# MaSDaV

## Abstract:

Online grocery shopping is increasing day by day in many countries and is the safest way to order groceries at this point of time. Many housewives, bachelors and students have to spend time in buying groceries whereas in that time they could finish many other work. Moreover, in the time of a pandemic like this, going outside to buy groceries might expose us to the virus and put our life in danger. Therefore, we decided to create a device and an app for it such that people could order groceries online from any website they want all by voice command. Not only this, but the app also has features such as reminders, making lists and also guides you through recipes, all you have to do is command.First, we took a survey about questions related to our project that would help us make it better and give us a proper idea. Second, a lo-fi prototype was made on paper- a rough sketch- to decide how the final product would look like. Then based on that, we created our hi-fi prototype on Figma. Figma provided pretty much everything we needed to design our app. After we were done making the prototype, we made an evaluation form and floated the form in our class for people to review our prototype and give suggestions and we tried to implement some suggestions in our project to make it better for the users.


## Introduction

The 21st century is the century of smart devices. Commencing with phones and ending with fridges, a wide array of devices can be made “intelligent”. However, one of the appliances which we use the most hasn’t changed for years in our homes. The fridge. The first fridge was invented in 1834 by an American inventor Jacob Perkins. However, if we take a look at the fridges of the 20th and 19th century and compare them with the functionality of the fridges today, we wouldn’t see a large difference. Below we can see an example of the first ever fridge invented.

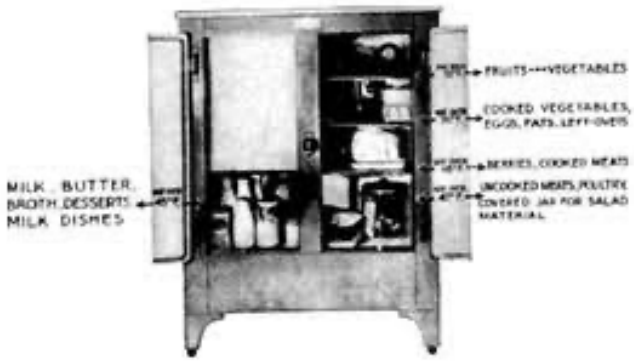



Fig 1. Fridge created by Jacob Perkins in 1834

Fig 2. Smart fridge by Samsung

However, now the convention of smart fridges has already been developed and is widely available to the general public. The functionalities which they can provide are diverse: helping the customer to cook recipes, making notes of some points, helping us do some functionality on our phone like making a call and sending text messages. Some advanced models can even detect and identify the contents of the fridge. All these cool functions may sound cool however, there is a downside toit, too. Not every one of us can afford to buy a fridge at a cost 3-5 times more than what the appliance normally costs. And also it doesn't often make sense to buy a new fridge when you have one working perfectly fine at home for the extra functionality for a large part of the population.

Hence we put forward the idea of a special device, which along with its helper app (for Android and iOS users) will transform your fridge into a smart one. It has a lot of features which are similar to the ones already mentioned and the list is even extended longer with such functions as providing live reports of the conditions of the fridge and letting the user play music of his choice. Our product, named MaSDaV is still at the ideation stage and has a working prototype of the app we are going to use. The main functionality of the device can be manipulated using the app.

Let us have a look at the functionality of our device. The available actions the user can take are:

1.The voice assistant will be activated upon opening of the fridge doors. The device will use ML to identify the commands issued by the user about what to do. The voice assistant will be automatically activated whenever the user opens the door of the fridge door and our device will be activated automatically.

2.Will be able to understand commands of what to add to our cart on websites like BigBasket. We can directly add things to the cart on websites like BigBasket. Our app would be better than the already available solutions because we will have a broader reach than our competitors.

Also due to a wide span of websites with which we will be collaborating we will be able to withstand tough competition. Moreover, using our service will be more preferable than using the services of such global giants like Amazon due to our cowering with local websites.

3. Speakers which are sold as an add-on to the speaker will provide enhanced functionality. If a customer buys the more premium version of our device he will be buying an additional pair of speakers which are attached to the fridge from the outside with a magnet. This would enable such functions as listening to music, setting an alarm or a reminder, or to talk on phone with a person. Often in the kitchen the hands of the user are busy and using the Assistant hands-free would increase the accessibility of the product.

If we take a look at the existing solutions of the problem at hand, we will see that there are not many products currently in the market for this niche. Even though companies with ordinary voice assistants are a part of the stakeholders which will be affected by MaSDaV,they can't be considered direct competition. Since they do not provide the solution of being a kitchen-specific assistant, there are not a lot of major players in the field chosen. An example is:

- Carla by Creuna (https://www.creuna.com/en/cases/carla-from-arla/)

- Fridge Eye by Brezzl (https://www.iotevolutionworld.com/smart-home/articles/443465-ai-refrigerator-camera-aims-keep-food-fresher-grocery.html

## Video Link

https://youtu.be/B2Izl-JSvlU

# Part 1:

**Problem Statement**:
Even though we have digitized a lot of trivial tasks in today's date, a majority of the population worldwide still relies on offline grocery shopping. Moreover, our user base (to be described later on) also has to remember what products are already in the fridge and which aren't when shopping. In the kitchen, using your phone device simultaneously with cooking often results in slips and sometimes even accidents. These problems can all be solved if a Smart Fridge is present in the kitchen to help with these trivial tasks and help in multitasking to the user.

**User base**:
The target user base of our project are :

- Housewives: Housewives generally have to go to grocery shops on a daily basis and worry about what to make for different meals in a day. This only consumes a lot of their time but also adds on more work to their existing chores.
- Bachelors or Students living alone: Students or bachelors who are living alone usually have to manage their household work after coming from college or office. Having to worry about what and when to get groceries and what to make for their daily meals adds up to their work.

