ADVANCED AGRICULTURAL CHAT BOT

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ABSTRACT

"Farming Fellow AI: Your Farming Partner" is an innovative Chabot designed to revolutionize the agricultural sector by providing farmers with accessible, personalized, and multilingual assistance. Utilizing advanced artificial intelligence (AI) technology, this Chabot is capable of interacting seamlessly with farmers in both Tamil and English languages, making it inclusive and user-friendly for a diverse range of agricultural communities. Through natural language processing (NLP) capabilities, "Farming Fellow AI" comprehends and responds to farmers' queries, covering a wide array of topics such as crop cultivation techniques, pest management. Its intuitive voice interface further enhances accessibility, allowing farmers to engage with the chatbot hands-free, even while they work in the fields. The chatbot serves as a knowledgeable companion to farmers, offering timely advice, actionable insights, and relevant information to optimize their farming practices and enhance productivity. By leveraging AI-driven analytics, "Farming Fellow AI" can also provide personalized recommendations tailored to specific farming conditions, crop types, empowering farmers to make informed decisions and overcome challenges effectively. With its user-centric design and multilingual support, "Farming Fellow AI" aims to bridge the digital divide in agriculture, empowering farmers across Tamil-speaking regions to harness the benefits of AI technology for sustainable and profitable farming. By fostering greater accessibility, efficiency, and knowledge-sharing, this chatbot strives to be a transformative force in driving agricultural innovation and prosperity for farming communities.

Keywords: Chatbot, AI, Agriculture, Machine Learning (ML), Deep Learning, Farming Fellow, Multilingual,

Natural Language Programming (NLP) Natural Language Tool Kit (NLTK).

1.INTRODUCTION

Chabot - AI driven interactive agri bot providing real time assistance in cultivation and market linkages. Real time soil health data provides details about the nutrient level, moisture content and pH level indication. Soil health report provides the actionable recommendations for the optimal crop growth. This application provides farmers with real time insights, helping them to identify which area needs irrigation, fertilization or pesticide treatment. The wrong combination of nutrients in soil affects the growth of crop and reduces the production. This can be solved using the real time soil testing. This chat bot identifies the nutrients level and provides details about cop yield and gives required

As a result, traditional topology-based routing protocols designed for MANETs may not be suitable in vehicular communications. Another method is added with the details obtained from geographic information services and piloting system with the use of position-based protocol. These position-based protocols usually take the characteristics of the road, attacks in the wireless signals, traffic lights and density of the traffic into account simultaneously.

The multi-hop transmission is quite important for a lot of applications in VANETs. For example, a moving vehicle can query a data center several miles away for traffic status by multi-hop V2V communications; the drivers or passengers who intend to shop at a faraway mall may query the roadside buffer of this store by multi-hop V2V communications for some interested goods; a driver can engage a wise route to reach the available parking lot according to the information shared by adjacent vehicles. Even though the favorable V2V communication pattern has attracted many research efforts in the past years, the previous works considers that the network is connected well, with zero or only few partitions of the network. However, recent researches have shown that there is problem with network fragmentation and is much worse in VANETs, especially for scattered traffic environments. Even during busy hours, due to the low penetration ratio of equipped vehicles on the road, the network has a connectivity which is low. In addition, the high nodal mobility and dynamic topology change will further ruin the connectivity of the network. In such situations, a complete connected end- to-end route is hard to be built. To solve this issue, when the partitioning of link takes place, the data packets are forwarded using carry-and-forward scheme, by which the data can be buffered first and forwarded by the relay vehicles opportunistically, in case that an available next hop is acquirable.

2.RELATED WORKS

In[1] R. Rajkumar; Velappa Ganapathy at proposed by "Bio-Inspiring Learning Style Chatbot Inventory Using Brain Computing Interfaceto Increase the Efficiency of E-Learning" IEEE – 2020.In recent times Electronic Learning (E-Learning) and Massive Open Online Courses (MOOC) are more popular among the current generation oflearners. Coursera, Edx, Simplilearn, Byjus and many other E-Learning service providers are available to deliver various courses. A recent study, in online courses, it has been found by Massachusetts Institute of Technology (MIT) that an astronomical dropout rate of about 96 per cent was found for the last five years. Educational researchers are attempting to decrease the dropout rate of E-Learning courses using various methods.

