

DES101: Introduction to HCI

Final Project

Group 5_3:

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Abstract:

We wanted to create an app that would help people. The farmer protest seemed a perfect opportunity; we decided to develop an app to help farmers sell their goods to bigger companies and get profit.

We live in a society where you will find mediators taking your vast share of profit in nearly everything. The person who suffers most from this system is Farmer, even though our country is primarily an agricultural country.

So we Group 5_3 came up with the idea to boost farmers' and retailers' profit margin. We decided to help farmers not be dependent on mediators for all their income, and help them get in touch with clients happy to buy from them at a better price.

The most substantial challenge we faced was that the farmers were scared to sell their goods to companies since they feared that they would be exploited and given even less money. To solve this issue we decided to add shopkeepers as a stakeholder since this way if the farmer feels that the companies are exploiting them they can choose to sell their goods to people who will give them a much better price than the corporates and these guys can buy in bulk, hence the farmers will also be able to sell a decent amount. As for bigger farmers, we believe they are skilled enough and they have enough produce to have a healthy bargain with the corporates.

Introduction:

Motivation:

While the whole farmer protest was going on we thought why are the farmers opposing the laws, it is not going to reduce their earning but increase them on the other hand because it reduces the chain of middlemen who are there sucking their share from the produce, and not contributing enough. We thought at that time it's the fear of change and all the extra work they will have to do to sell their goods to the large corporates, that's what is making the farmers get down to the street and protest. When our professor Mr. Rajiv allowed us to work on a project we thought to ourselves and all of us teammates believed that we should do something meaningful and we thought to build a non-profit app that acts as a bridge for the farmers and the large corporates, to build an app that helps the farmer smoothen out the process of selling their goods to large companies, and also make it easier for the companies to buy it from them.

Stakeholders:

While thinking about the stakeholders, we thought about the farmers and the larger companies as our stakeholders; we thought and added the common public as our stakeholder too cause it was difficult to know the needs of farmers and large companies. Also, we wanted to create something that mattered to most of us. If it brings any change, then it shouldn't be just for the farmers and corporates; we wanted all of us to relate to it so we had an idea about an online Mandi sort of place where you can buy stuff directly from farmers.

Surveys/Interviews:

With all these things in mind, we created a rough survey to figure out how much this app will be useful for the general public. According to our responses, more than 60 per cent of the public believed that such an app could be useful for us and farmers. To look for loopholes and more functionalities of our app we decided to take interview of some people, according to the people we interviewed the idea of including the general public in our app was a good idea in the way that it helps the farmers to have an equal level conversation with the public and sell at better prices, but we can't sell it to individual guys cause the farmers to make a profit by selling in bulk they can't afford to store stuff in the hope to sell it later. So we got suggested including groups of people who can buy things from farmers in bulk and then distribute it among themselves, basically, we added an option of a shopkeeper, this way both common man and farmers are happy cause common man got low prices and the farmer got an equal opponent to bargain with rather than ruthless corporates who only wants to make money (which by the way is one of the reasons farmers are protesting we found later).

Case Studies:

After interviewing and seeing the results of the survey we were quite well equipped with data to start building our app, but we still needed some key information, we needed to find a way to get the needs of farmers, we couldn't get in direct contact with someone, so we decided to go through already written articles and case studies to get information about the farmer's needs. We found that farmers are also scared of corporates exploiting them to make more money by paying them less, so we had to find a way to solve that issue too, luckily we already found a potentially life-changing solution for it earlier (including groups of common people in the app). We were also able to confirm our suspicion of farmers making very less profit because of a long list of middlemen, by using various articles and interviews. This also meant that we as a consumer of the goods had to pay extra too because we are also paying for those middlemen. So now equipped with all the possible solutions we were able to start building our lo-fi prototype. We were able to create an amazing app based on all the information we gathered.