**Stakeholders:**

- Customers
- Front-end and Back-end developers
- UI designer
- Investors
- Phone companies
- Executives

**Usability Goals:**

- ***Effectiveness:*** It should be effective to use and serve its purpose. The product should fulfil the needs of the user and do what it's made for. The user should not have any problem in ordering groceries online or browsing for recipes.

- ***Efficient:*** It will require minimum input from the user. The product should support users in carrying out their tasks such as placing an order, knowing the current prices of groceries, searching for recipes all through voice commands. Though voice command requires a few number of steps, we tend to make it as comfortable and easy as possible.

- ***Safety***: It will be ensured by multiple rounds of harsh condition testing, that the device can be kept inside the fridge at low temperatures in a way that it doesn't affect the fridge and will immediately shut down and send a notification on your mobile phone in case anything goes wrong.

- ***Learnability***: Easy to learn commands which will be optimized to modern-day standards. The product and interface will be designed in such a way that it is easy to learn for people of all age groups and be comfortable to use in very less time since most of it is based on voice commands, you just have to say "Hello Masdav" and your command.

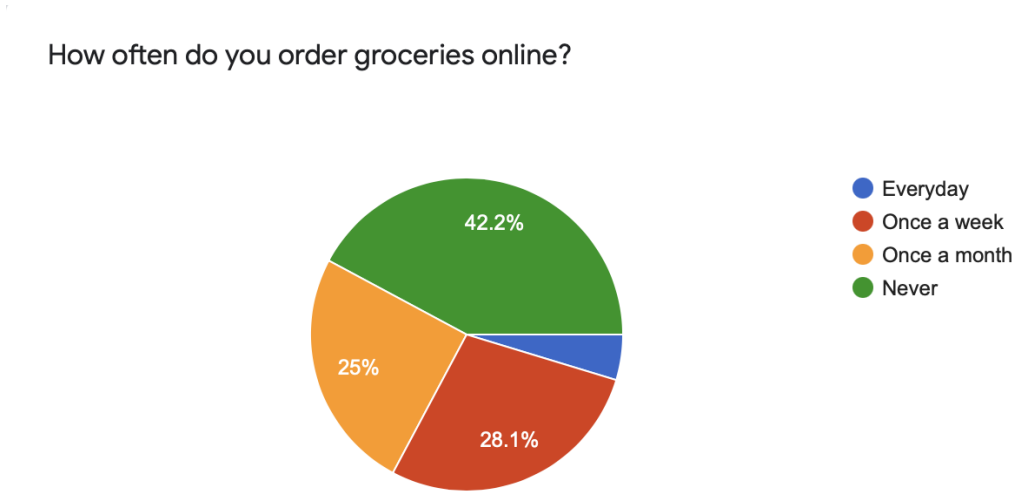
- ***Memorability***: It won't be required that the user remember any commands, since machine learning algorithms will try to understand a wide range of the commands that the user gives. Over time the software will remember your voice and the frequently used commands and questions.

## Part 2. Data Gathering

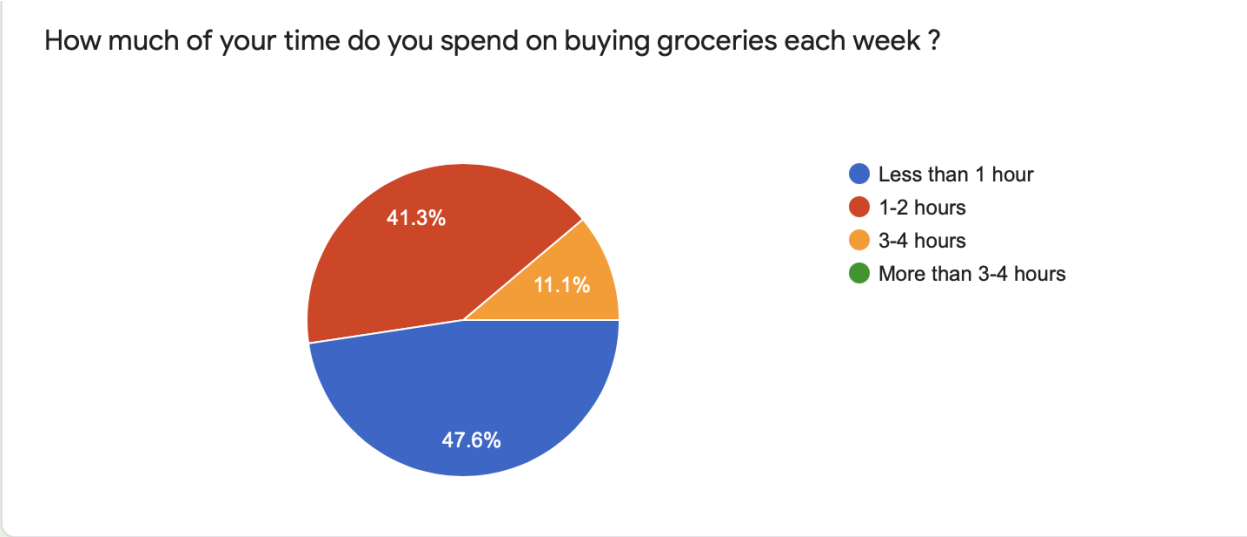
To collect more data about our project and the target user, we conducted a small survey in our college. We sent out google forms to our batchmates and friends with questions related to the project and analysed the data collected.

The main reason for collecting this data through the survey is so that we can know more about the target users, their behavior and their reaction to the technology and the product that we wish to introduce. Asking questions related to the topic will help to make the prototype better and well suited for the people's needs.

