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Artificial Intelligence integrated Interdisciplinary Model Bot for the Rural Development

Shivam Umesh Kadam[1*], Shaikh Mohammad Bilal N[2]

[1]*Department of Computer Science K.J.Somaiya College of Science and Commerce Mumbai, India*

[2]*Assistant Professor, Department of Computer Science K.J.Somaiya College of Science and Commerce Mumbai, India*

[1]shivam.kadam@somaiya.edu , [2]mohammasbilal@somaiya.edu

Abstract

This model paper addresses the A. I technology used for rural development. EMABOT is an Interdisciplinary-Model bot that performs multitasking applications consisting of three modes i. e. E-Mode, M-Mode, and A-Mode. By adopting this technology, the lack of knowledge in education, disease, medicines, and agriculture reduces. It is a user-friendly house of knowledge for the betterment of rural areas, educational coaching, conceptual learning of medical science, providing intellectual videos, and agriculture knowledge as well. Hence, EMABOT's would be a game-changer for rural development.

Keywords: *EMABOT, A.I Technology, Rural Development, Educational coaching, Medical Science, Agriculture Knowledge*

1. Introduction

The world is a globalized economy but then rural areas lack technologies, so for development EMABOT has been introduced. EMABOT consists of 3 modes they are Educational-Mode, Medical Science-Mode and Agricultural-Mode. In Educational-Mode, this model is providing information on all languages and subjects, knowledge for developing mini-bots, and providing day-to-day information on what's happening in the surrounding. Besides, schools and colleges are miles away from rural regions; E-mode helps in reducing the distance. However, it is impracticable to substitute teachers with application models. An initiative is taken by providing opportunities for primary and higher education using the model bot [8].

E-mode is a game-changer in educational fields. The Medical field is nothing different from a technological sector that consists of methods adopted for the production of medicines. But the virus is arriving in the whole world that is troublesome. Medical Science is the most dramatic force shaping the lives of the people as well as the world. Hence, this M-mode will help in innovations for improvement. In M-Mode, the model is providing knowledge from Ayurveda to Modern Medical science, it would be able to telecast video surgeries so that easily understandable for students. By practicing m-mode, students acquire knowledge of modern methods in the medical field. Food, shelter and, clothing are the three main aspects of human beings. Increasing population leads to increased farming results[9].

In today's time, agriculture is the heart of every sector. Due to the land mafias, most of the agricultural field has become barren, which results in no cultivation on such fertile land. According to WHO [7], by 2042 India would either consume a meal or breakfast. The Agricultural mode is going to play a leading role in converting the barren land into fertile land that will help our country to prove the prediction of WHO wrong. This mode is also providing knowledge about all types of irrigation process and methods. Not only it detects the condition of soil but also able to perform the agricultural practice.

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2. Problem Statement

2.1. Problem Identification

Developers created many systems for educational purposes, medical purposes, and agricultural purposes. But there is less such application providing information on these modes all at once. Many educational applications charge an amount that is not affordable for rural area people. Due to a lack of hospitals in rural areas, people cannot get proper medical assistance. Also, many farmers lack behind in modern methods of farming. Due to long distancing, a lot of students in rural areas are unable to go to school and get proper knowledge.

2.2. Problem Definition

To provide a multitasking single application so that there is no need for many applications.
To provide this application for free of cost so that not only rural area people but everyone can use it.
To provide proper medical assistance on a disease stated by the user.
To provide modern methods of farming, to increase the productivity in agricultural field. To provide educational base videos and lessons for children and youth.