Evaluation:

While interviewing people for the evaluation of our hi-fi prototype we were able to fix some minor issues, in the UI and make the whole app work seamlessly and smoothly. Also improving

the aesthetics of our app. We are very proud of the way our app looked and functioned, it was simple enough for farmers to use and benefit from it. We had achieved our goal of making something more meaningful than just marks, something with some really important real-life application, something that had the potential to change farmers' lives.

Summary:

To sum it all up our problem definition is the fact that there is no bridge between farmers and potential buyers of crops other than the Mandis which middlemen control. Our target users are farmers, groups of common people, big corporates. Existing challenges are unnecessary middlemen, low confidence in farmers, farmer and middlemen dependence, the image of corporates looting the farmers. Our proposed solution is to create an allrounder app that helps the farmers get a loan for any expense from banks, acts as a bridge between farmer and consumers (anyone that farmer wants to sell, groups/companies), and helps farmers in the process of farming.

Methodology:

Problem Statement:

Our purpose was to make a system for farmers, common people, and businesses who can sell/buy different farm-grown products with the elimination of middlemen from the process. This will reduce the final price of the product and help benefit even the farmers get the correct money for selling their products at market price. Our goal of this app was to create a system that incorporates all these features. The stakeholders for this project were farmers, food businesses, and middlemen involved in selling farm products. The user of this app will be common people as well as stakeholders.

Requirements gathering:

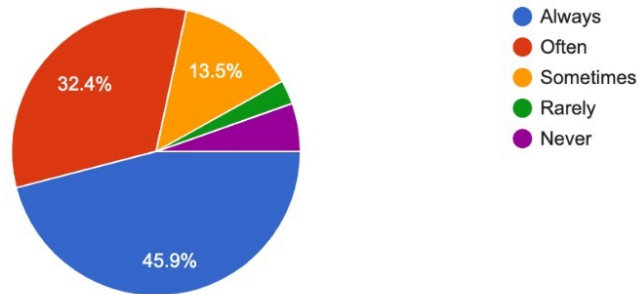
We decided to survey whether people would want to see such an app being used and what suggestions they have for it for requirements gathering. For this, we created a survey on google forms. To get more clear insights and data, we also decided to conduct a structured interview for different people of different age groups to have as diverse data as possible.

In our survey, we asked the users the following questions:

- How often do you find fruits and vegetables in retail stores to be more expensive than wholesale?

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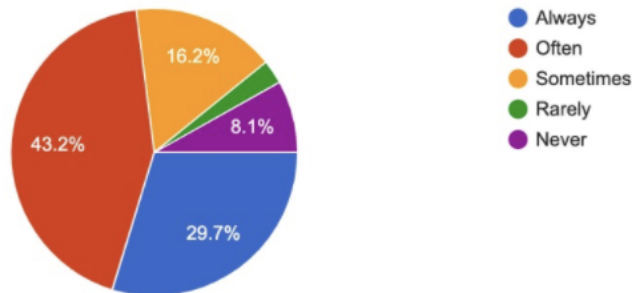
37 responses



- How often do you find fruits and vegetables in wholesale to be fresher than in the retail market?

How often do you find fruits and vegetables in wholesale to be fresher than in the retail market?

37 responses

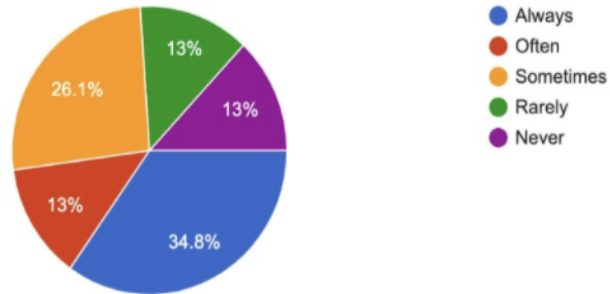


- How often can you travel some extra distance for fresher and cheaper food compared to the nearby supermarket?

How often can you travel some extra distance for fresher and cheaper food compared to nearby supermarket?



