Seed Market Service

by Group nr. 12

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Changelog: Based on the feedback of assignment 2 and feedback from Mali, we have fully finished the implementation of the application. Now the offers of the farmers are stored and **no dummy data is used** in both voice and web application. Moreover we added DTMF input of multiple numbers as well as call transfer and storing of the data of farmer's offer. Moreover, we added the web application for the media, namely radio, to play back the messages to the crowd.

Name

Seed Market Service

1. Summary of key idea

This service will give farmers the possibility to advertise the seeds they want to sell. Moreover, customers or advertisers (like radio) will be able to access this service as well. They will be provided with a list of farmers' advertisements dependent on their choices (e.g. customer wants to buy seeds of this specific type, region, etc.). This way farmers will be able to sell a lot more of their productions and there will be natural competition in the market.

2. Actors and goals

Stakeholder	Operational goal	Responsibility in the envisaged system
Farmers buying seeds(buyers)	Check the type, price of seeds sellers have for sale	Use the system to get the information of seeds to buy
Advertisers	Check the type, price of seeds to download and broadcast online	Use the system to get information about seeds to advertise
System developer	Provide a working system	Develop and Maintain the system
Farmers selling seeds(sellers)	Provide accurate seed types and prices	Information sources/provider

Table 1: Stakeholder table

3. Context and scope

Farmers and buyers/advertisers are the external stakeholders in this use case. Farmers pay attention to the seed types they have and the price they can provide, also the price of the same seed that other farmers give. Buyers/advertisers concern about the lowest price of the seed type they want. The scope of the scenario is that farmers will only provide the seed types and price, and buyers/advertisers will search for the seed they want and get all the advertisements of this seed. We do not consider that farmers will also be the advertiser to search for more information about the market price of the same seed. If farmers can set prices for each type of seed and store in the database, and when

buyers/advertisers call for one type of seed they can get all the available information, then we think the system is successful. For infrastructure, we must have a laptop and mobiles, also the system developer and maintainer. Also numbers of users(farmers, buyers, advertisers) and accurate information.

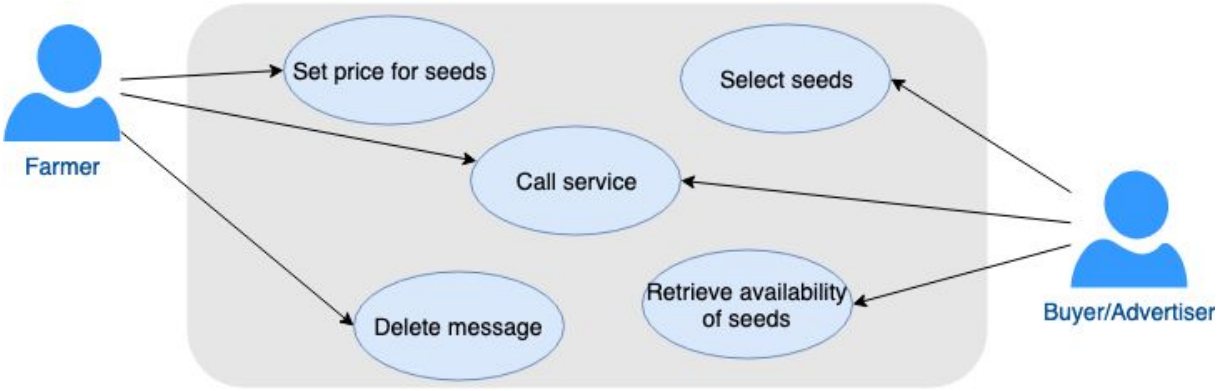


Figure 1. Interaction diagram

4. Use case scenario script

1. The end user - a farmer calls the number of services
2. The system receives a call and offers a selection of language
3. The end user chooses a language
4. The system offers a selection of roles to choose from
5. The end user chooses a role
6. The system offers a selection of seed types
7. The end user chooses a seed type
8. The system requests the end user for prices of seeds to set only when the role is a seller
9. The system offers a voice message of seed and price to the end user

5. Interaction and communication

In Appendix 1.