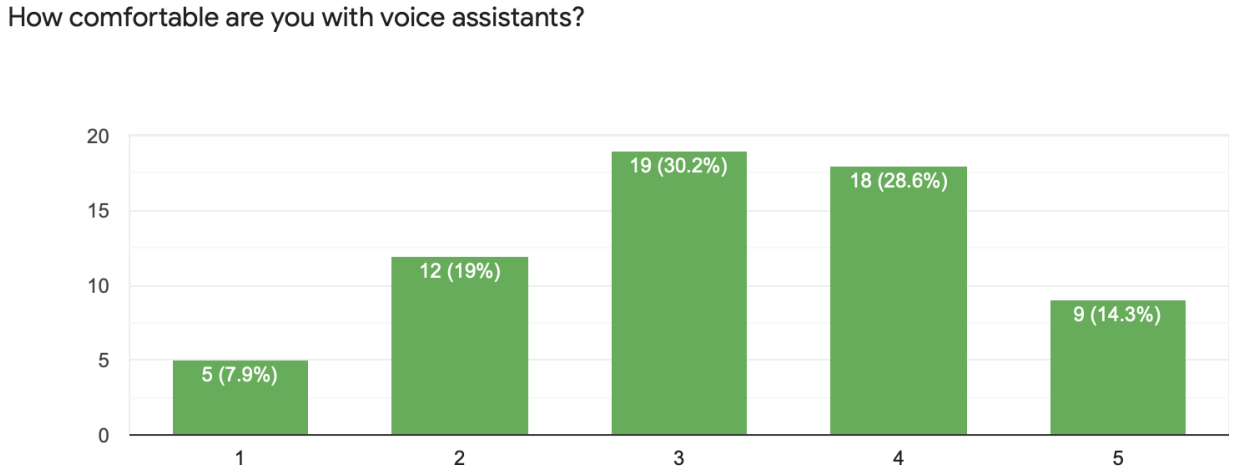
First, we asked the people how often they order groceries online, roughly 42% of the people don't order online, but let's not forget that online grocery shopping is still growing in India and is the most safest way to order groceries in this pandemic. About 28% of the people order groceries online once a week and 25% order once a month.



Second, we asked how much time on average do people spend on buying groceries. Around 48% of the people spend less than an hour for grocery shopping, 41% spend 1-2 hours and very few(11%) have to spend 3-4 hours.



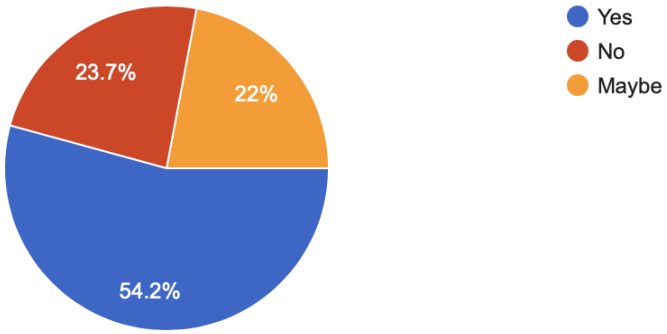

Third, we asked how comfortable they are with using voice assistants, and most of the people are good-comfortable with voice assistants. As we can see 14.3% of the people are very comfortable with using voice assistants, around 59% of the people are okay with using voice assistants and only about 8% are not so used to using voice assistants.



Fourth, we asked how often people make shopping lists before they go grocery shopping or order them, and as we expected most of the people do make lists. We wanted to know this since we planned to add a feature to make notes of the things required and to remind the user to buy them.

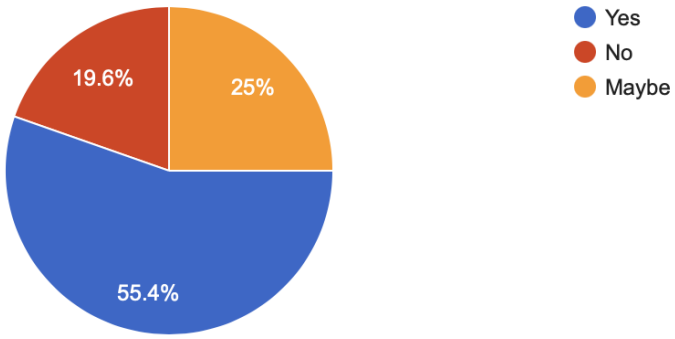
As we can see almost 54%, i.e, more than half the people always make a shopping list and 22% make a list at times. This is a very common thing and so we decided to add this feature in our app so that people can save everything in it and be reminded to buy the groceries.

Do you often make shopping lists when going to buy groceries?