Human Computer Interface (HCI) researchers are attempting to use Brain Computer Interface (BCI) to increase the efficiency of the E-Learning. Beta waves (14–30 Hz) are generated when the learners are more alert. Neil Fleming's VARK (Visual, Auditory, Read and Write and Kinesthetic) questionnaires are used by many researchers to classify the learners. Carl Jung explored that Introverts and Extraverts are the personality traits among the humans. Soomin Kim's study shows that for gathering of quantitative data, Chatbot may be a promising method.

The proposed research work in this paper is to find out a correlation between Introvert and Extravert personality types and their learning styles. Initially, modified VARK questionnaires are implemented as a Chatbot to classify individuals as Introverts or Extraverts. After the classifications by the Chatbot, two minutes of visual and auditory contents are given to Introverts and Extraverts and learners' Beta brain waves are recorded and a dataset is created at an interval of one second. The dataset is validated using Machine Learning (ML) algorithms, like Naïve Bayes, N48 and Canopy.In

In[2] Tzu-Yu Chen; Yu-Ching Chiu; Nanyi Bi; Richard Tzong-Han Tsai at proposed by"Multi-Modal Chatbot in Intelligent Manufacturing" IEEE – 2021 Artificial intelligence (AI) has been widely used in various industries. In this work, we concentrate on what AI is capable of doing in manufacturing, in the form of a chatbot. We designed a chatbot that helps users complete an assembly task that simulates those in manufacturing settings. In order to recreate this setting, we have users assemble a Meccanoid robot through multiple stages, with the help of an interactive dialogue system. Based on classifying users' intent, the chatbot is able to provide answers or instructions to the user when the user encounters problems during the assembly process. Our goal is to improve our system so that it can capture users' needs by detecting their intent and therefore provide relevant and helpful information to the user. However, in a multiple-step task, we cannot rely on intent classification with user question utterance as the only input, as user questions raised from different steps may share the same intent but require different responses. In this paper, we proposed two methods to address this problem. One

is that we capture not only textual features but also visual features through the YOLO-based Masker with CNN (YMC) model. Another is the usage of an Auto encoder to encode multi-modal features foruser intent classification. By incorporating visual information, we have significantly improved the chat bot's performance from the experiments conducted on different dataset. Andrej Miklosik; Nina Evans; Athar Mahmood Ahmed Qureshi at proposed by" The Use of Chatbot in Digital Business Transformation: A Systematic Literature Review" IEEE -2021The research on chat bots has gained momentum over the past few years. Academics and practitioners investigate how these tools for communication with customers or internal team can be improved in terms of their performance, acceptance, and deployment .Although there is a plethora of recent studies available, not all of them deal with the digital business transformation implications of chat bots. The main aim of the research presented in this paper was to conduct a systematic literature review of high-quality journal research papers in order to summarize the current state of research on chat bots, identify their role in digital business transformation and suggest the areas warranting further attention. 74 papers were included in the research. Topical (focus and applications), methodological (methods used, sample size, sample type, and countries studied) and bibliometric (publication outlet, citations, and Altmetric Attention Score) aspects are evaluated and described. Scholars and practitioners can use the results to identify topics, areas, and applications that are intensely discussed in the literature and require further attention, select a methodology for their research that is well established in the field or is emerging, identify the most influential publications not tobe missed in their research or identify publication outlets for publishing their research on chat bots.

In [4] Sanjay Chakra borty; Hrithik Paul; Sayani Ghatak at proposed by" An AI-Based Medical Chat bot Model for Infectious Disease Prediction" IEEE – 2022.The purpose of this paper is to show concisely how we can promote chat bots in the medical sector and cure infectious diseases .We can create awareness through the users and the users can get proper medical solutions to prevent disease.

We created a preliminary training model and a study report to improve human interaction in databases in 2021. Through natural language processing, we describe the human behaviors and characteristics of the chatbot. In this paper, we propose an AI Chatbot interaction and prediction model using a deep feed forward multilayer perceptron. Our analysis discovered a gap in knowledge about theoretical guidelines and practical recommendations for creating AI chatbot for lifestyle improvement programs. A brief comparison of our proposed model concerning the time complexity and accuracy of testing is also discussed in this paper. In our work, the loss is a minimum of 0.1232 and the highest accuracy is 94.32%. This study describes the functionalities and possible applications of medical chat bots and explores the accompanying challenges posed by the use of these emerging technologies during such health crises mainly posed by pandemics. We believe that our findings will help researchers get a better understanding of the layout and applications of these revolutionary technologies, which will be required for continuous improvement in medical chatbot functionality and will be useful in avoiding COVID-19. progression of junctions the packets should pass through, and not as a succession of nodes-relays.

