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"Farmerbot"- An Interactive And Assistive Interface For Farmers

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***Abstract*—In India, agriculture plays a predominant role in economy and employment. Farming is the backbone of India. Farmers loose their yield because they lack knowledge of new technologies and different parameters that help them increase their yield. The proposed system performs machine learning analysis on all the parameters required for increasing the farmers yield. The system "Farmerbot" overcomes the problem and provides farmers the better opportunity to obtain the desired information and to scale up with upcoming market trends and technologies in a user-friendly manner. Farmerbot is actually a virtual conversational assistant, through which the users can communicate with the bot. The services used are three step process. First step is the speech to text translation using speech recognition. This is followed by text-to-text language translation and finally the text is synthesized into speech. As the availability of data and computing power improved, each of these individual steps advanced over time. The focus is on developing the bot in a more intellectual way, that it can even recognize not so well grammatically defined sentences, misspelled words, incomplete phrases, etc. This can help people to converse easily with the bot.**

***Index Terms*— Farmerbot, Machine learning, speech-to-speech recognition.**

I. INTRODUCTION:

In India, agriculture plays an important role in economic development by contributing about 16% to the overall GDP and accounting for employment of approximately 52% of the Indian population. According to the Farmers portal, rapid growth in agriculture is essential not only for self-reliance but also to earn valuable foreign exchange.

Agriculture is the major provider of employment to people in many parts of the world. Many people depend on agriculture for their livelihood. Most countries depend on agriculture for their GDP growth. The technology in the field of agriculture is developing day-by-day. Also, a large number of software is being simultaneously developed, to educate the farmers with this technological information.

The objective of this project lies in translating language directly using voice characteristics of the source speaker. Hence, the key difference in this approach compared to the general machine translation techniques available today is the lack of an underlying text representation step during inference. Although it has to be noted that this task is extremely challenging for various reasons. Unlike Text-To-Text (TT) translation systems which require text pairs for end-to-end training, the Speech-To-Speech (STS) model training requires speech pairs that are more cumbersome to collect. In this project the model is trained to map speech spectrograms for both source and target speakers.This project is inspired from Google's 'Translatotron : An End-to-End Speech-to Speech translation model'. In line with the 'Translatotron' model this thesis makes use of a simpler Sequence-to-Sequence (STS) encoder-decoder LSTM network using spectrograms as input to examine the possibility of direct language translations in audio form.To this end the uncertain alignment of spectrograms may lead to errors in source and target audio mapping. Our aim is to probe into the possibility of a similar functional network structure but more fundamental and straight forward.

II. LITERATURE SURVEY:

A. Virtual Conversational Assistant

This system presents a query about agriculture, gets the response in text as well as speech and also helps in predicting the future data of price, so that they can plan their activities. The future enhancement can be done by giving the response in their regional language itself and the usage of cognitive technologies predicts exciting times ahead for agriculture on its road towards efficiency, sustainability and meeting the world's food needs. This conversational assistant uses Natural Language Processing techniques to understand the user queries in their natural language. This will make the system understand even the grammatically not well defined sentences as input queries.

B.FarmChat

This system presents FarmChat which combined conversational and language technologies to naturally converse with farmers in answering their farming-related queries. The conversational intelligence of the chatbot was informed by analysis of large corpus of farmer call centre logs and guided by agri-experts who work closely with farmers. The study with farmers in rural area indicated that it's possible to provide satisfying information support to the farmers through Chatbot.

C.A Crop Recommendation System for Precision Agriculture

Precision agriculture is the technology of "site-specific" farming. It has provided us with the advantage of efficient input, output and better decisions regarding farming. Precision agriculture aims is in identifying these parameters in a site-specific manner in order to resolve issues regarding crop selection. The "site-specific" technique has improved the results yet there is a need to supervise the results of such systems.

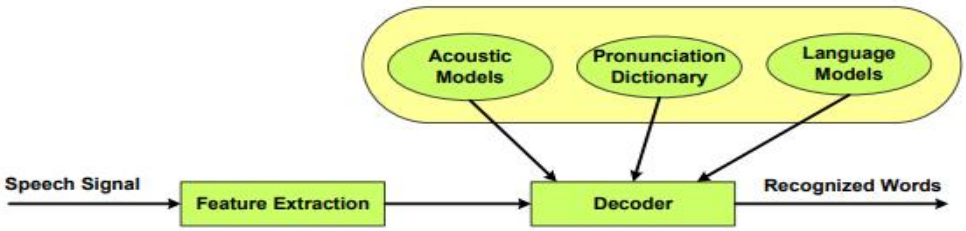
D.A software model for precision agriculture for small and marginal farmers

Precision Agriculture (PA) was originally developed to address variability in soil and crop parameters for large-scale agriculture in developed countries. The general concepts of PA can also be adapted for farm-based agriculture for small and marginal farmers in Developing Countries. This approach is characterized by a farmer-soil-crop database acquired from the field, crop calendars provided by agricultural experts, real-time acquisition of parameters such as temperature and rainfall through sensors, and an analytical model that simulates the crop calendar using static, semi-static and dynamic inputs, leading to farmer- and crop-level support advisories delivered through devices such as mobile phones and tablets.

