KISAN MITRA : AN INTELLIGENT CHATBOT

Yograj Alimkar[1], Deepak Sharma[2], Yukta Vishnoi[3], Deepti Vijay Chandran[4]

[1-3]Students,Dept. Of Computer Science,Smt.Indira Gandhi College of Engineering, Navi Mumbai,Maharashtra,India.
[4]Professor, Dept.Of Computer Science,Smt.Indira Gandhi College of Engineering, Navi Mumbai,Maharashtra,India

---***---

Abstract - *Agriculture occupies an critical role within side the Indian economy. Indian farmers nowadays are dealing with the trouble of low profits because of the dearth of records approximately authorities schemes, fertilizers, farming gadget etc. Agriculture hired 50% of the Indian paintings pressure and contributed 17–18% to country's GDP. In 2016. Agriculture and allied sectors like animal husbandry, forestry and fisheries accounted for 15.4% of the GDP (gross home product) with approximately 31% of the body of workers in 2014 This paintings pursuits to implement, a Chatbot that promotes far flung interplay of the users/farmers to the agriculture surroundings the usage of Natural language processing. We need to construct a talk bot which could solution the queries of the farmers and also can offer a probable records and answer associated with agriculture. There also are such a lot of authorities schemes which may be now no longer regarded to the farmers that are very useful for the farmers, the chat bot also can offer records as mentioned. Some smallholders and marginalized farmers have low recognition as maximum of them stay in far flung regions and do not have get right of entry to records approximately soil properties, seeds, currently used tools, fertilizers, etc. The report proposes an intelligent, transportable gadget that makes use of Natural language processing strategies to assist farmers use exclusive farming strategies, and in addition assist them to reply their queries and remedy their doubts the usage of chatbot a good way to shop their time. To meet all of the necessities of farmers, a chatbot is proposed the usage of Natural language processing technology. The gadget will act as an interactive digital assistant for farmers, answering all queries associated with agriculture. This paper will undergo the implementation of the chatbot the usage of the chatterbot libraries and Android Studio*

Key Words: Chatterbot, NLTK, android studio, Farming Assistant, NLP, Voice assistant

1.INTRODUCTION

Farming performs a prime function with in side the for the improvement of the country. It gives employment possibilities to a big variety of humans across the world. Day-through-Day the generation is growing withinside the agriculture area [1]. Nowadays the authorities is accumulating information concerning rainfall and crop manufacturing however it's miles of no need for farmers. Analyzing and accumulating the information can most

effective be beneficial to farmers to offer relational developments. There is likewise a few software program to train farmers approximately technology. But maximum of those technology aren't viable as they do now no longer supply correct solutions to the queries requested through the farmers [2].There are farmers who stay in far off regions of the country, who do now no longer have any statistics associated with new technological developments and agricultural practices, who do now no longer have get admission to to enough statistics on crops, soil properties, seeds, modern day equipment used, fertilizers, etc. Lack of get admission to agriculture understanding and statistics approximately the modern day farming practices ends in bad crop and farm animals productivity. To conquer the drawbacks, a chatbot is proposed the usage of the sample matching approach that offers an interface, in which the users, in this example farmers, can speak with the chatbot efficiently. This mission Kisan Mitra is an omnibus cellular app advanced to assist farmers through presenting applicable statistics to them quickly. With click on of a button, they are able to get the statistics on climate of the day, Nutrient Management, Government Schemes, Market Information, Providing statistics approximately the seeds, planting materials, area statistics and cultural practices etc. And that too of their Regional Languages to empower farmers withinside the nice feasible manner. Using Machine getting to know algorithms question responses are generated [1,2,5]. If the proposed machine does now no longer reply to the farmers' queries, those queries are forwarded to experts. Apart from farmers, it'll additionally assist the folks who are novices and interested by farming [1].In destiny sentiment evaluation and language translation may be implemented to this application [3,7]. The Chatbot has a few precise functions like including the query and retraining, updating the prevailing query, mailing the unanswered queries to enhance the ones question to better degree through expert. These operation makes the chatbot respond efficiently.