In [5] Mallikarjuna Gowda C P; Anupam Srivastava; Shubham Chakra borty; Anurag Ghosh; Harsh Raj "Development of Information Technology Telecom Chatbot: An Artificial Intelligence and Machine Learning Approach" IEEE-2021. Nowadays, educators can show case the technology of chat bots in various fields such as teaching and learning. Earlier the resources are almost negligible, in the field of education with the learning design integrated in it. But now with the advancement of technology, chatbot can fill the gap in the teaching landscape too. Using chatbot in the education domain is reassuring, since these bots can point out some of the logistics and diversified issues that a normal class might face. Besides this, with the further advancement of Artificial Intelligence, tech-giants like Apple, Google, and Amazon are providing platforms where building conversation is more focused rather than technicalities ,of computer programming i.e., to be more specific in natural language processing. In

this paper, we have built a rule based chatbot on a platform named Discord, also showcased that how a chatbot can be integrated into other online platforms to counter the challenges faced in teaching. Q/A features are used to get in-depth knowledge about various preinstalled data in chatbot...

3.PROPOSED SYSTEM

1. Multilingual Support: It interacts seamlessly with farmers in both Tamil and English languages, ensuring inclusivity and accessibility for a diverse range of agricultural communities.

2. Natural Language Processing (NLP): Leveraging advanced NLP capabilities; the chatbot comprehends and responds to farmers' queries on various topics such as crop cultivation techniques and pest management, enhancing user experience and efficiency.

3. Intuitive Voice Interface: With an intuitive voice interface, farmers can engage with the chatbot hands-free, enabling them to access timely advice and insights even while working in the fields, thus maximizing productivity.

4. Personalized Recommendations: Through AI-driven analytics, it provides personalized recommendations tailored to specific farming conditions and crop types, empowering farmers to make informed decisions and overcome challenges effectively.

5. Bridge the digital divider: With its user centric design and multilingual support the chatbot aims to bridge the digital divide in agriculture, empowering farmers across tamil-speaking regions to harness the benefits of AI technology for sustainable and profitable farming, thereby fostering greater accessibility, efficiency and knowledge-sharing in farming communities.

BLOCK DIAGRAM
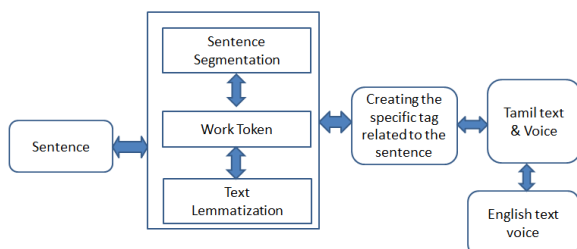
ARTIIFICIAL INTELLIGENCE

While a number of definitions of artificial intelligence (AI) have surfaced over the last few decades, John McCarthy offers the following definition in this 2004 paper (PDF, 106 KB) It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.
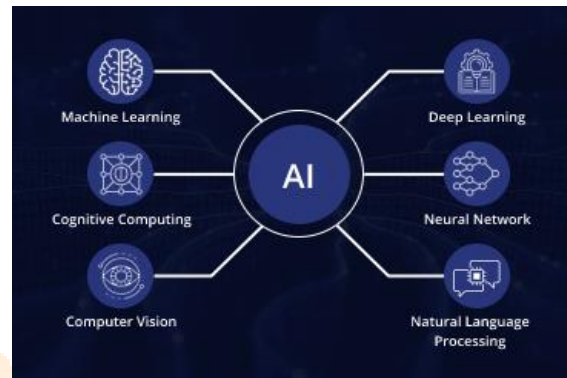
As the hype around AI has accelerated, vendors have been scrambling to promote how their products and services use it. Often, what they refer to as AI is simply a component of the technology, such as machine learning. AI requires a foundation of specialized hardware and software for writing and training machine learning algorithms. No single programming language is synonymous with AI, but Python, R, Java, C++ and Julia have features popular with AI developers. . In a number of areas, AI can perform tasks much better than humans. Particularly when it comes to repetitive, detail-oriented tasks, such as analyzing large numbers of legal documents to ensure relevant fields are filled in properly; AI tools often complete jobs quickly and with relatively few errors. AI tools will be important in fields ranging from education and marketing to product design.

