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An Attempt towards Structuring Agricultural Information using WhatsApp as Query redressal Social Media Platform

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Abstract

ICT has been initiated and implemented effectively by the public private partnership, government, researchers and various Institutions. Availability of wireless service, Internet and mobile communication have forced ICT to find foothold in daily routine of the Indian farmers. ICT has huge impact in agricultural development but still in natal stage. Many farmers are not availing the actual potential of ICT due to poverty, social constraint, illiteracy, language barriers and unwillingness to adopt new technology. Many Indian farmers have reported positive change in income, quality of produce and timely access to the market information by using latest mobile application. WhatsApp is the most popular and easy to use Mobile Instant Messaging service amongst the Indian farmer. It supports sharing of localized information and utilizing these services as query redressal public platform. This paper is an attempt to gather meaningful agricultural data for analysis and filtering of relevant need based information assessment. The main focus of the present work is to develop an automatic information handling and redressal of the need based agricultural information system using WhatsApp as social media platform.

Keywords: ICT, Mobile application, Word Cloud, Python, Group Chat Analyzer, Mobile Instant Messaging.

Introduction

It has been observed that the WhatsApp is being used as MIM (Mobile Instant Messaging) service for sharing localized information and utilizing its services as a query redressal public platform. There exist many WhatsApp groups which consist of farmers, researchers, agricultural professionals, veterinary doctors etc. NGO groups are also operating such services. There exist several success stories which prevented farmers to commit suicide. Many farmers have been rescued from the grip of money lenders. Many farmers are utilizing this platform to ask questions related to agricultural practice and got instant solution. WhatApp is playing vital role in disseminating information and building social network. This work presents a case study of such existing WhatsApp groups. How they are using its capability to share information in typical Indian village boundaries that resolve pertinent queries. The analysis of WhatsApp group chat log can provide detail understanding ofquery pattern. WhatsApp chat-log analysis has valuable insight about the current agricultural trends, needs and gaps. Chat log can be used as a basis to identify their actual requirements. This study reveals that Indian farmers are utilizing WhatsApp for establishing connection with stakeholder which is enabling them to share knowledge and culture. It is giving them economic and political power. WhatsApp is providing direct access to the consumers, up to date relevant information on trends and preferences.

Objectives of Study

The objectives for the paper is to investigate the following

i. What are the readiness and barrier level of farmers to accept new paradigm for sharing agricultural information in typical Indian village boundaries.

ii. To investigate Indian Farmer involvement in using WhatsApp services.

iii. To find impact of WhatsApp as query redressal public platform in typical Indian village boundaries.

iv. To perform empirical evaluation of WhatsApp group chat log to understand bottleneck faced by the users of these group.

Pervasiveness of ICT in Indian Agriculture and its Impact

ICT in Indian agriculture is evolving rapidly in the right trajectory. Many projects on ICT has been initiated and implemented successfully by public private partnership, government, researchers and various institutions. Digital India launched by Indian government aims towards the promotion of digital literacy and creation of digital infrastructure. It has empowered agriculture value chain of Indian agriculture by providing right information in right time. 58% of the rural household depends on agriculture as the one of their most eminent source of livelihood. The role of ICT in agriculture needs to be considered within Digital India. It has led to the rise of many AIS (Agriculture Information Systems) and mostly they are mobile application. Some of the popular mobile application are KisanSuvidha, IFFCO Kissan Agriculture, RML Farmer-KrishiMitr, PusaKrishi, AgriApp, KrishiGyan, Crop Insurance ,AgriMarket and WhatsApp are most popular among the stakeholders. Recently government of India has launched eNam (e-National Agriculture Market) Platform. It is e-market platform for transparent sale transaction and price delivery. Many farmers are availing these services irrespective to poverty, social constrains, illiteracy, language barrier. India is foreseeing the next paradigm shift for sharing and scheduling of agricultural information which will enable farming socially, economically, and environmentally sustainable while contributing to delivery of nutritious food for all.