2. LITERATURE SURVEY

In the paper titled " E-AGRO: Intelligent Chat-Bot. IoT and Artificial Intelligence to Enhance Farming Industry," the writer stated Agriculture is the principle enterprise withinside the rural regions of Sri Lanka and the agriculture contributes a considerable quantity to the financial system of Sri Lanka. However, the agriculture is turning into much less worthwhile enterprise and subsequently, there's an willing fashion that the agricultural network continues far from agriculture. There are many motives for this development.

Among them having access to records at proper time approximately agriculture is a main issue. Hence, the goals of this venture are to community farmers and offer answers to farmers' troubles at proper time. To that end, we advanced a talk room to proportion the farmers' stories and knowledge. Further, we advanced an wise Chat-Bot, which presents answers for positive troubles of farmers via an internet gadget.[1]

In the paper titled "Agribot: A Natural Language Generative Neural Networks Engine for Agricultural Applications". OpenWeatherApi and different gadget mastering algorithms .Weather prediction the use of Agribot given region as enter Mostly farmers communicate of their nearby languages. We want device which could inter- relate our gadget and their language. The climate prediction module may be changed in order that it accesses the region with out userinterruption. In order to enhance the overall performance in future, authentic length photographs taken in actual international environment [2]

In the paper titled "Language Identification from an Indian Multilingual Document Using Profile Features." the writer on this paper, an set of rules for language identity of Kannada, Hindi and English textual content strains from published files is proposed. The technique is primarily based totally at the evaluation of the pinnacle and backside profiles of character textual content strains and subsequently does now no longer require any man or woman or phrase segmentation. Further studies to enhance the set of rules thinking about extraordinary font kind and length and additionally to paintings on handwritten files.[3]

In the paper titled " Language Identification for Multilingual Machine Translation," the writer on this paper provides a short assessment of the want and demanding situations concerned in automated language identity for gadget translation task. Language identity and machine translation may be very critical to make move lingual records to be had to mass. As Marathi, Hindi and Sanskrit are very intently associated languages, getting the distinguishing capabilities that classify them is a tough task. As these types of languages proportion the identical script, type of named entities is likewise tough.[4]

In the paper titled "AgriBot - An wise interactive interface to help farmers in agricultural activities." the writer completed whole paintings changed into based totally on goal of supplying farmers with a accessible and transportable digital interactive farming assistant that may talk with farmers. The app changed into designed to be extraordinarily farmer specific. Agribot, now no longer simplest allows farmers get high-quality crop pointers however it additionally allows them betternurture their plants, shop their plants as a way to growth shelf existence of plants, in addition to assist them discover high-quality rates. [5].

3. PROBLEM STATEMENT

Now a days , the smart phones are bit not unusual place or even the farmers are capable of use it basically . They locate a few obligations a piece hard to go looking or accumulate records approximately their simple necessities with the aid of using typing and looking or with the aid of using the language barrier to they're going through a few problems to serve at the net to accumulate records so we had determined to create an software for them to lessen all their obstacles and to serve them with the desired records with the aid of using imparting the functions in our software to ease their a few type of In our venture we're seeking to lessen the obstacles of the farmers to get up to date with the today's and medical stuffs to growth their productivity.

3.1 DATA SOURCE

For Working of any chatbot the information is vital for schooling the chatbot. Therefore, the primary step of growing the chatbot is information.The information base for the chatbot is received from the information this is collected. Grouped information from the maximum requested query and solutions approximately farming or agriculture from the net. This accrued information is given as a dataset for schooling the model. The dataset consists of attributes: query (query) and response (answer) in CSV.

Table -1: Example of Live Data Set.

QUESTION / QUERY	ANSWER / RESPONSE
HI	Hi, I am Kisan Mitra, You can ask me about agriculture
How wheat is grown?	Wheat is planted at different times depending on a region's weather conditions. Some farmers grow theirs in the winter while other grow theirs in the fall. Once the soil is ready, a machine called a grain drill is used to plant the seeds. Wheat grows through stages.
Major crops grown in Maharashtra?	Principle crops grown in the state are rice, jowar, bajara, wheat, tur, mung, urad, gram and other pulses. The state is major producer of oilseeds. Groundnut, sunflower, soybean are major oil seed crops. Important cash crops grown are cotton, sugarcane, turmeric and vegetables.