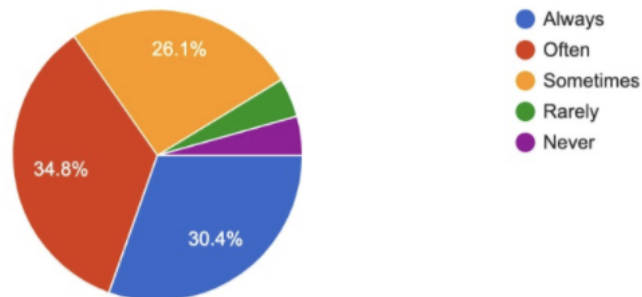
23 responses



- How often do you think our app will improve farmers' earnings?

How often do you think our app will improve farmers earnings?

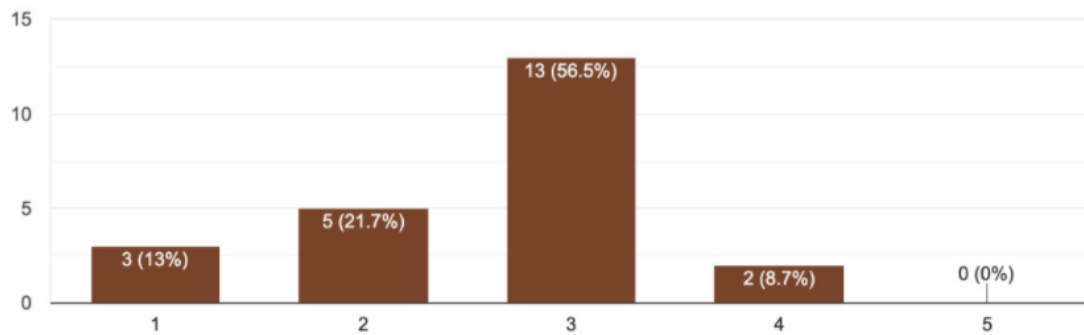
23 responses



- To what extent do you think our app will benefit you?

To what extent do you think it will benefit you?

23 responses



Here '1' represents to a large extent and 5 represents to less/no extent.

- What do you think what kind of problems farmers/ consumers might face in this app?

What do you think what kind of problems can farmers/ consumers might face in this app?

7 responses

Farmers might get into competition to provide better offers than the others and this will lead to the reduction of prices, so it will be good for consumers, but i don't think that will be good for farmers.

Firstly, due to new farm policy this app might not compete big corporates, secondly most of the farmers aren't enough educated on smartphones and technological stuff.

Sometimes the stuff might be fresher but quality check is also important.

Most of the farmers are not used to technology, so educating them could be a challenge.

Understandability

Authenticity of seller

We collected these responses from form and reduced our findings. We deduced from these findings that 90% of people felt that fruits and vegetables are more expensive in retail stores compared to the wholesale market. We also found that more than 70% of respondents traveled some extra distance to buy fruits and vegetables. A large number of respondents also felt that the products in wholesale supermarkets are fresher than the ones in retail stores. Most respondents also agreed that this app will help improve the earnings of farmers. Some of the problems that respondents pointed out in the form are also being taken into account while designing our app.

After we got our results we decided to have a structured interview with users of different age groups. The questions of the interview were made such that it will help us get ideas of how does a user want the app to really be like. The questions were as follows:

- How do you think removing or reducing middlemen between farmers and consumers can be beneficial to you?
- We are trying to build an app that helps farmers contact big companies to sell their produce, what are the features that you believe should be added in this application for making this process easier for farmers?
- Do you think we should create this app for common man's use too? Will you use such an app to buy fresher food supplies?
- What kind of sacrifice are you ready to make, can you make the effort to travel some distance, or pay more money for fresh food supplies?
- What specific functionalities do YOU as a user will wish to see in our design?
- What features in the app can we make to make the interface more user friendly?
- What are some of the challenges that people can face in an attempt to remove middlemen from the process of buying directly from the farmers? How can these challenges be reduced/solved according to you?
- Have you ever used an app to buy vegetables like grofers? If yes what were the price differences (if any) you saw between that app and mandi type market?
- What are some drawbacks of apps like grofers that affect the users?
- Any final suggestions?