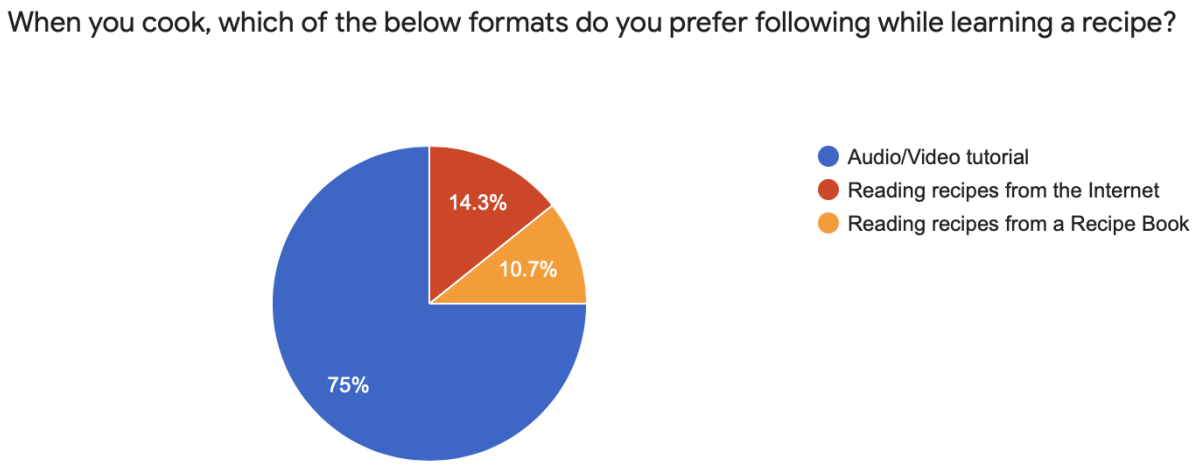



Next, we asked how many people would be interested in our product,i.e, to turn your fridge into a smart fridge. In the results, we noticed that more than 55% of the people want their fridge to be a smart fridge with all the amazing features. As it is not affordable to get a whole new smart fridge our product will make it easier to get the same features with other new things.

Would you like to have a device that turns your fridge into a smart fridge?



Lastly, we asked which method people prefer to use to learn new recipes. Most of the people watch audio and video tutorials. It is the most common and easiest way to learn any recipes. Almost any recipe in the world is available on the internet and Youtube.



## Part 3: Lo-Fi prototype

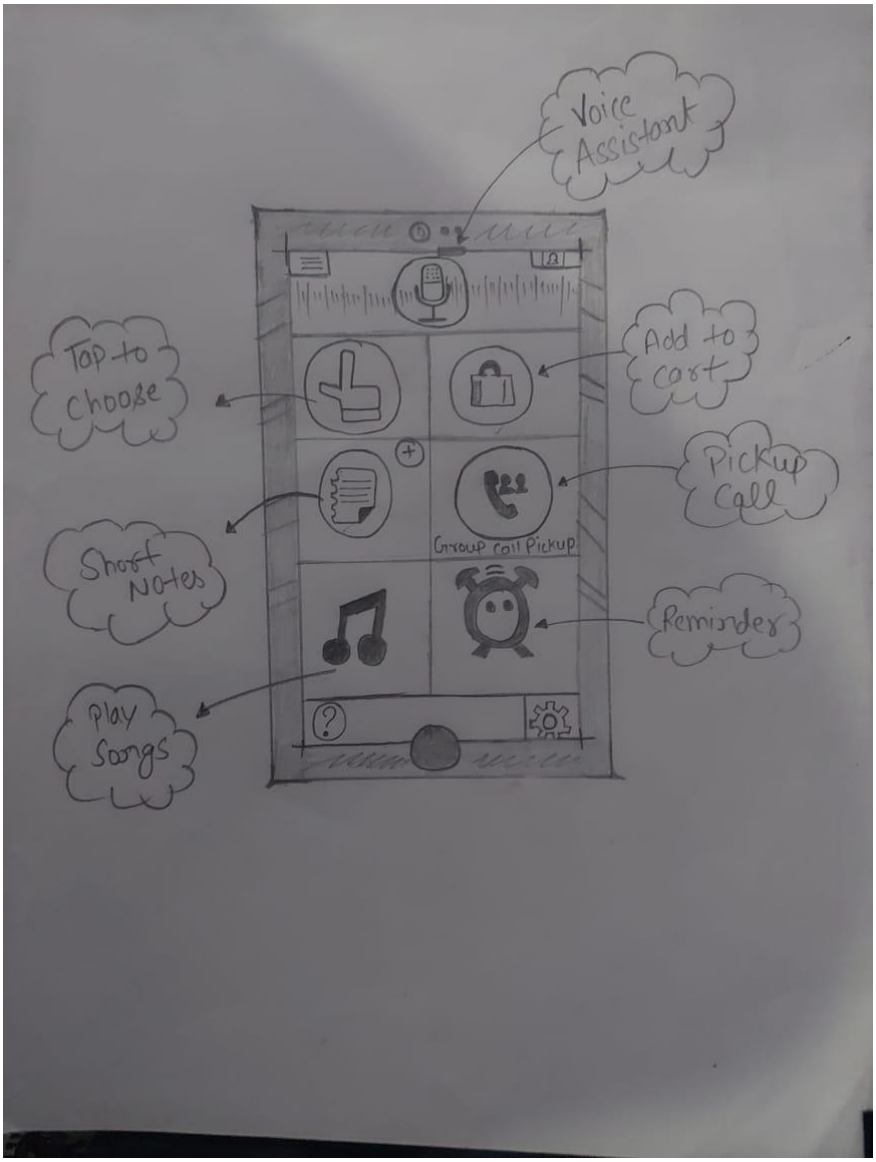
Below are the possible lo-fi prototypes which can be used for creating our assistant app. Since these are the Lo-Fi prototypes only, the possibility of any minor/major amendments still exists.

A low-fidelity prototype is a quick and easy representation of a concept, or an information structure created for getting quick feedback and improving the product. These prototypes are generally characterized by low technology application and can use a variety of materials , including sheets of paper , among many others.
"Low-fidelity prototyping works because it effectively educates our group members to have a concern for usability and evaluation, because it maximises the number of times we get to refine our design for High - fidelity prototyping.