3.2 DATA PREPROCESSING

Pre-processing refers back to the differences implemented to our information earlier than feeding it to the algorithm. Data Preprocessing is a method this is used to transform the uncooked information right into a smooth information set. In our device the voice enter is first off transformed in to textual content format. When running with textual content information, we want to carry out numerous preprocessing at the information earlier than we make a chatbot examine. Based at the necessities we want to use numerous operations to preprocess the information.

Tokenizing is the maximum simple and primary factor you may do on textual content information. Tokenizing is the system of breaking the complete textual content into small elements like phrases. Here we iterate thru the styles and tokenize the sentence the usage of nltk. word_tokenize() characteristic and append every phrase withinside the phrases listing. We additionally create a listing of lessons for our tags. Now we are able to lemmatize every phrase and get rid of replica phrases from the listing.

Lemmatizing is the system of changing a phrase into its lemma shape after which developing a pickle document to keep the Python gadgets which we are able to use whilst predicting than we had created the schooling information wherein we are able to offer the enter and the output information for the chatbot to examine and deliver the output accordingly.

4. PROPOSED WORK

4.1 DATASET PREPARATION

As our chatbot is multilingual we ought to educate our device different language datasets. So we had created the datasets in 3 languages i.e. English, Hindi and Marathi languages. We had created many queries primarily based totally at the farming primarily based totally to educate our device in order that it could recognize how the enter terms can be. To educate our version we had used NLTK because it has many functionalities to talk with the device via way of means of the usage of Natural language.

a. NLTK

NLTK is a toolkit assemble for running with NLP in Python. It provides us several text processing libraries with masses of test datasets. It goes Under Process: Tokenization, Lower case conversion, Stop Words removal, Stemming, Lemmatization, Parse tree or, Syntax Tree generation, POS Tagging. Tokenization: The idea is to break up each word and assemble a vocabulary such that we can represent all terms uniquely in a list. Lower case conversion: We convert all terms into the lower case to avoid redundancy withinside the token list. Stop Words removal: Removed noise in advance than processing for cleanser processing withinside the model. Stemming: Extract the premise word and put off the rest. Here the premise word long-established is called 'stem' and it is not constantly that stem wants to exist and characteristic a meaning. Lemmatization: We want to extract the lowest form of the word here. Which is available withinside the dictionary. We have the WordNet corpus and the lemma generated may be available in this corpus. Parse tree or, Syntax Tree generation: We can define grammar and then use NLTK Reg exp Parser to extract all factors of speech from the sentence. we offer each word a particular tag and approach them.
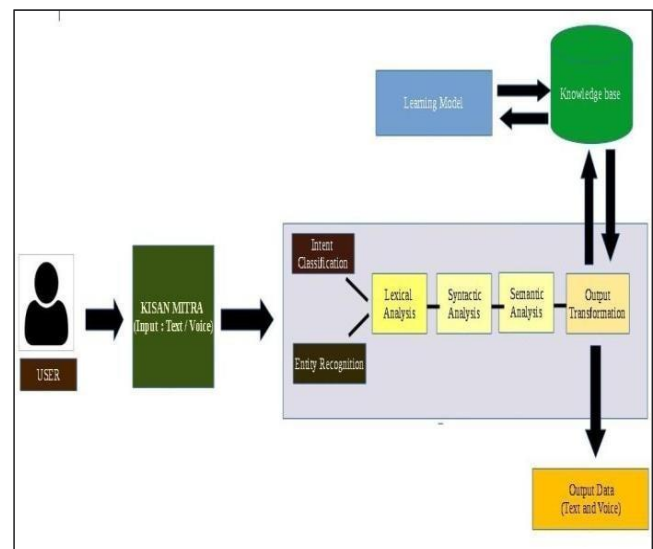
b. Architecture