These set of questions we asked 2 people of different age groups and tried to gain as many insights as possible regarding the topic.

Person 1: (A fresher at IIITD)

- How do you think removing or reducing middlemen between farmers and consumers can be beneficial to you?

It depends on middlemen. Index of the price of selling vegetables from each middleman and compare it to choose the best middlemen amongst them.

- We are trying to build an app that helps farmers contact big companies to sell their produce, what are the features that you believe should be added in this application for making this process easier for farmers?

UI should be easy to read and should work on cheaper smartphones. They should be able to upload/update their crops on the app.

- Do you think we should create this app for the common man's use too? Will you use such an app to buy fresher food supplies?

Hard choice because farmers sell in bulk and common people won't be able to buy in bulk usually. Useful for larger families only.

- What specific functionalities do YOU as a user will wish to see in our design?

INDEXING of all middlemen, tracking of crops, for farmers, it should be easy to use.

- What features in the app can we make to make the interface more user-friendly?

Delivery men will be needed like in apps like big basket, zomato etc.

- What are some of the challenges that people can face in an attempt to remove middlemen from the process of buying directly from the farmers? How can these challenges be reduced/solved according to you?

If they provide a good cost. Consumers will go for a better cost. Middlemen can also use this app as a USER like they can directly deliver it to other consumers.

- Have you ever used an app to buy vegetables like grofers? If yes what were the price differences (if any) you saw between that app and mandi type market?

Sometimes it is cheaper on a big basket. Some fruits were more costly on a big basket than the items that are less available. The location also matters if something grows in ur area it can be cheaper. Even on mandi, the cost stays the same. Add a location feature in the app that will enable the users to see regional products which are grown there.

- What are some drawbacks of apps like grofers that affect the users?

Hard to search in a big basket, automation option on getting regular deliveries.

- Any final suggestions?

Store the bulk amount of vegetables we will be benefiting from it. Make the app user-friendly as in to track their orders. Middlemen should be able to buy/sell their products too.

Person 2: (A 46-year-old cost manager)

Summary of answers to the questions given in the interview:

- As a consumer we will get better prices since the companies will be able to get much better prices for the crop and also the farmers will get much better prices.
- Multi-language for regional languages.
- Guidance for better farming techniques.
- All prices around the country should be shown giving farmers knowledge about the situation. And giving them a better chance at getting better prices.
- Visually easy (visual signs), to go through the app thus making it easier for the semi-literate farmers to use the app.

- We could open it to small groups of people rather than single persons, who are ready to make the effort to buy the stuff directly from farmers, this is in favor of farmers because it means that the farmer still sells in bulk.
- We can change the focus of the app from large-scale corporate companies to smaller groups of people, thus making the process of selling an equal level talk, thus increasing the profit margins of the farmers.

We also looked at some case studies of farmers to gain a farmer's perspective on this issue since it wasn't possible for us to interview a farmer.

After going through case studies, articles written about farmers we have figured out that middlemen tend to take an unnecessary share of farmers' income without the farmer realizing it, the farmers stay satisfied by the meager income provided by the middlemen because of a lack of knowledge. Since there are millions of small farmers in India it makes it harder for the government to procure the crops thus depending on layers of middlemen who take up a huge chunk of the income leaving farmers with barely any income. After going through the surveys and articles, we found that some farmers believe the farmers and the consumers are in a symbiotic relationship and both parties are giving equal contributions, what farmers don't realize is that these middlemen are giving them the money that should predominantly be theirs only. Our app is gonna help farmers get a much better income for their produce and is gonna eliminate the role of middlemen as far as possible. We also figured out that these middlemen also provide financial support if necessary like an unofficial bank, so we are going to add options in our app that is going to help them get loans since that is one of the major reasons that the current middlemen are loved so much by the farmers.

Major Points:

- Farmers don't realize middlemen take a major chunk of their income.
- Farmers are dependent on middlemen for emergencies and urgent financial needs.