The growth of mobile communication technology has created opportunity for economic growth, social empowerment and innovation by providing access to the market information and services to the millions of rural Indian inhabitants. It is very interesting to know that WhatsApp is one of the most popular MIM (Mobile Instant Messaging) service used among Indian farmers. The advantage over SMS (Short Message Service) is that MIM services are mostly free. MIM services allow the users to share text in regional languages and media like video and audio. These features make it popular platform for group chatting. Many Chat groups have been formed across India to support Indian farmers. These groups are operated by NGO, Government agencies or self-help groups. WhatApp is used as query redressal public platform by these groups.

Collection of Data and Initial Analysis

Existing group chat log of Indian farmers and other stakeholders has been exported from the WhatsApp as shown in the Figure 1. There are four groups named Shri Shyam Krishi Seva, Kisaan Parivar Dairy and KissanParivar has been considered for this case study. This group consists of farmers, researchers, veterinary doctors and other stakeholders across India. Farmers are posting their queries and getting response. They also share their farm experiences and their day to problems. For initial analysis their entire conversation for a particular period has been taken. For simplicity the images, video and audio clips are being ignored for analysis. The following preliminary observations are made based on the above data set:

i. The problem of inaccuracy was eliminated, considering the authenticity and credibility of the group.

ii. The data is in text format and highly unstructured.

iii. There is no clear categorization of the topics being discussed.

iv. The subsequent text after one text is not always a reply to the immediate previous one; it can be a new discussion or a reply to a previous question.

v. Most of the posts are in other formats images, videos and sound clips.

vi. There are many other posts which are not relevant to agriculture.

vii. Volumes of message are being posted hence it is difficult to track each and every message.

Design approach for automatic chat analysis system

Group chat log has been exported in single text file. In order to analyze chat log of different group at a time then multiple text

19/03/18, 10:54 AM - +91 78749 19570: jafrabadi buffalo kakisike paas photo or video ho to bejiye...

19/03/18, 11:02 AM - +91 98125 79637: Kitna milk deti h bhai

19/03/18, 11:02 AM - +91 91705 24482: 28 litre.

19/03/18, 11:03 AM - +91 76075 00153: Prizkyahai

19/03/18, 11:03 AM - +91 91705 24482: Ye meranhihai.

19/03/18, 11:05 AM - +91 91705 24482: Jafrabadikeliyebahuthaiitna.

19/03/18, 11:07 AM - +91 91705 24482: Iska fat %18hota haijbkimurraka 9% hotahai.

19/03/18, 11:07 AM - +91 94545 35656: Year maikitne din ka average hai 18 liter ka

19/03/18, 11:08 AM - +91 98125 79637: Sahimein

19/03/18, 12:08 PM – Dr. Mukesh : Veterinary se koi problem kaSamadhan homoeopathic se kare. Mere contact number par direct bat karsaktehai . 100% percent result milega.

Figure 1: Sample Chat log of Kisan Parivar Dairy

file needs to be exported from WhatsApp. Figure 2 shows Design approach Flow Chart.

