
A Voice Assistant for Shopping Malls to Find Product Location Using Natural Language Processing.

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I. ABSTRACT

Traditionally, people go around and search the whole mart/shopping mall for a single product, or ask around the staff who are busy maintaining the place. As in today's busy world where people do not have time to eat a meal peacefully. Most of the times they find the product on their own or with the help of the staff, but sometimes fail to find it even with the help. Which results in the wastage of ones precious time and energy looking for it.

So in order to overcome this problem we have come up with an idea of creating an app which would assist the customers easily in marts with the usage of NLP and AI. When a person enters the name of grocery in the application's search bar they will be assisted by the application by giving the location of the product that he/she is looking for, the location will be given in the form of the floor number followed with the column number, row number, shelf number of the product.

Ultimately this reduces one's time, helps them find the product easily and gives a blissful shopping experience.

Keywords-: NPL (Natural Language processing), AI (Artificial Intelligence), Application, Search bar.

II. INTRODUCTION

Shopping is seen as a source of diversion or relaxation to many people from this hectic life, but if that time becomes more stressful when one can't find the product they want. But in some cases when there is an urgency/need of a product and searching for it makes the situation worse. This can be partially solved, by asking for help from the staff. But it is not always helpful as (partially because):

1. They are not always available to help as they may be working on something.
2. They themselves will not know the location of the product.

3. They may provide the wrong information and may end up wasting out time way more rather than reducing it.

4. It is not pretty good to ask the staff for help very frequently too.

The solution to the above scenario is simple, A Voice Assistant, which will communicate and answers us with the location of the Products.

A Voice Assistant can make our shopping spree blissful, one can easily have conversation with voice assistant just like they do with humans using technology like NLP and AI as a main concept. This also helps visually challenged people by giving them the location via audio, which includes floor number, column number, row number and stack/rack number. All a person has to do are the below two steps:

1. Go to the search bar of the application &
2. Search for the product by speaking/typing the name of the product needed.

Once the user gives the input the application starts its process of searching the product and gives the location respectively and in any case if the product is not present or not found it replies as "Not Found", so that the user can stop looking for it and move on to the next search. The advantage of this application is that it saves half of the time we spend in Shopping and making Shopping Smarter. [14]

The motivation to come up with such an idea is by experiencing/seeing front hand of people wasting their time in shopping places by searching for what they want rather than just buying those. It also helps the illiterates as it can just take in the audio of our speaking and give out the location as it has the option of text search and voice search, with output via audio out loud or text on screen. Now at times like this where the whole world is constantly under fear of getting the "Novel Corona Virus" also know by different names like "Corona", "Covid-19". It reduces human interaction as it makes one independent, there will be no more asking for help from the staff and reduce the chances of getting the virus. It also helps those who are not confident/comfortable with making human interactions [Introverts] to help themselves using this.

III. RELATED WORK

[6] A good solution is given by Mobile Assistive Technologies(MAT) to help visually impaired people to help and make their everyday life task easier by Mostafa Elgendy and Cecilia Sik Lanyi [2017] "Third eye: A shopping assistant for the visually impaired". Where in they use Smartphones with assistive technology in it to help them navigate through shopping.

[13] Daniel Hüsson and Alexander Holland implemented intelligent personal assistant (IPA)[2019]. This IPA is able to listen to voice commands, to interact by opening a report and giving a brief summary via speech-to-text to the user and explaining the most important information in the relevant context of the displayed KPIs.

[10] "Artificial Intelligence Based Person Identification Virtual Assistant" The framework enables just approved users to access voice commands. By this we can get protection and security for virtual assistant (VA). Users can ask their help addresses like time, date and climate and find solution to the inquiries by P.Pradeep, P.Balaji, S.Bhanumathi.

[1] "AI based voice assistant" by S Subhash is a very useful paper since it purely concentrates on AI based voice assistant for large scale the difference between Subhash and our paper is that we have implemented it for shopping mart while there is for larger database this paper makes us understand the relation and connect to database and voice assistant.

[2] "An Interactive Voice Assistant System for Guiding the Tourists in Historical places ", by R. Keerthana and T. A. Kumar helps us find the direction to destination by using Google Maps API, which indeed gives a methodology for guide our customer to the required product.

[5] Hage and Ramsey paper on " *Voice-enabled interactive e-commerce*. University of Ottawa" is very effective for since we deal with the better user experience and this paper of Hage talks about how AI plays an important role in education and e-commerce for better user experience.

[7] Bhandari and Leena "SmartCart: Mall Assistant." This paper is very similar to what our paper deals with but the main difference is that this SmartMart needs wifi connection to work and interact with customer.