Fig -1: Architecture of Kisan Mitra

The user can provide the input in form of text or speech , if the user give input in the form of speech, the input is converted in to text and the process of natural language processing takes place. We had used NLTK module for input processing and generating output based on the language selected by the user. The natural language process start after the conversion process , the process such as lexical analysis , Lexical Analysis is the first phase of the compiler also known as a scanner. It converts the High level input program into a sequence of Tokens. Lexical Analysis can be implemented with the Deterministic finiteAutomata. The output is a sequence of tokens that is sent to the parser for syntax analysis.Syntactic analysis is defined as analysis that tells us the logical meaning of certainly given sentences or parts of thosesentences. We also need to consider rules of grammar in order to define the logical meaning as well as the correctness of the sentences If the system I not able to give the answer or it does not understand the query it process it and try to learn how to give an appropriate answer for that query next time. For reasoning we are using nltk as it has functionality to understand the phrases and it provide the best suitable answer. And for further functions we had provided in our application we had used api's to pull the live data from government official websites. For application development we are using android studio as an platform. It works using java and flutter. Our GUI and other functionality were made using java but our core functionality of chatbot was not been able to develop using python and android studio does not support python directly. So to use python in android studio we have to use chaquopy which is an library used to add python interpreter in android studio. We have to add some dependencies in the manifest files but it has some limitations as we cannot perform major or heavy task using chaquopy.
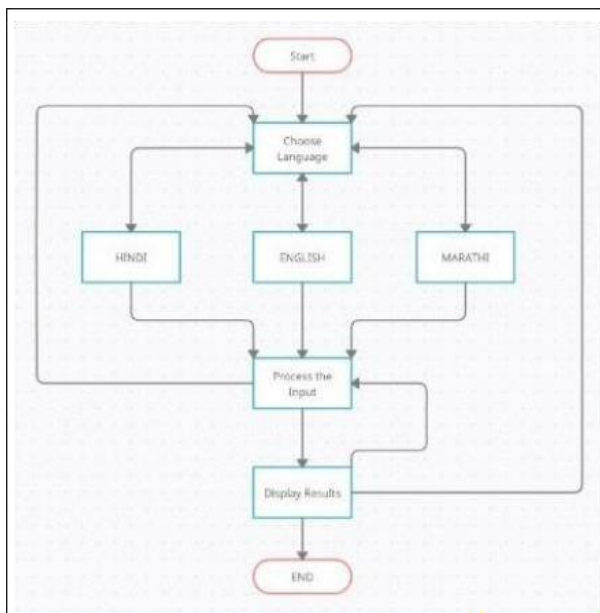
Fig -2: Flowchart of Kisan Mitra

Once the user start the application the language selection appears we had provided 3 languages English Hindi and Marathi. The next page depends on the user choice , if the user choose the English language the content will be in English language and if Marathi the content will be in Marathi same as for Hindi. According to the chosen language the user can talk with the bot and can use the application in the same language. If the bot is not able to answer the query the bot will directly search it on the Google for this we had used beautiful soup library in python which is used for web scraping using this we had removed a limitation as the using our system the user can ask further more queries apart from farm based and it will also try to learn if the user will ask that question again so the bot will be able to answer the query. We had also implemented other features in our application such as weather information, crop information, market information, government schemes and much more. We are extracting live data for all features from government based official websites.

4. Result

If a farmer wants to know anything for any purpose and if he don't know how to operate with Google than it becomes at most not possible to get information from other end so to overcome this problem we had created an application to assist farmers for their queries. Using our application named Kisan Mitra the farmers will be able to get the solution for the queries they asked. And if the farmer is not known about the English language we had also provide other regional languages such as Hindi and Marathi for the communication. So there will be no barrier for language. We had provided other features so that the user can directly access that features from the main screen only. The features are

5.1 Weather

Fig -3: Weather Page

Fig -4: Weather API

The fig no.8.2 shows the gateway request for get post service for our weather application. This is used in this part is the API for live weather fetching functionality according to the city. This key is fetching data from google by using Jason dependencies in our java based application. The user can easily use our feature by using our bot or the specified feature present in the application.