III. PROPOSED SYSTEM:

According to working model of speech, the models illustrated previously are made up of millions of parameters, from which the instruction corpus needs to be learned. We make use of additional information where appropriate, such as text that is closely linked to the speech which is used to translate. It is possible to write this text in the source language, the target language, or both. As we are dealing with data where order is important, we make use of the Long-Short-Term-Memory(LSTM) neural networks to design the model. Their improved performance over regular neural network for STS learning or order sensitive data such as spoken words and sentences have proven them to be a worthy building block for the translation algorithm. We make use of the high level representations of the audio data for both target and source to compensate for the lack of pre-defined mapping for the purpose of training. Future development will reach billions of smart phone users for the most complex intelligent systems focused on deep learning that enables farmers a very portable and easy access which would both assist them with their farming methods as well as recommend them the best suitable crop as per given conditions so that they can decide what crops they can grow so as to get maximum yield in a better way.

IV. SYSTEM ARCHITECTURE:



V. TOOLS REQUIREMENT SPECIFICATIONS:

Software Requirements:

- O/S : Windows 7/Higher.
- Language : Python (Version Python 3.6)
- IDE : Anaconda 3.2/Higher(Spyder),
- Other requirements : XAMPP Control Panel

Hardware Requirements:

- Processor : Intel Core i3 GHz
- Hard Disk : 160 GB
- RAM : Min 4GB

VI. METHODOLOGY:

The key benefit of the methodology is that a single framework can be trained directly on the source and target text, which no longer requires a pipeline of complex systems used in statistical machine learning.

- Connected Speech: Linked words or connected speech are identical to independent speech, and except for brief delays between them, they make separate utterances.
- Continuous Speech: Continuous speech allows the user to speak almost naturally; it is also called computer dictation.
- Spontaneous Speech: At a simple level, this can be viewed as speech that is natural-sounding and not rehearsed. An ASR device with random speech abilities should be able to accommodate a variety of normal speech features, such as sentences that run together, and that include "ums" and "ahs" and even slight stutters.

1. DATA COLLECTION:

The proposed system collects sample dataset from KCC dataset. KCC dataset, which contains the logs of calls at KCC by farmers. Each call log contains 11 fields namely date and time of the call, crop, query type, query and answer by KCC expert.The dataset used in this proposed system contains crops, crop diseases name, pesticides, fertilizers and crop diseases.

2. DATA PREPROCESSING:

Data pre-processing is a method that is used to convert raw data into a desired and understandable format before using it to feed the algorithm. Data which is acquired from the real world often contains missing values, errors and are inconsistent.

3. SPEECH TO TEXT CONVERSION:

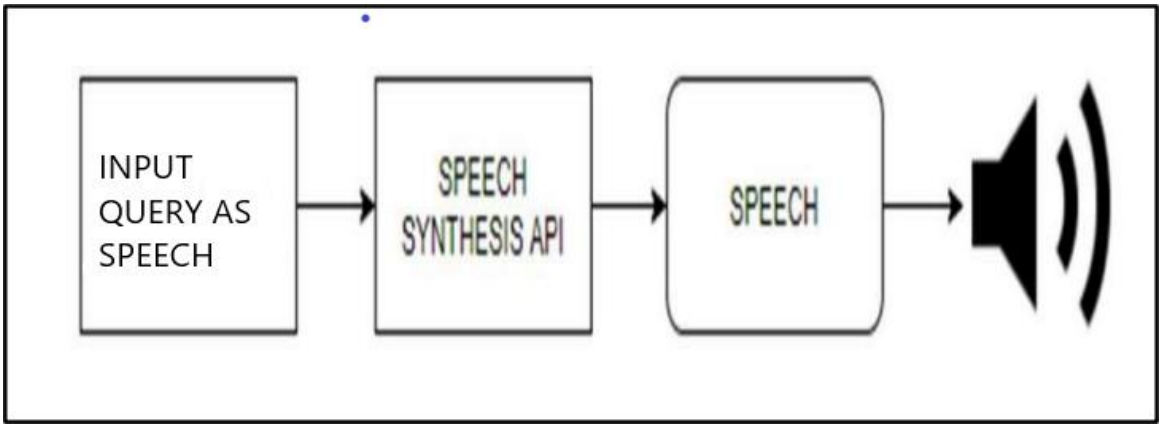
A speech recognition engine (or speech recognizer) takes an audio stream as input and turns it into a text transcription. The talk bot will have abilities to hear what user says and respond appropriately by saying it via microphone. For the talk bot to hear what user says, the speech recognition API will be used. Computer will receive a voice input . The voice will be inputted to speech recognizer. Several examples of the recognizer that can be used such as Google Speech Recognition API.

4. TEXT TO SPEECH:

Bot would not be so human without ability to speak. As a machine that only knows 1 and 0, but can only talks if it is designed to. Text to Speech (TTS) is one of the example to make computer talking. For example, the input to the TTS API (Google TTS) would be a reply text from bot API. The text would processed by TTS API and the output would be a voice file which contains an appropriate response to the input from user.