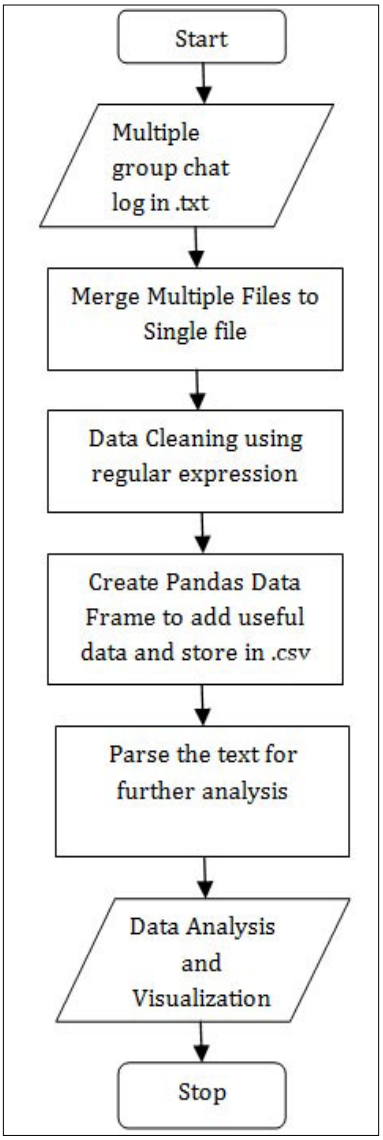

Figure 2: Design approach Flow Chart

Then these files are merged before parsing. For this python code has been developed. Pandas and Numpy Python Package has been used to for the parsing the text. Each line of the chat log consists of date, time, the sender information and then message. The idea is to parse the text file to extract relevant information. All non-alphabetical characters, hyperlink etc needs to be eliminated. In case of media file sharing <media omitted> has to be stored in dataframe to count the number of media shared. Using regular expression the text is stored in a list. Using pandas to_csv save the list as the csv (comma separated values) file which contains Date, Time User, Message, Year, Month, Day, Hours, Words, Word Length, Message Characters and Media.

The next step is to analyze the text in the obtained csv file. The Message column is converted from DataFrame to a list. The output of Message List converts each line into item. Then split the string into a list of individual words for creating wordcloud.

Then response matrix can be generated to keep the track of who responses to whom and how often they do that. Further data analysis can be performed using Pandas, Numpy and Matplotlib packages has been used for data visualization.

Analysis Results of Chat Log

The farmer group chat log has been tested on the model and results are shown in following figures. Figure 3 shows the distribution of users with message count. Top fifteen users have been shown who has posted maximum number of messages. Figure 4 shows the distribution of busiest date when maximum number of messages has been posted. Figure 5 shows the distribution of the media in the form of the images, video or sound clips shared by the top fifteen users.

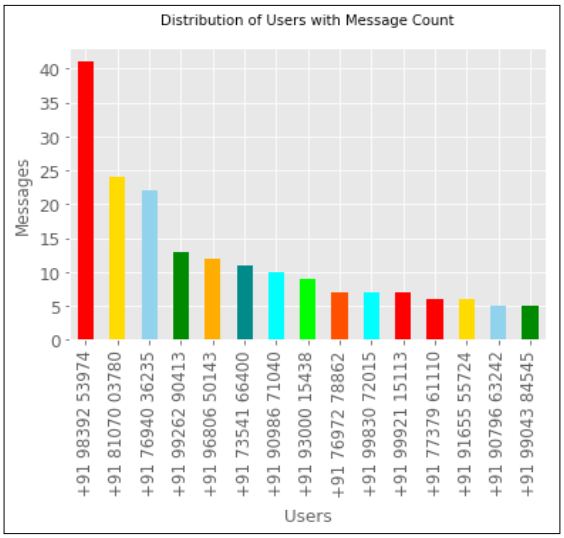

Figure 3: Distribution of user with word count

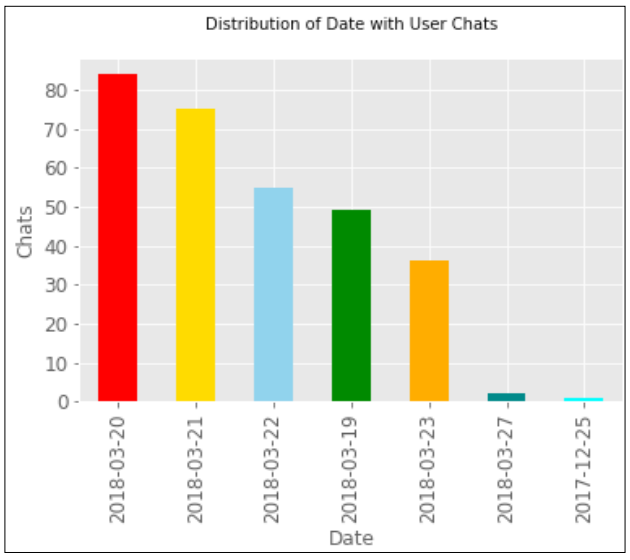

Figure 4: Distribution of Date with user Chat

Distribution of Emoji shared by farmers and other stakeholders is shown in the Figure 6. The above results suggest that they are familiar with system and are using this platform to share their emotions and experiences.