Literature Review:
Table No. 1

Authors	**Emphasis**	**Y*ear***	**Conclusions and Recommendations**
Mikic, Burguillo, Rodr´ıguez, Rodr´ıguez, and Llamas	**T-BOT and Q-BOT: Two Bots for Tutoring Courses and Evaluating Students [5]**	2008	This paper describes about two bots for student development where T-Bot is a role of tutor and Q-bot is a role of evaluator. Both bots were developed as easily integrated modules.
Orlando and Giovanni	**An integrated system to monitor activities in e-learning system.[10]**	2008	The paper describes an integrated system paper with the purpose of monitoring and supporting a systems performance and discovering the student issues. An AIML- based chatbot works as the front-end of the application and is the instance the learner interacts with.
Gopi Battineni Nalini Chintalapudi and Francesco Amenta	**AI Chatbot Design during an Epidemic like the Novel Coronavirus [6]**	*2020*	This system is basically designed for Covid-19 situation to determine the severity of the infection which includes connecting a doctor via its system if the threshold limit of the symptoms has crossed severity level. This helps in keeping track of the user's health and a way to stop more spreading and take immediate action if needed.

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Fonte, Nistal, Rial, and Rodr´ıguez	**NLAST: A natural language assistant for students [11]**	2016	This system is consisting an android application and a server platform. The purpose of this chatbot is to provide a friendly interface.

3. System and Functionality

EMABOT can be described as a virtual assistant bot. It also adapts properties of chatbot such as carrying out actions in response to the human user's request or response [1].

Under functionality, Elharrar [2] has identified seven types of bots. From seven bots we are using some bot's application they are as follows:

a. Optimizers - Solve concrete problems more effectively and efficiently than applications and websites [2].

b. Chatty Bots: These bots are designed to provide a real-time messaging platform with users for the sake of conversation and engagement.[1]

c. Super Bots: They are also called as intelligent personal assistants due to its ability to make discoveries and resolve issues within a given domain on behalf of a human expert such as an academic advisor [1].

Also, Goal based bot's application is used in the creation of EMABOT.

3.1. Functionality:

This model bot works on pattern recognition and the proper set of algorithms. EMABOT's important feature is speech recognition and speaker recognition, and it works on response generation algorithm.

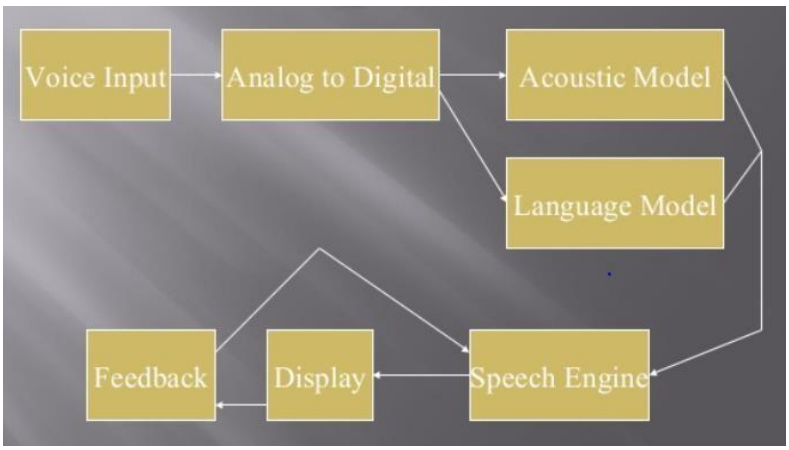

Figure1: Speech Recognition Model Source: slideshare.net [4]

The above figure 1 shows that, when the system gets voice input, there is a conversion of analog to digital language that can be done either by an acoustic model or language model. After that, the speech engine stores the sound, and then it is displayed.

The below figure shows the process of acoustic waveform conversion to an acoustic signal and finally to speech recognition by the computer. Here, the main aspects are Acoustic analysis of speech signal and linguistic interpretation [4].