SPEECH SYNTHESIS AND RECOGNITION:

- Verbal communication is the favored form of communication for most people and while creating a Farmerbot especially for farmers the communication may be a great barrier.
- So, for that conversing for them via speech rather than text is feasible and saves time as some farmers may be illiterate, so it makes sense to have the Farmerbot communicate in the same way and at same predicted language. The role that speech recognition plays in making the bot understand speech and how speech synthesis can help to build out a bot's voice, sentiments, and language.
- Speech recognition and synthesis technology takes an audio note of a farmer's request and breaks it down into minor parts, based on voice regularity and pitch, before feeding it into a neural network.
- The neural network then finds patterns in the audio sampling . Instead of LSTM if Recurrent neural networks then it can remember previous audio patterns and can use that data to help build out future responses.
- This training data also makes it easier for Farmerbot to comprehend what a user wants without being distracted or muddled by background noise, dialects, or accents because it has a larger pool of data to filter through to find similar requests and comebacks.



VII. RESULT:

The results achieved by exploiting the complex nature of the encoder decoder network built up of the basic LSTM/BLSTM unit may indicate the possibility of a direct translation algorithm for a modest architecture. With the right amount of training data and technical guidance concerning the band-filter for the inputs in the decoder should create a vast difference in the results.

VIII. FUTURE WORK

The future work of this project, replacing LSTMs with GRUs should decrease the computing time for the network. This will create a great deal of difference when processing large amounts of data along with including the improvements, a multi task training setup can be arranged. A list of phonemes both as an utterance and written text for both the source and target language would be required.

IX. CONCLUSION

To address the problem of farmers, the system is proposed for a conversational assistant as Farmerbot. The proposed Farmerbot can positively impact underserved communities by solving queries related to agriculture using natural language processing technology. Literature Survey is conducted and able to identify the gapes in the existing system. Methodology is been defined for the proposed solution and hardware and software stack is also identified.

REFERENCES

[1]Ramya .C, Shreya .R, Sowmiya .R ," Virtual Conversational Assistant –The FARMBOT", International Journal of Engineering Technology Science and Research IJETSR, Volume 5, Issue 3 ,March 2018.

[2] Prof. Yashaswini. D , Hemalatha., Niveditha. (2019)," Smart Chatbot for Agriculture ",International Journal of Engineering Science and Computing, Volume 9 Issue No. 5 , May 2019.

[3] Mohit Jain ,Ibm ∗ R Usapratyush Kumar,Ishita Bhansaliq. "FarmChat: A Conversational Agent to Answer Farmer Queries",IBM Research, Yorktown Heights, NY, USAKHAI TRUONG.

[4]Pudumalar, E. Ramanujam, R. Harine Rajashreen, C. Kavyan, T. Kiruthikan and J. Nishan, "Crop Recommendation System for Precision Agriculture", IEEE Eighth International Conference on Advanced Computing, March 2016.

[5]Talha Siddique , Dipro Barua , Zannatul Ferdous , Amitabha Chakrabarty , "Automated Farming Prediction" , IEEE 2017 Intelligent Systems Conference , March 2017.

[6]Satish Babu , "A software model for precision agriculture for small and marginal farmers", IEEE Global Humanitarian Technology Conference , August 2013.

[7] Prashant Y. Niranjan, Vijay S. Rajpurohit, Rasika Malgi"-A Survey on Chat-Bot system for Agriculture Domain" IEEE 2019 1st International Conference on Advances in Information Technology

[8] Proc. ACM Interact. Mob. Wearable Ubiquitous Technology.,Vol. 2,No. 4,Article170, December 2018.

[9] Aakash G Ratkal, Gangadhar Akalwadi, Vinay N Patil and Kavi Mahesh, (2016), "Farmer's Analytical Assistant", IEEE International Conference on Cloud Computing in Emerging.

[10] P.Jothimurugan, J.Muthu Saravanan, R.Sushanth, V.Suresh, H.Siva Subramaniam, S.Vasantharaj, S.Yogeswaran,Sri Eshwar College of Engineering, Coimbatore,"Solar E-Bot for Agriculture", 2013 Texas Instruments India Educators' Conference, 2013 IEEE.

[11] K.D.Patel,"Review on Techniques in Natural Language Processing",International Journal of Scientific Research in Research Paper.Computer Science and Engineering,Vol.7, Issue.5,pp.01-04, October(2019) .

[12]Sweta P. Lende and M M Raghuwanshi, "Question Answering System on Education Acts using NLP Techniques", IEEE sponsored word conference on futuristic trends in Research and Innovation for Social Welfare, 2016.

[13]Gourish Malage,Kiran Patil,"Raita Snehi-A Voice Based Farmer Information System",International Journal of Scientific research in Research Paper.Computer Science and Engineering,Vol 7,Issue 6,pp.347-352,Jun-2019.

[14]Vandita Mathad, Greeshma R.R., Harshitha J.V., Deepika S., Snigdha Sen,"Quality Assessment of Crops Through Disease Detection Using Machine Learning",Vol.8 , Issue.2 , pp.99-102, Feb-2020.