specific language. The use of speech recognition has supported individuals, companies and others to achieve better communication and interaction to achieve their goals. It was considered the process of compiling a text message or a report based on someone else's voice input. Speech analysis is a key component in speech recognition as it converts individual audio to digital format for storage and transmission, using computer equipment as needed. Speech recognition is also called automatic speech comprehension, which supports digital voice transmission and vice versa. Companies now code their employees for poor remote control so they have to work with other team members to carry out their activities, companies in education, supply chain, healthcare and other sectors need constant interaction as this is not possible at work. At a distance. It is important for the company to gather the communication and store it for future decision making. Artificial intelligence also uses available information, which is mainly used in linguistics, phonetics, etc.

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