5.1 Government Schemes
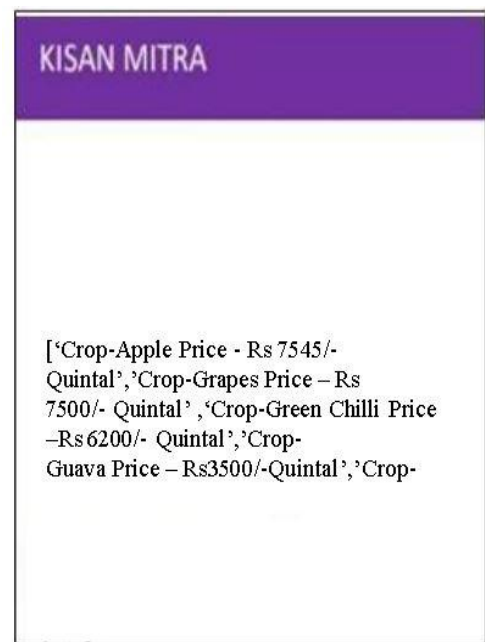

Fig -5: Government Schemes Page

Fig -6: Government Schemes API

The fig no.6 shows the gateway request for get post service for our government scheme application. The API urlis the api key from the website vikaspedia which is an government managing website for the schemes for farmers and other workers like fisherman etc, which has all the updated government schemes and we are fetching information from this site and displaying it on our application screen. The user can access this feature from the navigation panel and the feature named as Government Scheme.

5.3 Market Information

Fig -7: Market Information Page

Fig -8 : Market Information API

The fig no.8 shows the gateway request for get post service for our market application. The API url is the api key from the website data.gov.in which has all the updated market information we are fetching information from that site and displaying it on our application screen. The user can access this feature from the navigation panel named as Market Information.

5.4 Chatbot System

We had provided chatbot in our application in three languages as English, Hindi and Marathi. We had also implemented web scraping for this we had used bs4 library which is also known as beautiful soup library in python. As we had made application on android studio platform so we had used Chaquopy to integrate python in android studio. For English chatbot section we had created Data set to train out bot to answer queries according to the phrases as the user

can ask and to help the bot understand the quaries we used NLP(Natural Language Processing) and NLTK(Natural Language Toolkit).Both libraries aue used in python to work with natural language and phrase detection. As NLP helps in language processing and NLTK helps in tokenization , phrasing etc. All other languages works same as English.
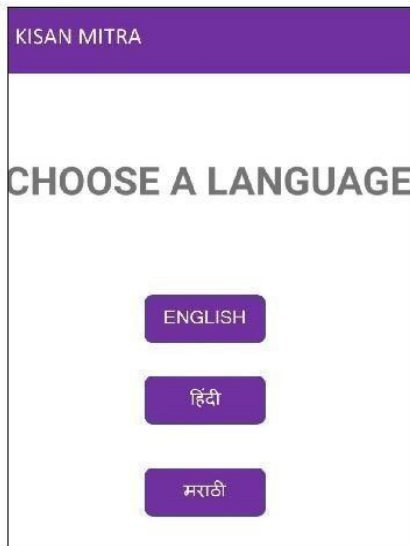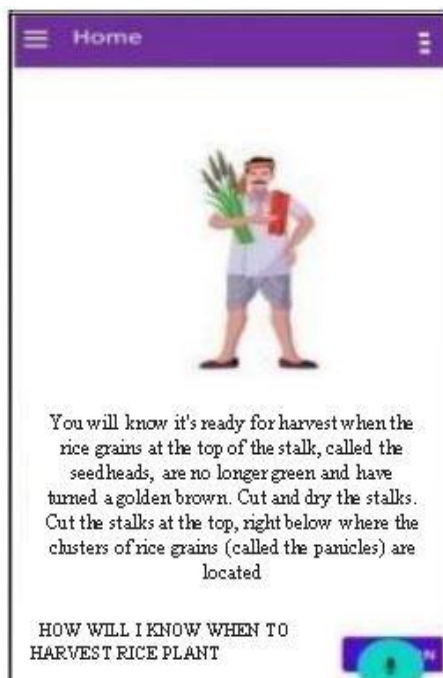