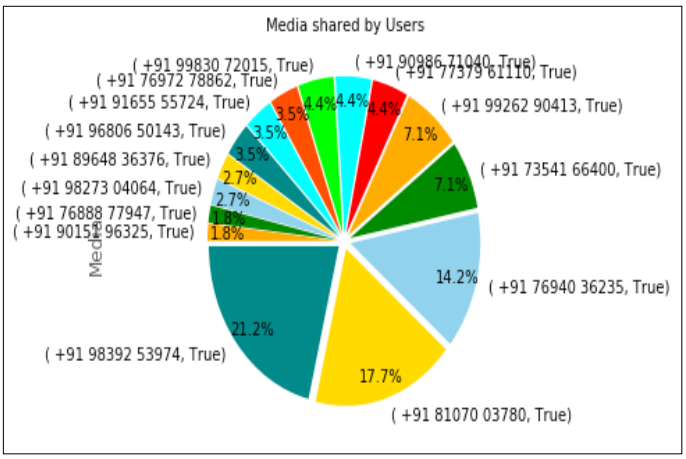

Figure 5: Distribution Media Shared by users

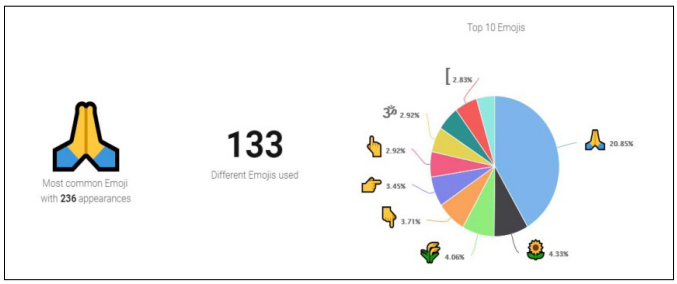

Figure 6: Distribution Emoji Shared by users

The idea is to analyze the busiest hour to know at what time farmers are sending message frequently. Graph obtained as shown in Figure 7 depicts that farmers are posting maximum message at 9 PM. If Indian farmers are interacting at 9 PM then it suggests that availability of electricity and internet are not constraint in sharing of information in typical Indian village boundaries. These results also reveal that poverty, social constraint, illiteracy, language barriers are not major barrier to stop Indian farmers to adopt ICT in their day to day life. In this sample study only male users are participating in group chat log therefore one cannot deny uneven gender distribution. Social structure prevail female users to participate in such groups. Human psychology suggests that only likeminded people can coexist in a group. The study shows that many users have also left group over the period of time and formed separate group with the other likeminded people. Therefore the main intention to use WhatsApp as querry redressal system has been defeated and got limited to a particular group.

Further, Figure 8 depicts the day wise distribution of the message and in this sample Monday was discovered as the busiest day. It may vary from one sample to other but this analysis show that every day they are sharing information. WhatsApp has helped to build social network not only for sharing information