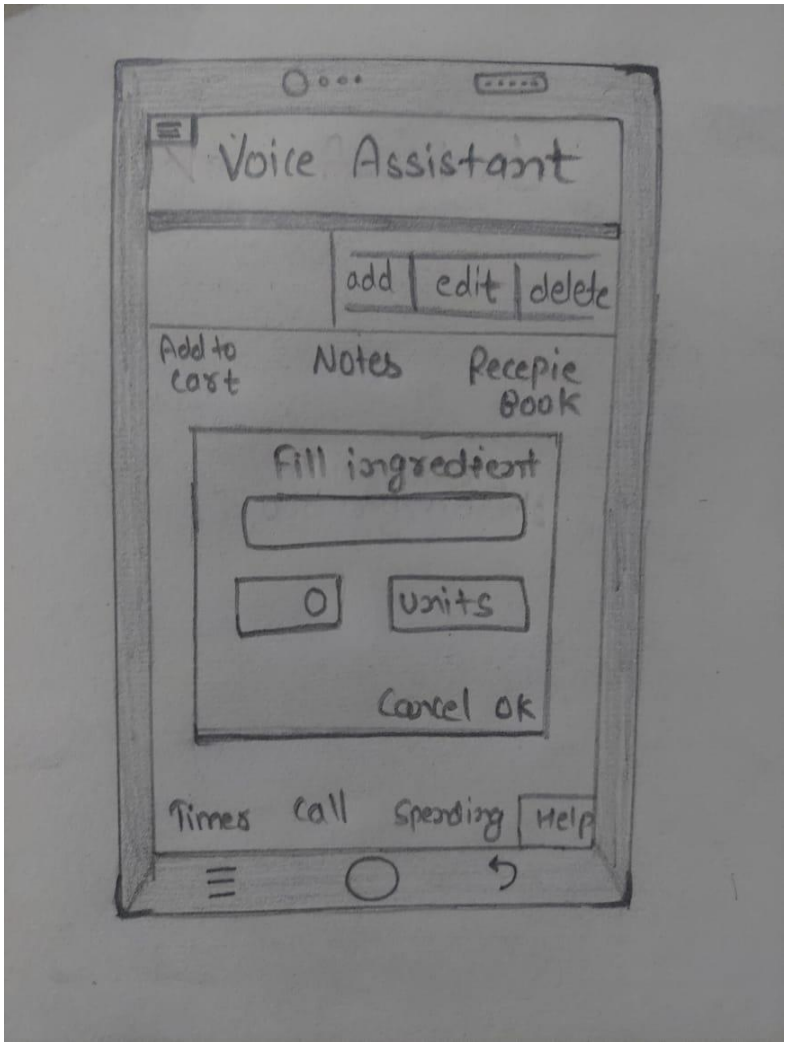
Generally the paper prototypes do not have a very polished look, users feel more comfortable in being critical and pointing out UX problems. This can also be done by highly designed screens, where users are more frustrated with themselves, what they are doing is 'right' or 'wrong'.This gives them more opportunity to find out the problems.

The cost of a low-fidelity prototype is extremely low. Without focusing on every interface detail, designers can follow their design ideas and create a simple and testable prototype within a few minutes.
Since a low - fidelity prototype is easy to demonstrate, designers can also directly share it with other people ( including the team members and stakeholders ) to collect design feedback.

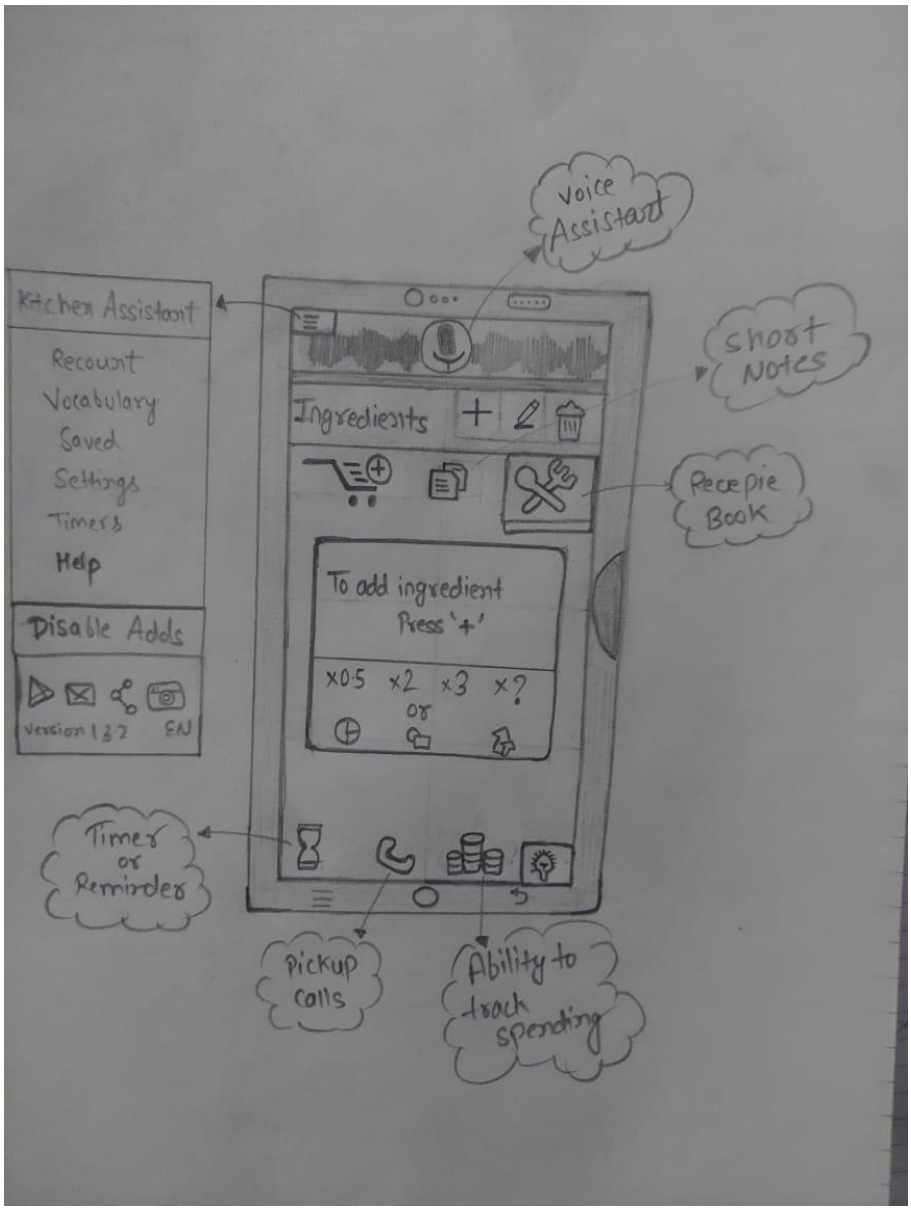
A low - fidelity prototype is good for designers to detect and tackle potential UI / UX issues quickly.
That's why we can't jump over the low - fidelity prototype to make a high - fidelity prototype. This proves that low - fidelity prototype is a necessary factor to make high fidelity prototypes.