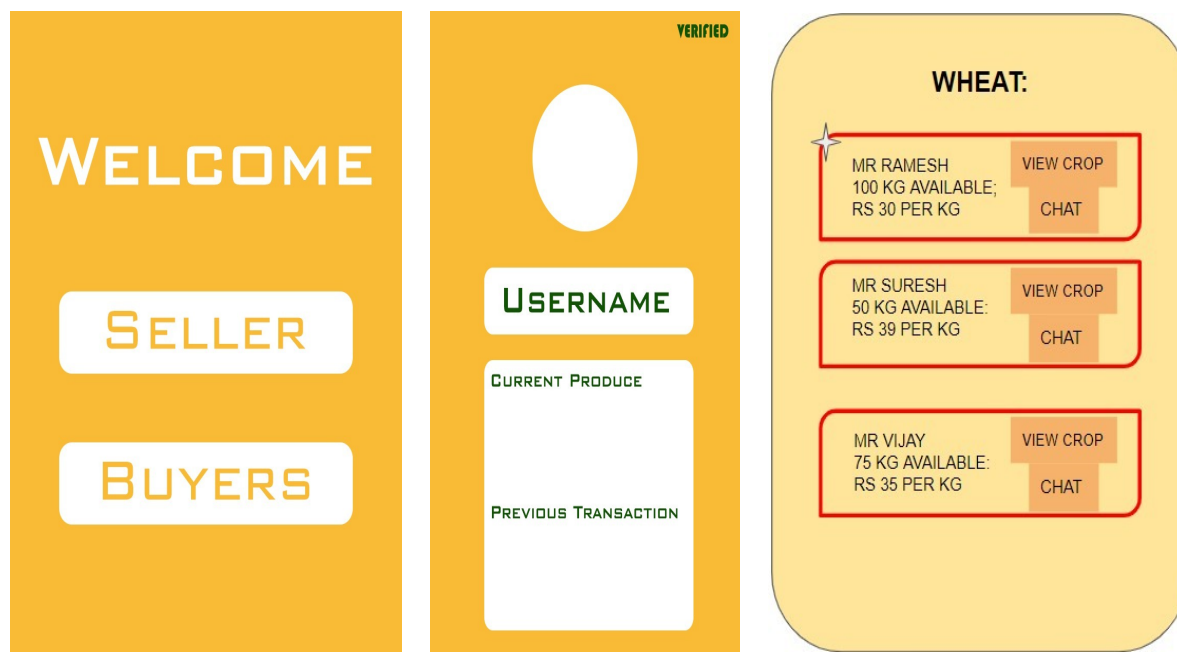
These showed that there is a clear need for making farmers independent of middlemen to have better earnings for their crops.

Ideation:

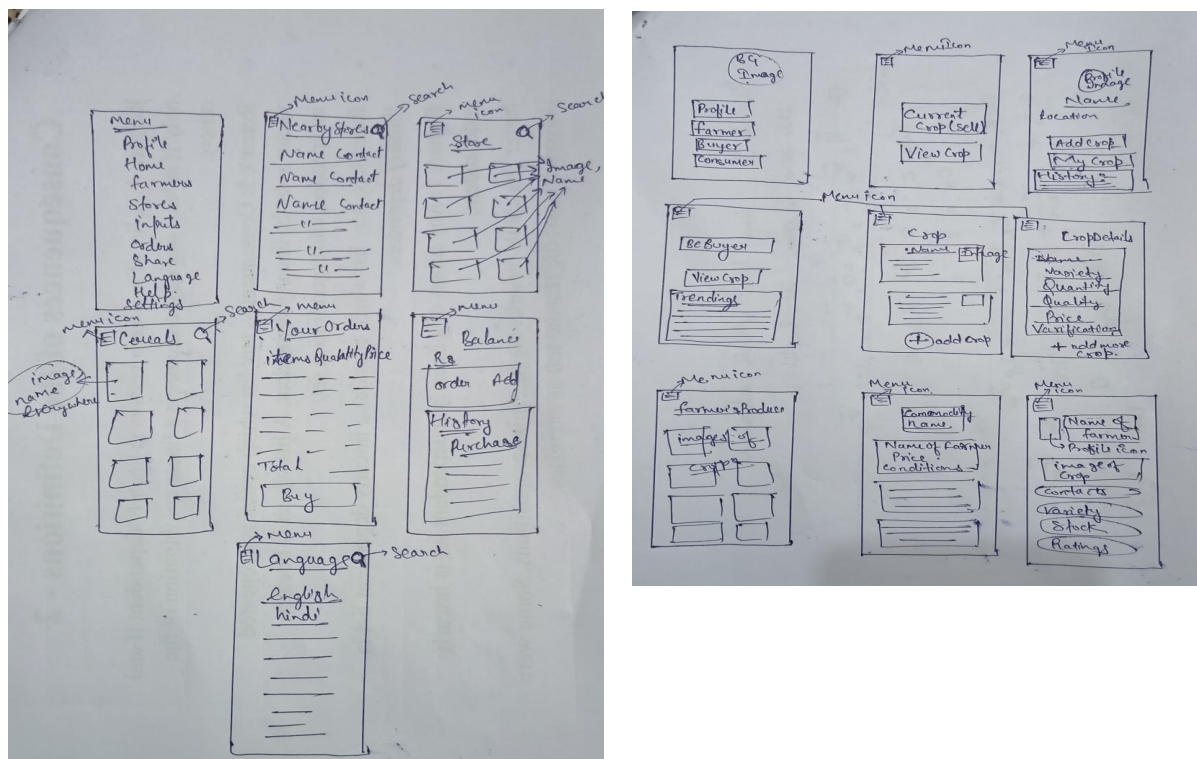
Based on the responses we got, it's evident that users are most concerned about the fact if farmers will be easy to understand the app and its usage properly. For this, we tried making the app as simple as possible by adding a variety of languages for farmers. Apart from that we made the UI very simple and used as few buttons as possible to just get the job done. Another concern was adding an option for the middlemen and users to benefit from it. So we added 3 options at the starting of the app one for farmers, one for the middlemen, and one for common people. All 3 people can use the same app to get their work done. A farmer can upload his/her crop, middlemen can also sell/buy different crops, and other buyers can see the listings of items

depending on if they want to buy in wholesale or in less quantity. We also added tracking of the order page.

Lo-fi prototype: To get the lo-fi prototype we just focused on basic uploading the crops of the farmers and the list of wholesale buyers, their usernames, and transactions. This can be seen in the following image:



Later we expanded on this design by sketching it out on paper to get ideas for making the final Hi-Fi prototype.



Here we drew individual sketches for each page we will incorporate into Figma. Like how will the menu look like, how will the layout of the individual pages look, and where will each button go.

Hi-fi prototype:

In the Hi-fi prototype, we added the other features which we had found out through surveys and interviews. Like we added the menus, to display profile, to change language, wallet, wishlist, your orders, share, feedback, success stories, help, farm inputs, nearby farmers, etc. In the Lo-fi prototype, we didn't have an option for middlemen so that was also resolved in the Hi-fi prototype by adding an option for middlemen named "consumers" on the starting page. We also added more options for buyers. We included options like a display of products available from farmers, crop details, nearby stores (which can be filtered out depending on the location user so it's easier for them to see what products are available near them), and an option to update their profile. The interface is fairly simple for farmers to use since they will only be needing the app to upload their crops and call/contact the buyers. However, we have added more features for the consumers and buyers since we have made an assumption that they will be more tech-savvy compared to farmers.

Link to Hi-fi Figma prototype:

<https://www.figma.com/proto/BVn8rPxmWcZ1F3u6lnN0Jl/farmer-app?node-id=6%3A46&scaling=scale-down&page-id=0%3A>

Link to Youtube video of explanation of Idea and Hi-Fi app: https://youtu.be/nPE1Q_Z2RgQ

Evaluation:

For evaluation, we interviewed 2 students of IIITD and asked them about their views regarding the overall UI and UX while keeping in mind that farmers, middlemen, and common people will be using this app to buy vegetables and crops. Given below are the responses we got.