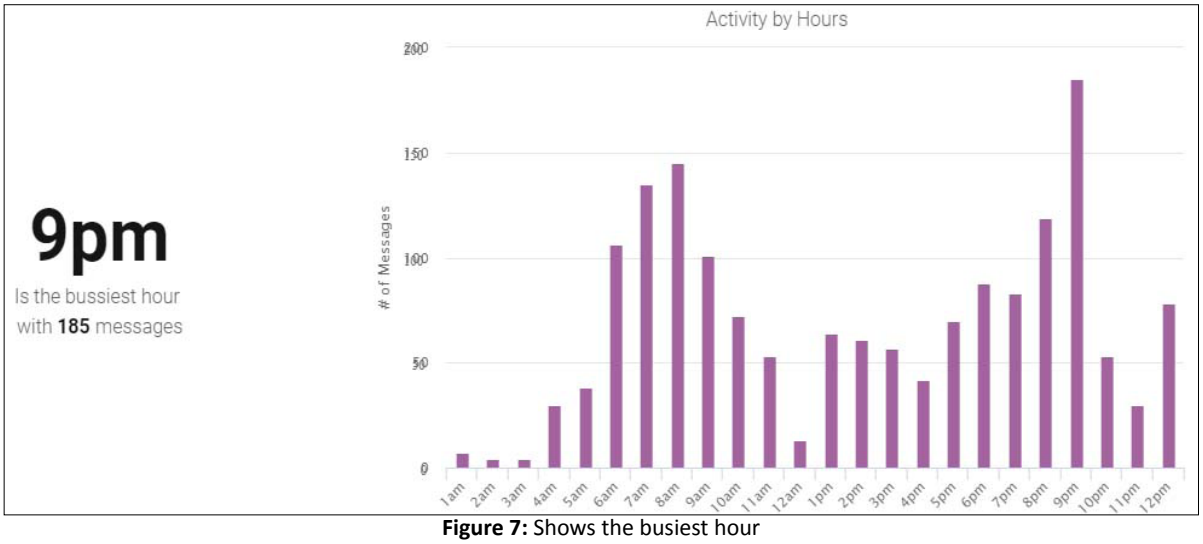

Figure 7: Shows the busiest hour

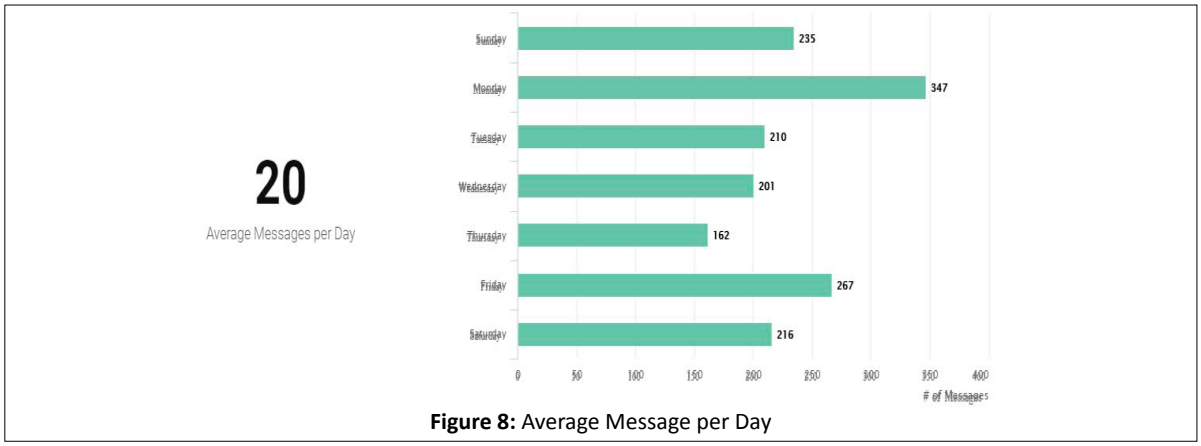

Figure 8: Average Message per Day

related to the agriculture but they are sharing messages related to the politics, entertainment etc. but the group administrator keeps vigilance that their conversation topic is restricted only to agricultural issues.

Some of the Word cloud has been generated to analyze the pattern in which farmers are interacting considered sample group chat log farmers. Figure 9 to 11 word cloud reveals some of the interesting pattern in the usage of WhasApp by the Indian farmer. Their conversation covers all the topics from farm, produce, marketing, NGO to research.