Voice Assistant
Add to cart
Tap to Choose
Pickup Call
Group call Pickup
Short Notes
Reminder
Play Songs

Home Page




Kitchen Assistant page




Cooking assistant page

Now, briefly explaining the icons and features in our app.

Voice assistant:-

The Voice assistant can "transcribe , translate" and understand the user's intent to have engaging shopping - related conversation in various indian languages. Users can speak out what product they are looking for and the voice assistant will find it for them. Simply put, a

voice assistant is a piece of software that communicates to the user audibly, and responds to spoken commands.

Add to Cart:-

The add to cart option comes in handy when ordering from a grocery store or a retail store as users will now be able to select multiple items in a single order. It also becomes easier for users to keep a track of orders and payment as orders for multiple products will now be listed in a single message.

Recipe Book:-

Recipe book is a collection of recipes, instruction and information about the preparation and serving of food. At it's best , a chronicle and treasury of the fine art of cooking. In simple words, a recipe book is a set of instructions used for preparing and producing a certain food, dish or drink. The purpose of a recipe is to have a precise record of the ingredients used, the amounts needed , and the way they are combined.

Ability to Track Spending :-

Ability to track spending helps the user to track their daily spending, making it easier to view your expenditures, offline. This simple function helps users by giving them the ability to view total expenditure on groceries and day to day items by month.

Short Notes:-

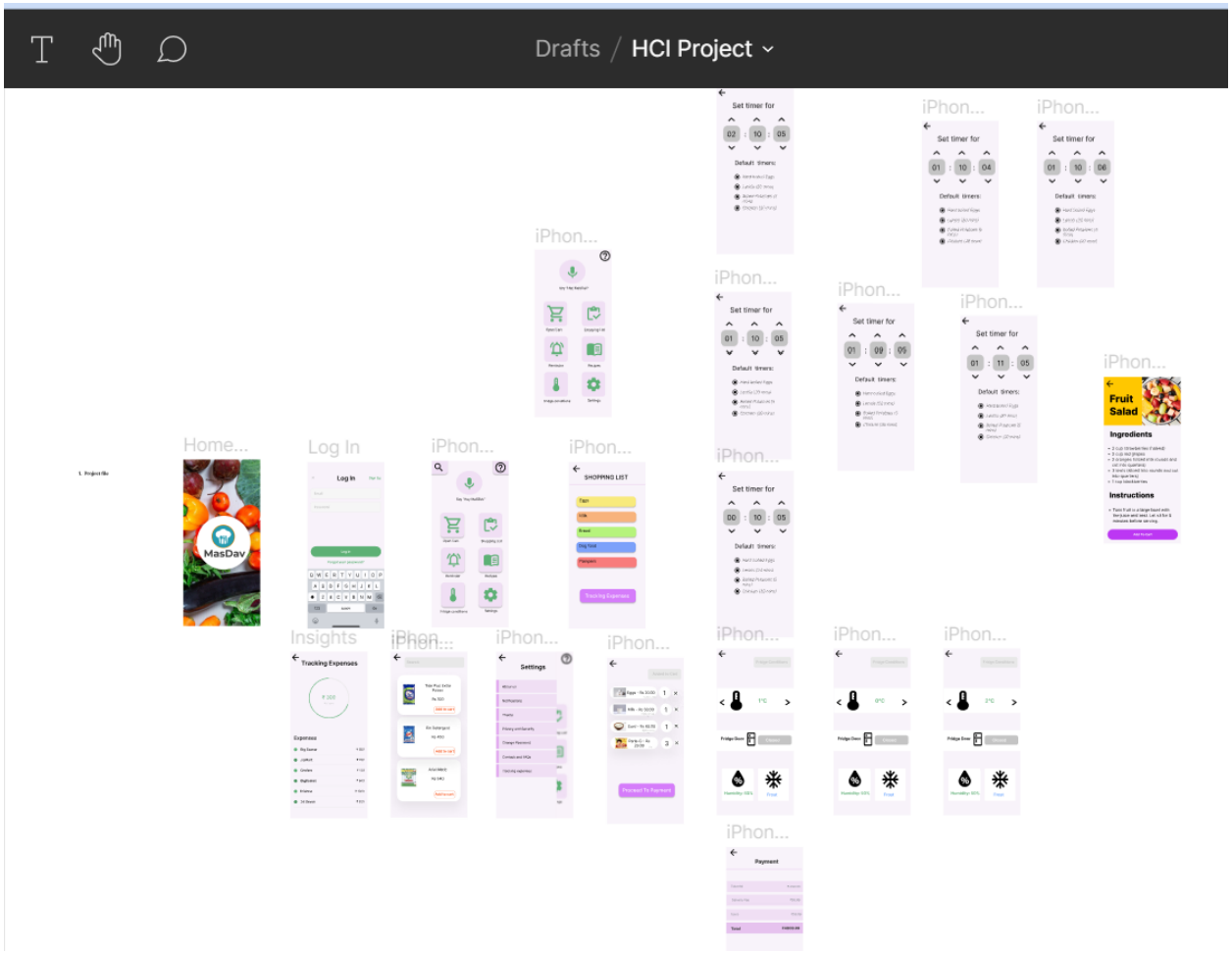
Simply populate the short notes with your various grocery items, give the note a name, and you are ready to go. You can also share the notes with your friends, roommates , family members etc. That way everybody can see the note, add to it, or check items off as needed. It's extremely useful and functional.