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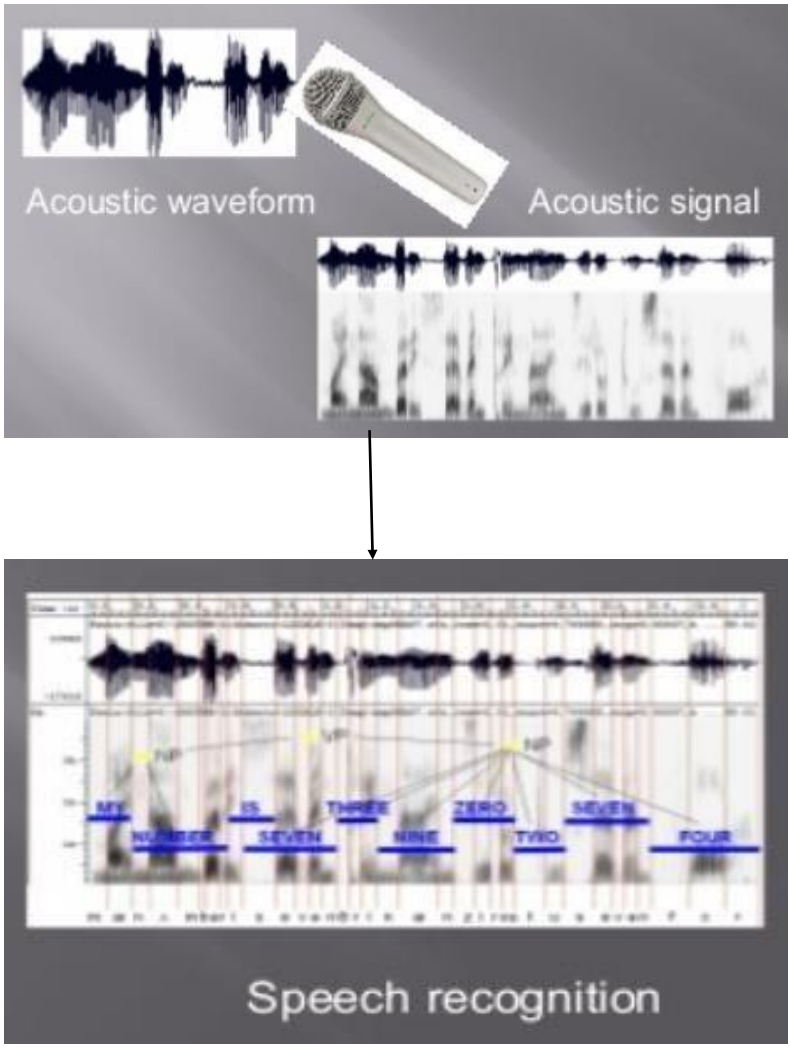

Figure 2: System speech recognition Source: slideshare.net [4]

Also, algorithm used is called as Response generation. Structurally, every bot model has three main functional components:

1. Entities: The context or domain of the user's request. For example: admission, examination, product selection, etc. The properties of every entity must be clearly defined [1]
2. Intents: Questions to be thrown to the Bot by the user [1]
3. Responses: The answers provided by the Bot [1]

In response generation algorithm [3], Once the bot understands the message then the next step is to generate a response One way is to generate a simple static response while another way is to get a template based on intent and put in some variables [3].

The pattern of response differs from user to user. In that circumstance, the bot can study and analyze previous chats and its associated metrics to tailor customized responses for the user [3].

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The following dia gram is the representation of sepa rate response genera tion and response selection modules:

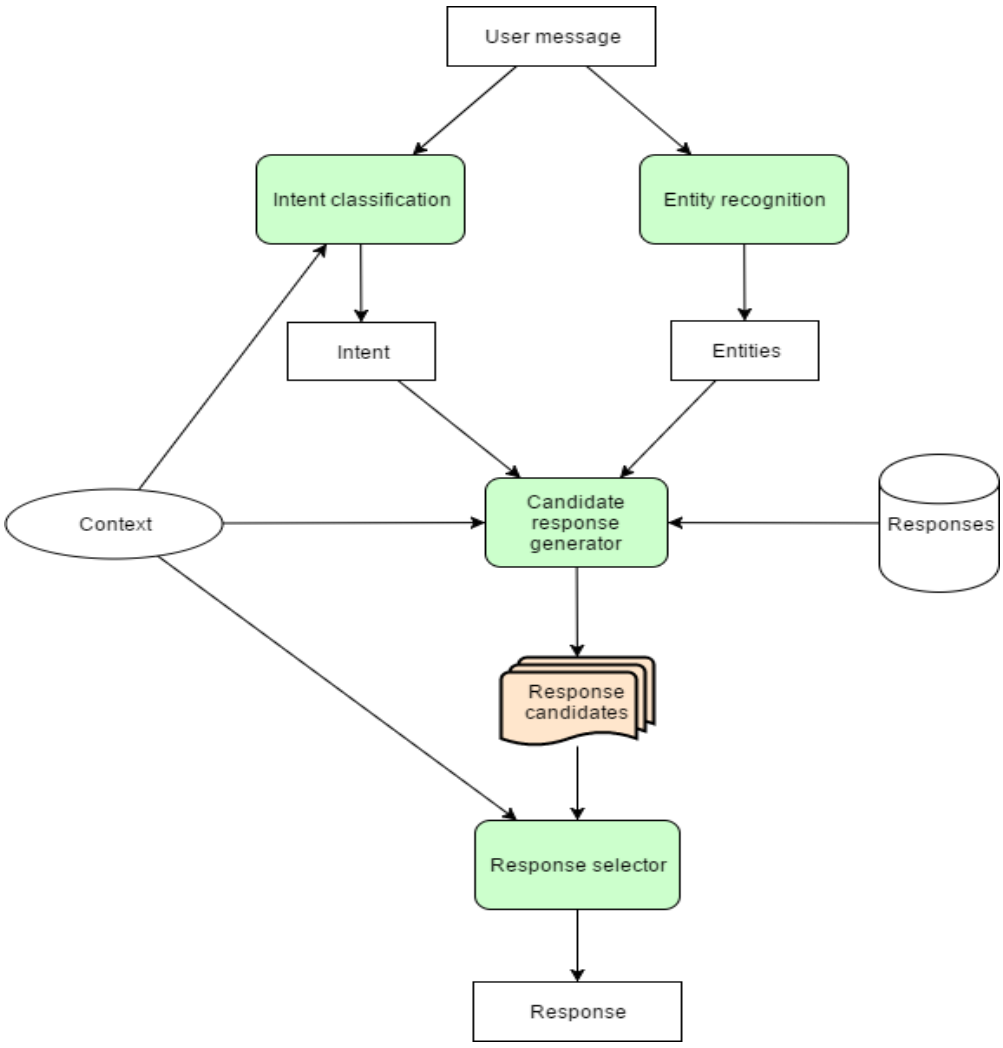

Figure 3: The Block model of Bot Source Artist: Pavel Surmenok

5. Proposed System

The working of EMABOT is as follows:
EMABOT also works on Mechanism called as Response Generation system.

5.1. User LOGIN:

User needs to register and login for using this EMABOT application. Since people in rural areas are uneducated so the feature of speech recognition is added, where the user needs to speak out details and the data of voice is stored in the database so that there is no need for overcoming the registration process again. After the registration process is completed, the user is directed to the mode of selection page where they have to choose the appropriate mode

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5.2. Mode of Selection:

After login, the user has to choose one from three modes. The three modes are Educational mode, Medical Science mode, Agricultural mode. Then the user has to select the single mode and then have to give input message.

5.3. User input:

After the selection of a mode, user gives the input to the model application. Next step is to wait for response generation.