MACHINE LEARNING

Machine Learning, often abbreviated as ML, is a subset of **artificial intelligence** (AI) that focuses on the development of computer algorithms that improve automatically through experience and by the use of data.. At its core, machine learning is all about creating and implementing algorithms that facilitate these decisions and predictions, In traditional programming, a computer follows a set

of predefined instructions to perform a task. However, in machine learning, the computer is given a set of examples (data) and a task to perform, but it's up to the computer to figure out how to accomplish the task based on the examples it's given. This ability to learn from data and improve over time makes machine learning incredibly powerful and versatile.

DEEP LEARNING

Deep learning is a machine learning technique that teaches computers to do what comes naturally to humans: learn by example. Deep learning is a key technology behind driverless cars, enabling them to recognize a stop sign, or to distinguish a pedestrian from a lamppost. It is the key to voice control in consumer devices like phones, tablets, TVs, and hands-free speakers. Deep learning is getting lots of attention lately and for good reason. It's achieving results that were not possible before. In deep learning, a computer model learns to perform classification tasks directly from images, text, or sound. Deep learning models can achieve state-of-the-art accuracy, sometimes exceeding human-level performance. Models are trained by using a large set of labelled data and neural network architectures that contain many layers.

NATURAL LANGUAGE PROCESSING

Natural language processing (NLP) is a branch of artificial intelligence (AI) that enables computers to comprehend, generate, and manipulate human language. Natural language processing has the ability to interrogate the data with natural language text or voice. This is also called "language in". For instance, NLP is the core technology behind virtual assistants, such as the Oracle Digital Assistant (ODA), Siri, Cortana, or Alexa. When we ask questions of these virtual assistants, NLP is what enables them to not only understand the user's request, but to also respond in natural language. NLP applies both to written text and speech, and can be applied to all human languages. There are several other terms that are roughly synonymous with NLP.
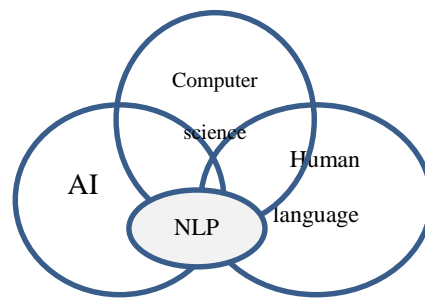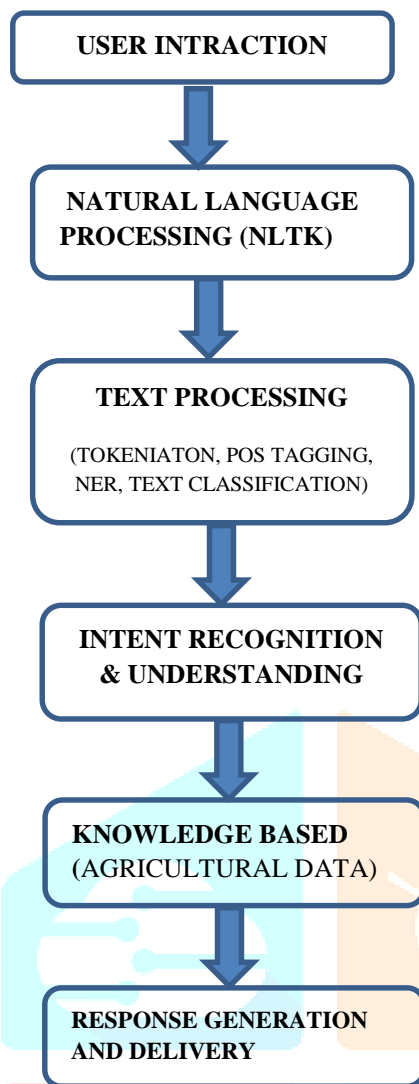
Natural language understanding (NLU) and natural language generation (NLG) refer to using computers to understand and produce human language, respectively. NLG has the ability to provide a verbal description of what has happened. This is also called "language out" by summarizing by meaningful information into text using a concept known as "grammar of graphics."

In practice, NLU is used to mean NLP. The understanding by computers of the structure and meaning of all human languages, allowing developers and users to interact with computers using natural sentences and communication. Computational linguistics (CL) is the scientific field that studies computational aspects of human language, while NLP is the engineering discipline concerned with building computational artifacts that understand, generate, or manipulate human language.

NATURAL LANGUAGE TOOL KIT

NLTK, the Natural Language Tool kit, is a suite of open source program modules, tutorials and problem sets, providing ready-to-use computational linguistics courseware. NLTK covers symbolic and statistical natural language processing, and is interfaced to annotated corpora.