IV. PROBLEM STATEMENT

The fundamental issue which people are facing regarding shopping in marts or malls, is finding the location of products without wasting any time. Even though online shopping is widely used these days there are many who prefer offline shopping, so that they are confident about the product and if they match their liking. We have the following issues:

Firstly, most of the people waste a lot of time on searching/finding where their product is instead of actually buying the product.

Second, visually impaired people find it difficult to do offline shopping and is a bigger issue.

Third, some people feel uncomfortable/diffident to ask for help from the staff and thereby find it difficult to locate products, resulting in a stressful shopping.

V. OBJECTIVES

The Project Objectives are as follows:

- To reduce the searching time for a product.
- To reduce the search complexity of a product.
- To make shopping easier.
- To eliminate the concept of seeking help from the staff.
- To make the user feel comfortable and independent.
- To help the visually challenged.

VI. MODULES IDENTIFIED

Our project consists of three major modules:

1. Speech-Recognition: This is a AI package which allows computer to understand human language and its main functionality is, to convert speech to text. This paper makes use of this package to take the input from the customers as the query.

2. date-time: This library is used to identify the current time of the system, Therefore in this paper its used to greet the customer based on the system timing like "GOOD MORNING ", "GOOD AFTERNOON " etc.

3. pyttsx3: This is a python package which is a third party library used in this paper for converting text to speech inorder to interact with customer by reading out the required query result.

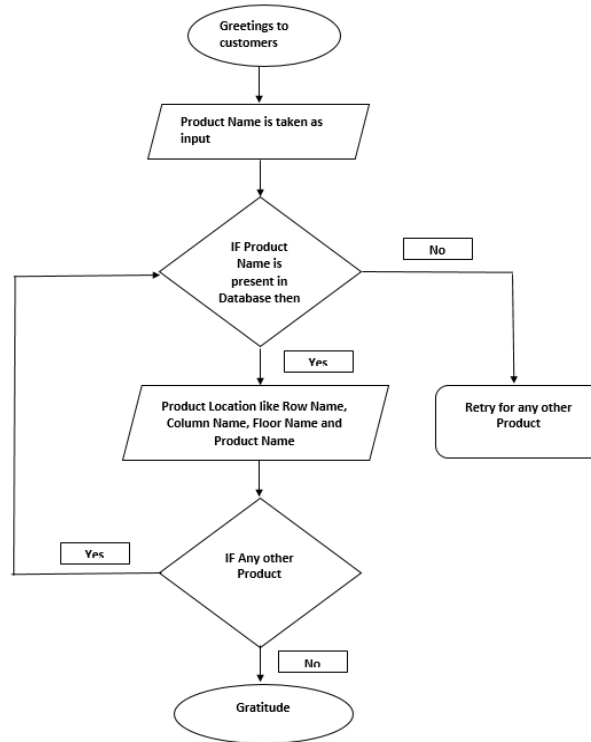
VII. SYSTEM REQUIREMENTS

SOFTWARE REQUIREMENTS:

•Pycharm IDE - software development tool used to create the AI based application.

•Google firebase – the Database used to store the information about the store.

VIII. WORK FLOW



IX. METHODOLOGY

Step 1: When one walks into the mart/mall they should have the respective application in their smart phones.

Step 2: After successful installation it is all ready to use.

Step 3: The user should give input i.e., the name of the product they are searching for in the search bar, we have two ways provided to give the input either as a text search or as a voice search, we use Natural Language Processing

concept of 1speech to Text conversion using Speech Recognition package provided by Python which is used to implement the Front End.

Step 4: Once the input is given the search algorithm starts, which searches the product name given in the database provided, the database contains the product name, and the location of the product i.e., the floor number, column number, row number and the rack/stack number of the product. Once the search starts the the input given is compared with the product name column and the following column with its location is given if its a match.

Step 5: If the product is found, it gives us the location of the product in 2 ways one by speaking out loud i.e., audio format or by displaying the location on their screen. If the product is not found we will be getting the output as "Product Not Found" and ends the process.

Step 6: The user can follow the given location and find the product they are looking for.

Step 7: Once the user has got the one he/she searched for, they can move on with their next search.

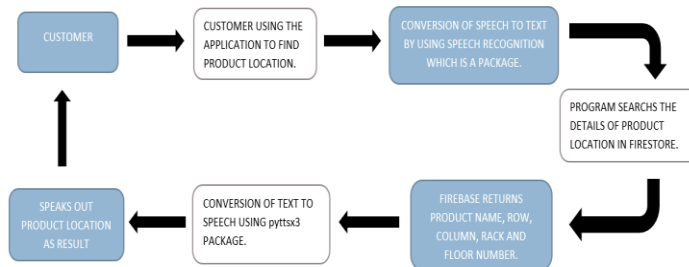


Fig a.Methodology used for developing the voice assistant.