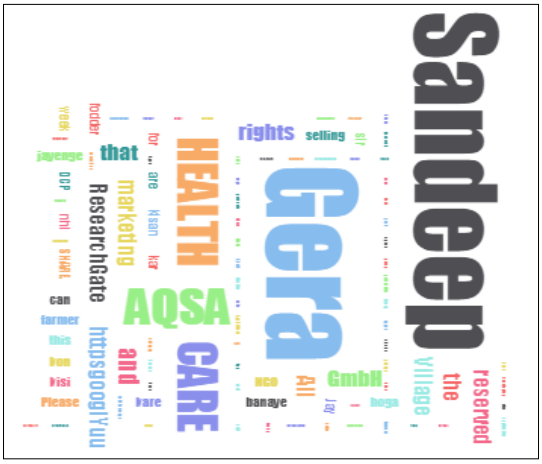

Figure 9: Word Cloud 1

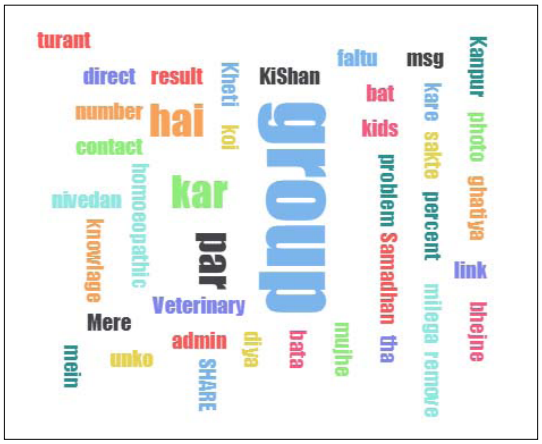

Figure 10: Word Cloud 2

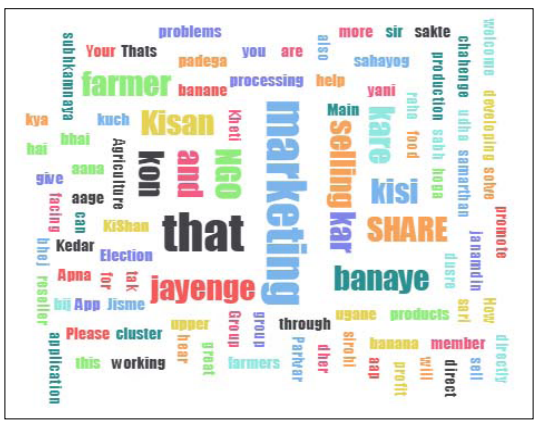

Figure 11: Word Cloud 3

Word cloud of irrelevant topic has been generated as shown in Figure 12 which kills the main objectives of the group but these are also required to bind the sentiment of the group and build trust.

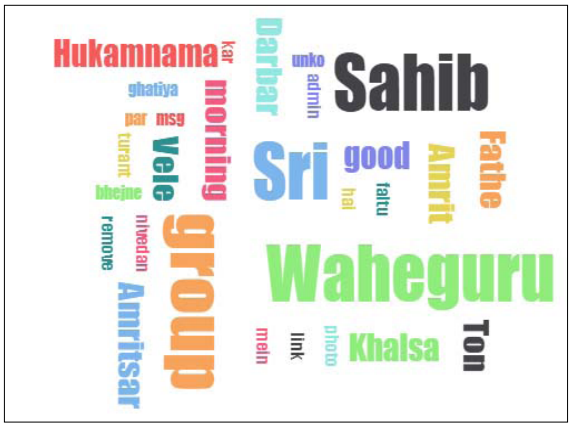

Figure 12: Word Cloud 5

Summary of the Key Findings and Recommendation

The main objective ofthis paper is to review how WhatsApp a Mobile Instant Messaging service is being used among the Indian farmers within the village boundaries. It was to consider how information is disseminated. Like minded Indian farmer community usually forms WhatsApp groups. Once the group is formed they start sharing information. With the time, it leads to interminable expansion of such groups. There exist few members, who actively participate and respond to the queries raised within the group. Some of them are idle and silent observers within the group, but they are also benefitted with the posted content. Based on participation, natural set of Group Moderators are identified apart from the Group Administrators. Group Administrators has privilege to add group members and monitor the posted content. Usually these groups are open to share their agriculture experience and post queries. The role of the Group Moderators is to address posted queries. In ideal scenario, it is expected that the content is restricted only to the Agriculture, but in reality posted content is not limited to agriculture. Group Moderators has to bring back discussion to the relevant topic.