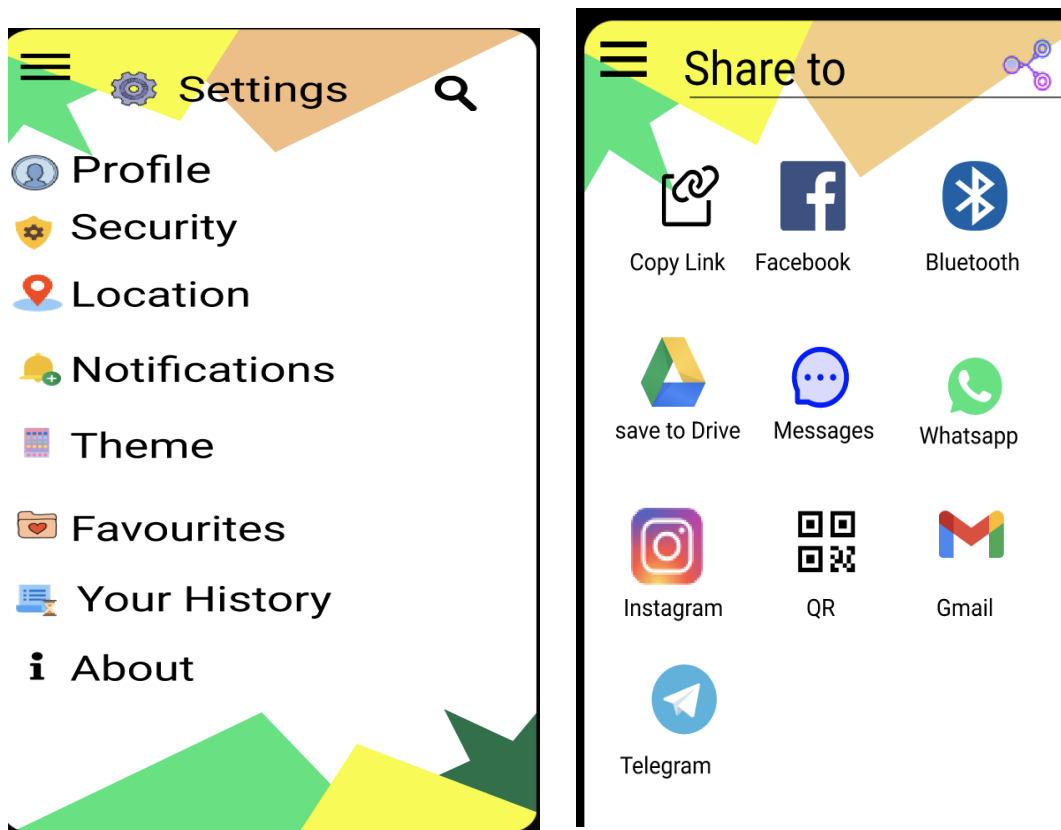
Person 1:

1. In settings, we have the option of the profile that should be linked.
2. It's very simple which makes it very easy to understand.
3. In updating the id of a person we didn't give the option to update the photo
4. We should give a small answer to the questions in some common QnA section.
5. There is no way to go back and no menu in the success story
6. In case of misclick on update ID, there is no way to come back
7. Pulses in nearby stores doesn't have back button
8. It's really easy to go across all the features and understand the app.

Person 2:

- The font can be changed and can be much more aesthetically pleasing.
- The farmer is in all caps, change it.
- Colors can be changed a bit, brighter colors can be used.
- The Colour of the buttons can be changed, everywhere it's green and it's very dull.
- The buttons seem very cheap and very boring.
- The app is very simple, and hence very easy to use, farmers can use it easily.