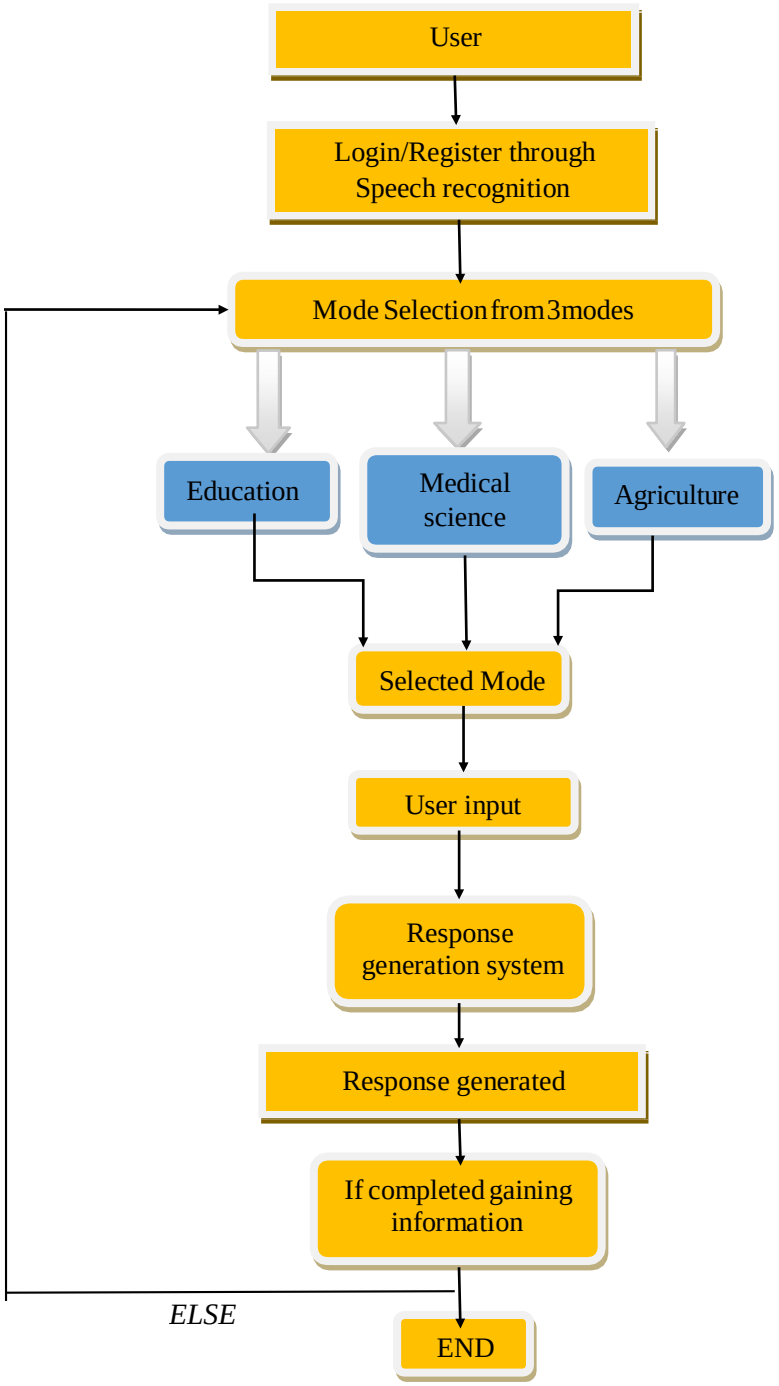

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Figure 4: Simple Working of EMABOT

5.4. Response generation:

After the user gives the input message, the response generation system is applied where according to intent classification and entity recognition various responses occurs. Then according to users request the specific response is generated.

5.5. The Response Generated:

Once the process of response generating is completed, a response is generated. Now the user can end the application or they can again start from selecting the mode at the start, for this if else condition is used.

6. Survey Analysis

EMABOT Survey conducted for knowing people's opinion where (N=108), N states the number of people.