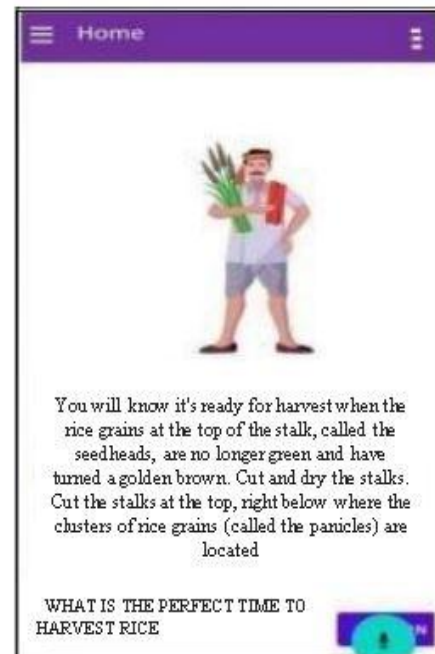**Fig -9 :** Language Page

Fig -11 : English Language - II

Fig -12 : Hindi Language - I

Fig -10 : English Language - I

Fig -13 : Hindi Language - II

Fig -14 : Marathi Language

5. CONCLUSION

Project concludes that creating such a framework is conceivable. Farming is the spine of the economy. It gives nourishment, crude materials and indeed business openings to so numerous individuals. It's been practiced for over thousands of a long time presently. Over the long time, due to the headway and most recent patterns in innovation, agrarian strategies have moreover advanced, but in India, there are little and negligible ranchers who hone ancient, conventional strategies due to need of assets. Thus, this framework works as a virtual right hand which guides the ranchers by replying all their inquiries with respect to rural hones, in this manner making a difference them create higher benefits. In future the chat may be empowered to send inquiries within the frame of

pictures and videos and get the correct reaction. Future scope would be empowering sound and video calling highlights with the master, empowering video and picture reaction from the chatbot and Generally, this activity of actualizing chatbots will help ranchers and subsequently boost the economy.

6. FUTURE WORK

In future, we can upgrade our application, as we can add the other regional languages to make it more efficient to theusers of other religions, so that they will be also able to search the information and will be able o use our features more efficiently without hesitating. We can also add some more features as the requirement of the application users in the future to make our application more reliable on the basis of problems faced during the usage and other reliable features according to the feedback & etc. In future we can also make it handier and more efficient so the less literate users can also use it more efficiently, effectively and easily.

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 2022.

[2]Prof. Yashaswini. D , Hemalatha., Niveditha. (2019)," Smart Chatbot for Agriculture ",International Journal of Engineering Science and Computing, Volume 9 Issue No. 5 , May 2021. [2]Proc.ACMInteract.Mob.WearableUbiquitousTechnol.,Vol.2,No.4,Article170, December 2021.

[3]Aakash G Ratkal, GangadharAkalwadi, Vinay N Patil and Kavi Mahesh, (2019), "Farmer's Analytical Assistant", IEEE InternationalConference on Cloud Computing in Emerging [4]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", 2018 Texas Instruments India Educators' Conference, 2018 IEEE

[5]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(2018) .

[6]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, 2017.

[7]S. 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.nn

[8]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-2016.n \

[9]Vandita Mathad, Greeshma R.R., Harshitha J.V., Deepika S., Snigdha Sen,"Quality Assessment of Crops Through Disease Detection U

[10]M. C. Padma and P. A. Vijaya, "Identification and Separation of Text Words of Kannada, Telugu, Tamil, Hindi, English Languages through Visual Discriminating Features", [2016] [12]In proc. of International conference on Advances in Computer Vision and Information S.Pudumalar, E.Ramanujam, R.Harine Rajashreen, C.Kavyan,T.Kiruthikan, J.Nishan Thiagarajar Collegeof Engineering, [2015]

[11]"Crop Recommendation System for Precision Agriculture", IEEE Eighth International Conference on Advanced Computing,March 2016

[12]J. Browne. (2008, May 23). "From Toilet to Tap Discover. [Online]Available: http:// discover magazine. com/ 2008/ may/ 23-from-toilet- to-tap

[13]. A. Mulrine. (2006, March). "To the Rescue." Prism. [Online]. Available: www.prism-magazine.org/ mar 06/ feature_incredibles.cfm

[14]. (2005) "Provide Access to Clean Water." National Academy of Engineering Grand Challenges for Engineering. [Online].