Willingness to adopt ICT tools: The trend shows that,Indian farmers are willingly adopt ICT tools in their day to day life. Poverty, social constraint, illiteracy, language barriers are not major barrier to stop Indian farmers to adopt ICT in their day to day life.

WhatsApp the Most Popular MIM service: Indian farmers are using WhatsApp for personal connectivity. Farmers are connected to various Social Group to share their emotions and experiences. WhatsApp has helped to build social network not only for sharing information related to the agriculture, but they are sharing messages related to the politics, entertainment etc.

Conversation Pattern: The word cloud generated from sample chat log of Indian Farmer group suggests that their conversation

covers all the topics from farm, produce, marketing, NGO to research.

Limitation of WhatsApp MIM Service as a query redressal social media platform: WhatsApp MIM service provides real time sharing of message in various formats (voice, text, video and image). It also provides facility for voice and video call. But in context of its usage as a query redressal system, it has various limitations. It does not allow individual farmer to resolve query in real time. It all depends on availability of other members to respond and their domain expertise. As query keeps floating, it becomes very difficult to identify whether the query has been resolved or not. The bulk message thus prevents group moderators to respond to all queries in real time. There is always uncertainty to get accurate response to query as you never know person you are talking to. If a farmer has posted a query,it is likely to get multiple responses due to which the farmer will be in a confused state and finally stops him to implement solutions in practice. Ultimately the question remains same "**will you take pill on your friend recommendation**". It is not possible to build trust over the social media when it comes to issues like crop disease and animal disease in real time.

Recommendations: A prototype of the chatbot has been recommended in Figure 13 which can resolve limitation of WhatsApp MIM Service as a query redressal system. This chatbot can be used as automated query redressal system from where Indian Farmer can get accurate and reliable solution in real time. It will ensure correct response for each and every query in their regional language. It will also ensure that feedback mechanism for each query and response, so that in future system can be improved with time.

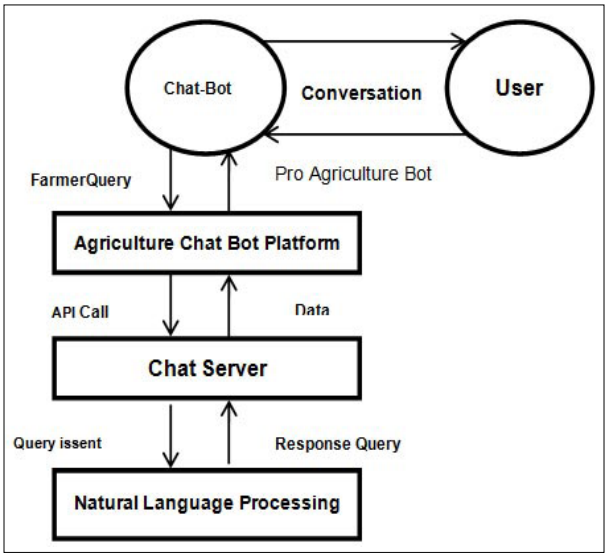

Figure 13: Prototype automated query redressal system

Conclusion

This paper investigated group based communication using WhatsApp, among the farming community in typical Indian village boundaries by evaluating their chat log. Word cloud has been generated after structuring of chat log using Pandas, Numpy, Matplotlib, Wordcloud and Python package. The Graphs & Word Cloud in this paper is programmatically generated using real dataset and carries the right meaning with clarity. These insight and results lay the foundation of future research for sharing and scheduling of agricultural information. WhatsApp MIM services can be used as query redressal but it has its own limitation. Moderator of the group has to keep the momentum of the conversation otherwise it defeats the actual intention. It has been observed most of the query has not been addressed because of the volumes of message posted. Therefore need based automated query redressal platform have to be designed and developed which can handle bulk of query at a time using the capability of Machine Learning and Natural Language Processing.

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