X. RESULTS

Here are the desired results from the Voice Assistant:

Initially, it shows the result of Greeting and Conversation with the customer to take the input from them also,

```

Run: yvz2
C:\python3.10\python.exe "C:/Users/ZAKIYA SHABNAM H R/PycharmPr
Good Evening!!
Listening...
Recognizing...
user said: hello

Process finished with exit code 0

```

Finally, the results obtained upon working on the query is, it shows the Product Name, Rack number, Column number and also the Floor number as show below,

```

Lemon IC cream => (Floor no: 2, Column no: 2, Product id: 1037, Row no: 6, Rack no: 11)
Lemon Lipstick => (Product id: 1047, Column no: 2, Row no: 4, Rack no: 2, Floor no: 2)
Lemon cream => (Floor no: 2, Product id: 1039, Rack no: 4, Row no: 1, Column no: 1)
Lemon nail polish => (Product id: 1041, Rack no: 11, Column no: 1, Floor no: 2, Row no: 1)
Lemon Lipstick => (Row no: 4, Product id: 1041, Rack no: 1, Column no: 2, Floor no: 2)
Lemon Shampoo => (Row no: 2, Product id: 1036, Rack no: 4, Column no: 2, Floor no: 2)
Maggi => (Product id: 1011, Rack no: 11, Floor no: 1, Column no: 1, Row no: 1)
Maggi => (Row no: 1, Product id: 1021, Rack no: 10, Floor no: 1, Column no: 1)
MaggiLime Lipstick => (Row no: 4, Rack no: 2, Floor no: 2, Product id: 1037, Column no: 2)
Milk Mustard => (Row no: 2, Floor no: 2, Column no: 1, Product id: 1022, Row no: 10)
Milk Fruit Salsan => (Row no: 5, Column no: 2, Product id: 1024, Floor no: 1, Rack no: 9)
Mustard Oil => (Column no: 2, Rack no: 10, Floor no: 1, Row no: 4, Product id: 1023)
Mustard Butter => (Floor no: 2, Column no: 2, Product id: 1040, Row no: 4, Rack no: 4)
Mustard Oil => (Column no: 2, Rack no: 1, Product id: 1020, Row no: 4, Floor no: 1)
Mustard Oil => (Floor no: 2, Floor no: 1, Product id: 1021, Column no: 4, Row no: 1)
Mustard Shampoo => (Column no: 1, Floor no: 2, Product id: 1026, Rack no: 4, Row no: 1)
Mustard Butter => (Row no: 2, Column no: 2, Product id: 1028, Rack no: 10)
Mustard Butter => (Product id: 1018, Column no: 2, Row no: 4, Floor no: 1, Rack no: 4)
Mustard Butter => (Product id: 1019, Row no: 3, Rack no: 4, Floor no: 2, Column no: 1)
Mustard Butter => (Product id: 1020, Rack no: 10, Floor no: 2, Column no: 2, Row no: 1)
Mustard Butter => (Row no: 5, Column no: 1, Floor no: 1, Product id: 1021, Row no: 1)
Mustard Butter => (Product id: 1022, Column no: 2, Row no: 2, Floor no: 2, Rack no: 7)
Mustard Butter => (Floor no: 2, Column no: 2, Floor no: 1, Product id: 1024, Row no: 2)
Mustard Butter => (Row no: 5, Product id: 1023, Rack no: 8, Column no: 2, Floor no: 1)
Mustard Butter => (Column no: 1, Floor no: 1, Product id: 1020, Rack no: 5, Row no: 1)
Mustard Butter => (Product id: 1021, Column no: 1, Row no: 4, Floor no: 1, Rack no: 10)

```

XI. CONCLUSION

In our proposed solution, we will be developing a voice assistant using natural language processing. This voice assistant can be used in shopping malls or malls to find out the location of variety of products available in the mall instantly just by saying the name of the product, thereby giving importance to the utilization of time in a conscious manner, i.e the searching time for the product is considerably reduced. This voice assistant also helps the visually impaired and introverts to shop offline in a much more simpler and easy way as it completely eliminates the concept of seeking help from the staff.

People usually find it uncomfortable to ask for help to the staff in the malls to locate certain personal products like sanitary pads. In such cases people can just make use of this voice assistant.

In times like COVID-19 and such similar situations where people are scared to get the virus, this voice assistant is of great help and a relief too.

Thereby, this voice assistant is very helpful for the society.

XII. FUTURE SCOPE

In future we can further add many other features like adding all the varying range/variety of the products.

This can be also implemented in libraries so that instead of asking the librarian multiple times one can just go find it.

On a small scale we can add all the marts in a fixed area into our application but on wider scale we can even add all the marts in a particular city with their products location by having conditional branching and the datasets which includes the product and its location of those marts accordingly.

XIII. REFERENCES

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