1. Have you used a multitasking model application having educational, medical, and agricultural information?

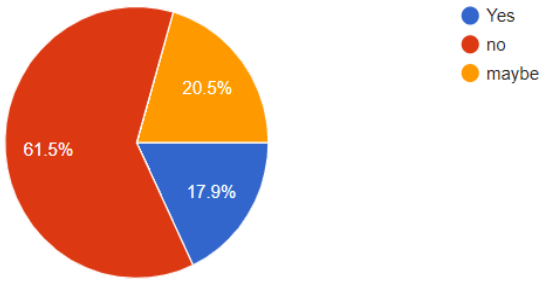

Figure no. 5

According to figure no. 5, 61.5% have not used such kind of application while 17.9% have used and 20.5% are responding maybe.

2. Since educational facilities are not that developed in rural areas and by using educational mode students can acquire all the necessary knowledge, so according to you can it be helpful?

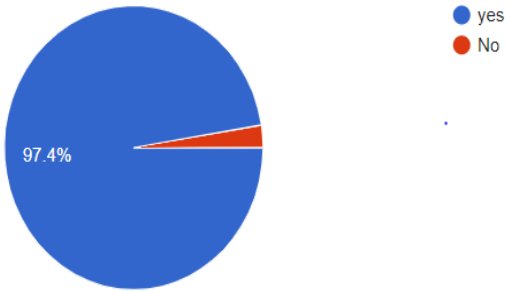

Figure No. 6

According to figure no. 6, 97.4% people think the E-mode is useful for rural development.

3. Since medical science mode will be providing information on every disease and cure, so is

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it useful?

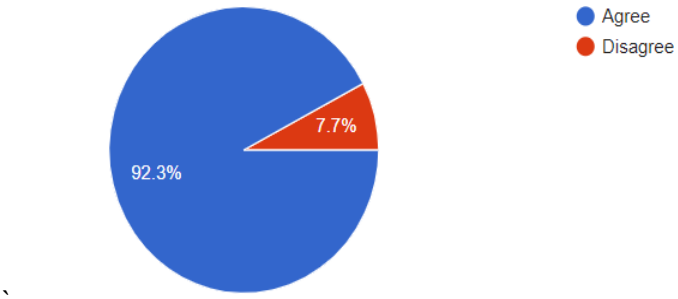

Figure No. 7

Above figure no. 7 shows that 92.3% people think this medical mode is useful and rest 7.7% think it is not useful.

4. The agricultura l mode will be providing modern methods of farming, so according to you is it useful?

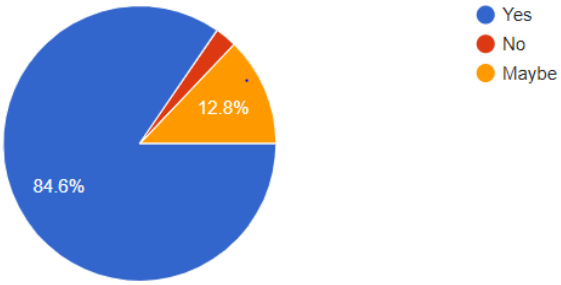

Figure No. 8

In figure no. 8, 84.6% people think agricultura l mode is useful. 12.4% think it maybe useful and rest 3% think it is not useful.

5. EMABOT would be providing assistance for rura l area people, will this be helpful for them? Would you like to use it?

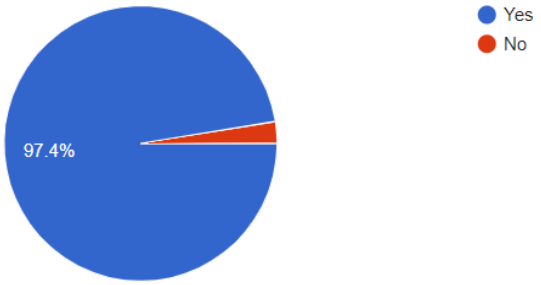

Figure No.9

In figure no. 9, 97.4% people think this is useful and rest 2.6% people think it is not useful.

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7. Conclusion

The EMABOT system for Rural Development is presented to help rural area people to improve their knowledge and efficiency in educational, medical, and agricultural fields. It

will surely make an impact on needy people so they can gain lots of benefits from this system.

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