## Part 4: Hi-Fi prototype

Links for the product:
https://www.figma.com/proto/4yubWIznahE2ghJthCqSxB/HCI-Project?node-id=16%3A12&scaling=scale-down&page-id=0%3A1

Link for the figma workshop:

- https://www.figma.com/file/4yubWIznahE2ghJthCqSxB/H7CI-Project?node-id=0%3A1




After the evaluation of the Low level prototype, it was found that the home page looked quite disorganized and had many unnecessary and unrelated functions and options making it less effective as well as a loss of efficiency as per the users. We therefore proceeded to group the

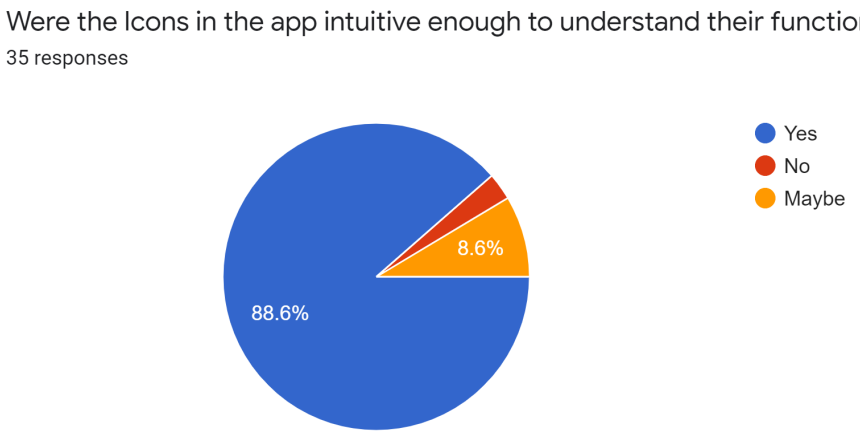
functions into groups and subgroups, namely open cart, shopping list , remainders, recipes, fridge conditions, settings. Some of the functions like the pickup calls , play songs and notes were dropped to make it a high utility product. We also studied and analyzed different softwares, smart refrigerators, cooking applications and the reason behind the failure of the smart fridges at the starting of their release to the market. We concluded that the fridges were just not easy to learn and could only be professionals but as the time passed people got used to it. So we proceeded to put a help button on top right of the home page. Also after studying the design of various applications and devices from instagram and whatsapp to the cooking apps of the various food companies. We therefore concluded to use the back button on the top left of each page to maintain consistency and a sense of familiarity among the users moreover, like most apps we too decided to make a login page as well as a starting splash screen. We then expanded the open cart function to a familiar “Add To Cart” page showing the items that have been purchased, also found in many shopping sites like amazon, Big Bazaar etc. Which was in turn connected to a “proceed to payment” option which had a “Confirm Payment” option. Next is our “Shopping List” option on the home page. This takes us to an editable list made by the user which also has an option of “Tracking expenses” which in turn takes us to a page showing us the total monthly/yearly spendings and also the amount spent on different shopping centers and markets. Then the “Remainders” function takes us to a timer/stopwatch that can be operated manually or set to the microwave or the pressure cooker ideal time so that food doesn’t get undercooked or burnt.



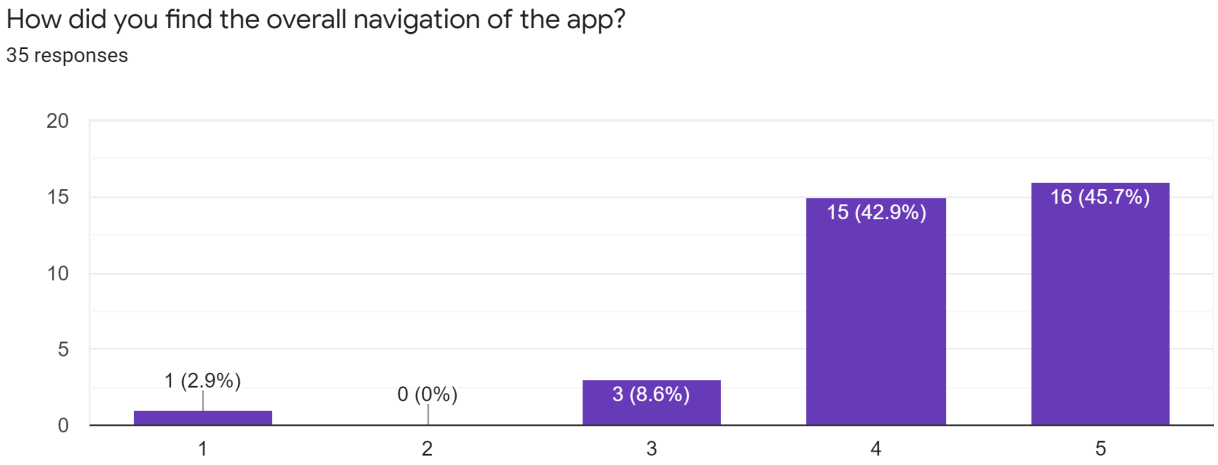
We also have the “Recipes” function which takes us to the most popular recipes and the page also has a “Add to Cart” option if the user feels like shopping, which directs us to the shopping cart function. The “Fridge Conditions” function provides the inner conditions of the fridge. Then, we have the settings menu that provides the user a set of functions to further choose from in a left sideways opening style menu inspired by the play store’s settings page. At the top left of the home page we have the search menu to search the food items that one needs to buy. At the end, we made sure that the App was easy to learn by providing various texts explaining the function of the various functions and also by including the “help” button. The prototype was then revised again to further improve the product based on the suggestions obtained by the various surveys conducted.