The Natural Language Toolkit, or more commonly NLTK is a suite of libraries and programs for symbolic and statical natural language processing for English written in python programming language. The NLTK is a platform used for building python programs that work with human language data for applying in statistical natural language processing (NLP). It contains text processing libraries for tokenization, parsing, classification, stemming, tagging and semantic reasoning.
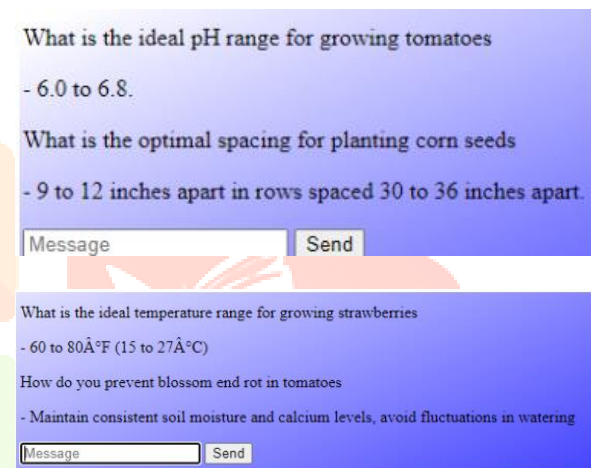
USER INTRACTION

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NATURAL LANGUAGE PROCESSING (NLTK)

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TEXT PROCESSING

(TOKENIATON, POS TAGGING, NER, TEXT CLASSIFICATION)

↓

INTENT RECOGNITION & UNDERSTANDING

↓

KNOWLEDGE BASED (AGRICULTURAL DATA)

↓

RESPONSE GENERATION AND DELIVERY

increased yields and minimized risks. Moreover, the intuitive voice interface has proven to be particularly beneficial, allowing farmers to engage with the chatbot hands-free while working in the fields. This feature enhances accessibility and convenience, enabling farmers to access real-time updates and recommendations without interrupting their work routines. Additionally, the Chabot's AI-driven analytics have played a crucial role in providing personalized recommendations, further enhancing the effectiveness of farming strategies. By leveraging data and analytics, "Farming Fellow AI" empowers farmers to make informed decisions, adapt to changing conditions, and overcome challenges more effectively.

OUTPUT

What is the ideal pH range for growing tomatoes

- 6.0 to 6.8.

What is the optimal spacing for planting corn seeds

- 9 to 12 inches apart in rows spaced 30 to 36 inches apart.

| Message | Send |

What is the ideal temperature range for growing strawberries

- 60 to 80°F (15 to 27°C)

How do you prevent blossom end rot in tomatoes

- Maintain consistent soil moisture and calcium levels, avoid fluctuations in watering

| Message | Send |

RESULT

4.RESULT

The implementation of "Farming Fellow AI" as a farming partner has shown promising results and garnered positive feedback from farmers. By providing accessible, personalized, and multilingual assistance, the chatbot has significantly enhanced the efficiency and productivity of agricultural practices. Farmers appreciate the seamless interaction facilitated by advanced artificial intelligence (AI) technology, allowing them to address a wide array of farming-related queries in both Tamil and English languages. One of the notable outcomes is the improved decision-making process enabled by the Chabot's ability to comprehend and respond to farmers' inquiries promptly. Through its natural language processing (NLP) capabilities, "Farming Fellow AI" offers timely advice, actionable insights, and relevant information tailored to specific farming conditions and challenges. This personalized approach has empowered farmers to optimize their farming practices, leading to

5.CONCLUSION

In conclusion, "Farming Fellow AI" represents a significant advancement in agricultural technology, offering farmers accessible, personalized, and multilingual assistance. By leveraging advanced AI technology, including natural language processing and intuitive voice interaction, the chatbot enhances user experience and efficiency, enabling seamless communication and support for farmers in both Tamil and English languages. Through its comprehensive coverage of topics such as crop cultivation techniques and pest management, "Farming Fellow AI" serves as a knowledgeable companion, providing timely advice, actionable insights, and relevant information to optimize farming practices and boost productivity. Moreover, its AI-driven analytics empower farmers with personalized recommendations tailored to their specific conditions and crop types, facilitating informed decision-making and effective problem-

solving. With a user-centric design and a commitment to bridging the digital divide in agriculture, "Farming Fellow AI" aims to empower farmers across Tamil-speaking regions, enabling them to harness the benefits of AI technology for sustainable and profitable farming. By fostering greater accessibility, efficiency, and knowledge-sharing, this innovative chatbot aspires to drive agricultural innovation and prosperity, ultimately contributing to the advancement of farming communities worldwide.

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