Based on the interview, the users had a problem with buttons, so we changed the button layout and rechecked the linking of the buttons to the individual pages, and improved them. We resolved all the problems the user had with using the back button from certain pages. We added more colors so that it can be more aesthetically pleasing for the users. For example, we changed the background color of some pages and also changed the icons to make them look less boring:



Analysis and Future work:

We began this project with the mindset of helping our farmers and making an app to help them make more profit on the crops they have grown. As we went through the process of requirement gathering, gathering all the data, and understanding the needs of our stakeholders, we were able to see the whole process of making an app through the developer's point of view and we understood the importance of the procedure as we saw results flourish in front of us. We understood the significance of review and the importance of a user in the whole development process. Going through the data gathering, we understood the importance of understanding user needs and how we build the product with the base as user requirement. Making low and hi-fidelity we understood how we began the journey of creating the product, how we changed and improved at every step to give the high fidelity prototype which looks just like the final product. In the end, we understood the importance of evaluation and how we need the users to tell us how our product performs in the field.

We tried to complete every requirement of our stakeholders. But we found that in some cases the farmers tend to have an emotional bond with the middlemen, which obviously, is not something that our app can simulate and it constricts the limit to which we can take the place of a middle man. In certain cases, it might be possible that a farmer lives in a locality where there is no way he can get anyone to help him run the app, and hence he or she cannot use our app to their development.

Since we have worked on an issue which is something our government is facing currently our future plan would be to help the government in the application of the agricultural laws by providing a smooth transition to privatizing the agricultural sector of our country and make it easier for the farmers to sell their crops to clients other than just the government 'mandis', and help the farmers increase their income by providing a number of clients to sell to, so they don't have to depend on anyone for any financial needs and are able to develop and improve their work every year since they will have more money to invest in improvement.

This app will require us to transfer large amounts of money, hence a secure pathway for transaction is required. With recent developments in blockchain technology and smart contracts, we believe that we can implement it in our system. A smart contract can ensure the system works smoothly and no form of corruption can take place.

Finderr verification can be done by our team to check if proper farming techniques and safe practices are used. Our verification will be given to sellers that ensure good products are sold, i.e.

get a 5 star rating in 10 orders. Similarly farms will receive a similar rating for if they clear the benchmark of safety and quality of products produced.

Next thing that we can add is “contract from seller”. Where a seller can order the crops he needs to buy from a farmer in an agreement. The farmer, if he agrees, has to grow the crop at a fixed rate that the seller can't refuse at a later stage. This way if a seller needs a particular crop for his/her sale he can order in advance.

Conclusion:

The main problem was that Farmers and potential buyers of crops other than the Mandis which are controlled by middlemen. Our target users are farmers, groups of common people, big corporates. Existing challenges are unnecessary middlemen, low confidence in farmers, farmer and middlemen dependence, the image of corporates looting the farmers. Solution was to create an allrounder app that helps the farmers get a loan for any expense from banks, acts as a bridge between farmer and consumers (anyone that farmer wants to sell, groups/companies) and helps farmers in the process of farming. This way the farmers can decide their own price which will be justifiable for them. This way both the users and farmers can be happy. Users will get fresh products without traveling too far for it. The users will also be able to see seasonal and regional fruits/vegetables available near them through our app. Overall, we as a group have done our level best in developing this app by keeping the user throughout the development process to make an app that will take care of all user requirements.

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Individual contributions:

Data collection and report writing:

- **Suyash Kumar Dubey:** Involved in Requirements gathering through taking interviews, adding questions to survey and sharing the survey, analyzing the results and writing it into the methodology, writing of conclusion part, and writing of evaluation results into methodology part.

- **Sarthak Grover:** Involved in Requirements gathering by creating the initial survey and finding out case studies, writing of abstract part, references part, introduction part, analysis and future work, took interviews during evaluation.
- **Sparsh Mehrotra:** Contribution in analysis and future work (2nd half), adding questions to survey and sharing the survey
- **Vishal Bharti:** Abstract (30%), adding questions to survey and sharing the survey

Making of prototypes and video

- **Sparsh Mehrotra:** Video(uploaded on youtube), LoFi prototype (1st stage), HiFi prototype (50%).
- **Vishal Bharti:** LoFi prototype (2nd stage), HiFi prototype (50%)