## Part 5: Evaluation of the prototype

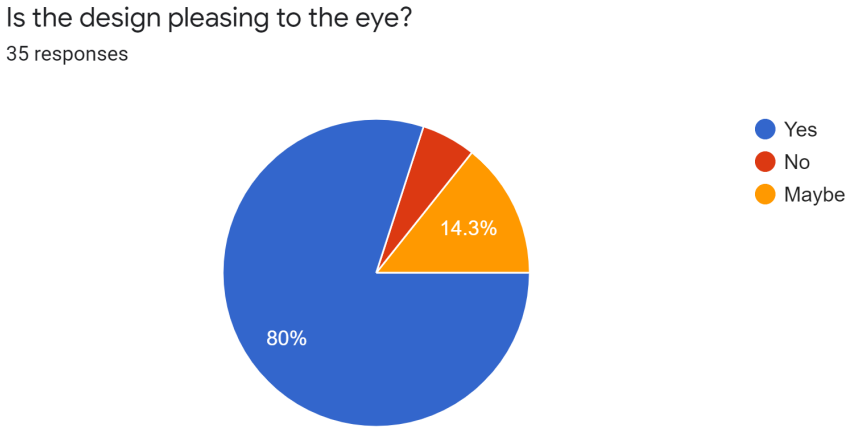
The high level prototype then got evaluated by the users through a form. Our main criteria for the evaluation was the utility of the product, the easiness to learn the icons and memorise them or how comfortable the user was with the product, how easy it was for people to perform the task that they wanted to perform and last but not the least, we wanted to make sure that the product was enjoyable to use.




We got quite a lot of positive feedback from the users along with a lot of positive suggestions to make the prototype even better. Most of the users found the icons to be intuitive enough to understand their function clearly indicating that we were able to follow consistency and making our app look quite familiar to the users.




We got a total of 88.6% of people who were easily able to access the different functionalities of the product indicating a very high learnability and memorability of the product.




The design seems to be quite enjoyable to the most users filled with attractive colours and curious buttons.

The Suggestions of the users:

> Easy to use, but could add more features
>
> Best app ever
>
> Good design, could make it more realistic though
>
> Give sign in/ tap option on the first frame...it can be slightly confusing as how to proceed further without that option...
>
> The booklet symbol is ambiguous and there was trouble relating it to the function it performed. The temperature scale was a bit like that, but relating to it was a bit easier after the first attempt. The rest of the icons were apt.
>
> Color scheme could be made better
>
> Lovely idea, would be excellent in the real world.
> Having multiple website choice for groceries would be really nice

We were suggested to add more features and functions. We therefore added some more functions and expanded the already existing functions to increase the functionality of the application like introducing the settings , introducing  and expanding the payment options and  introducing the help button. One of the users also suggested we label the functions of the login page to make it more memorable and learnable. We were also asked to add a color scheme to make it look attractive. We finally ended up using a light violet to the frames and also using different colours or different shades of violet on  different buttons.

The product was then reevaluated and this time too we got some more suggestions for further improvements of the product like adding some effects to the various buttons on the home page and also to include a starting screen something like the splash screen at the start of the application. They also suggested the use of various frames with different temperature reading to give a sense of continuity as if we are changing the readings of the fridge and the same thing was also applied to the timer’s reading.

Finally, highly satisfied with the product, we decided to finalise the prototype and conclude the project.

## Analysis and Future Work:

The idea was to make a special device, which is compatible on all platforms, can help transform a normal fridge into a smart one. It has a lot of other features which are shown in the prototype and we plan to introduce other features which will come along with separate products. The app would be better than existing websites because it will provide the best deals and give choice to the users. From the survey we concluded that the products designed can be enhanced further and that people would like to have such a product. One limitation of the product is that people who are not much comfortable with voice assistants might find it little difficult to use the device but that is why we have created this application where the user can find all necessary information. Another limitation is that it is specified in one direction, i.e, related to the kitchen, it cannot be used like other voice assistants to ask random questions and play music and stuff, at least not yet! A device like this can save ample time for people all around the world. Therefore it would make the life of people even easier, solving the problem of ordering groceries, having to go out in the pandemic, wondering about what to make for lunch and dinner etc,. We believe that due to these specifications, this idea will be a success in future.

## Conclusion:

Basically, our aim was to create a device that provides features such that it can be a kitchen assistant, turn your fridge into a smart one and also help you place orders for groceries. This is something unique, a field that is still developing. We had a great experience applying all the knowledge that we learnt in the class and it was intriguing to see how this is practically applied in real life. We now have a clear idea if we plan to make a product in future.

## References:


- Interaction Design - 5th edition
- Figma (some templates for design ideas)
- Amazon
- Grofers
- Big Basket


## Individual Contributions:

1. Darsh Parikh - 25%
2. Maksimjeet Chowdhary - 25%
3. Sarthak Dixit - 25%
4. Vijay Nain - 25%

Everyone in the team has collaborated and contributed equally to the project.