6. Information concepts

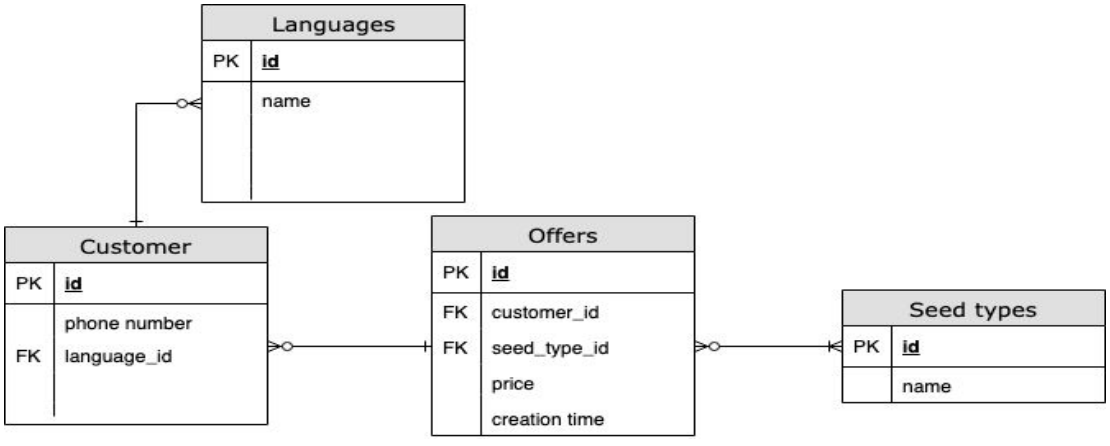


Figure 2. Database diagram

7. Technology infrastructure

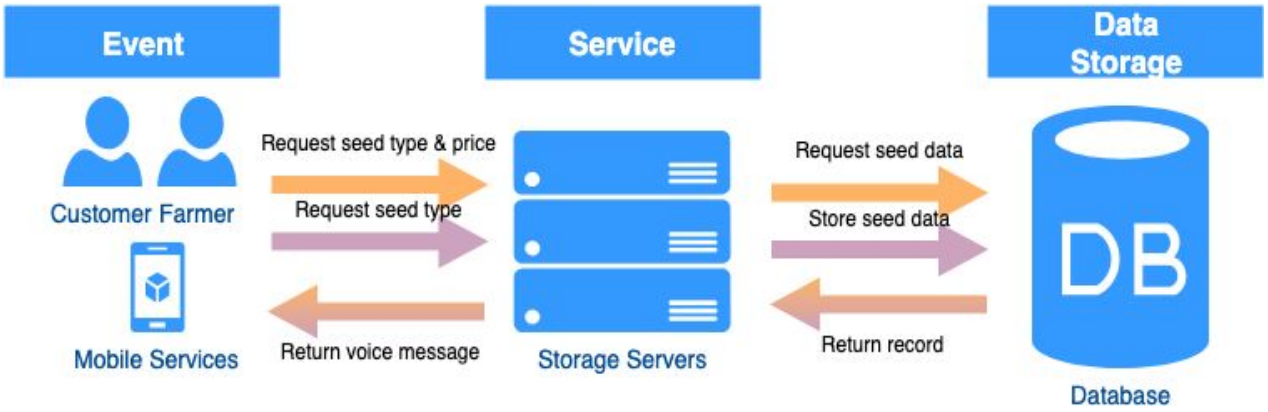


Figure 3. Infrastructure diagram

In this scenario, both Web Service (developed later) and voice service will be hosted on KasaDaka. We have to ensure, that the radio stations have a chance to connect to the KasaDaka Raspberry PI (RPI). But in some places, this will not be the case and instead, the radio broadcaster will be able to play lower quality recording using a mobile phone by calling the service.

8. Cost considerations

Cost-type	Cost	Cost carrier
Operational cost	Mobile services fee and calling fee	Farmers
Investment cost	Advertisement	Farmers and software owner
Development cost	To develop and maintain the system	Software owner and developers
	To add local language component	Software owner
In/outsource cost	To record and broadcast offers	Farmers

Table 2. Cost table

9. Feasibility and sustainability

From the perspective of technical and financial, this system can be developed anywhere with Internet access, so it's not a problem to maintain the system in Mali, also the expense for development will spend some budget, but won't spend too much for maintaining it.

With this system, end-users will save a lot of time collecting information and save human effort. That will be the motivations for farmers to use it.

But still the problem we focus most on is the quality of the sound, also we are not sure if the quality for French, Bomu, and Bambara are the same. It will be a lot easier for the text interface.

10. Key requirements

So-called MoSCoW list of requirements (Must have, Should have, Could have, Won't have) as a starting point for further architecture design, and system and component development.

Must have	Mobile services with local telephone number
	A database to store all the data and information
	A component to ask users to select from choices
	A component to transfer information to voice
	Software developers to create and maintain the system
Should have	Advertisement to make the system known
	Local number to call to have a less calling fee
Could have	Local Malian language to announce information
	Language components to switch(English, French, etc)
	Laptop with the Internet to download and store data
	Radio stations to announce and broadcast offers
Won't have	Components to report their extra information

Table 3. MoSCow table

11. Prototype description

11.1 Design decisions

Based on the use case of Seeds system in rural Mali from the AOPP, we designed the system named Seed Market Service. The system will cover the main function of the use case that users can select the role as a seller or a buyer/advertiser to execute further steps. As a seller, we consider that users can select the types of seed that users want and sign their price which will store in the database. As a buyer, we will provide all the advertisements about the seed users want after they choose the type of seed. After all the selection, customers will require a voice message as confirmation or advertisement which depends on their role.

During the implementation of the Seed Market Service, we had to make many decisions.

Based on the feedback from the presentation in Mali we decided to make the way to contact the farmer as easy as possible. The feedback specified that customer will not be able to call the number just from hearing it (as expected). Also, getting number in SMS is not always the cost-effective customer will

not be always able to call this number. Therefore we decided to use call transfer from VXML so customers are able to contact the farmer with one press of a button.

We wanted to store the numerical data in a machine-friendly way but we wanted to preserve the ease of usability for the farmers. The decision has been made to use DTMF input to input numerical data (days online, amount of seeds, price). Therefore our application data is pretty easily queryable and still not difficult to enter. For the location, we kept on using the voice recording. On each input, if the farmer is not satisfied with the input he can go back and fix the mistake.

Moreover, we made several micro decisions during the code development as it was our main focus.

11.2 Description of backend and frontend results

The same Django application is used for both front and back-end of the application. For the voice part, the application serves dynamically created VXML files. These files are accessed by calling the KasaDaka system with setup application. As Heroku (server to run the application) is unable to give access to the static files and FTP server was used to serve voice files ("Welcome", "What would you like to do?" messages).

The application has simple web based front-end and is showing only important data. This is information about farmer's offers including price, type of seed, amount of seeds, remaining days online. Moreover each offer contains the recording that concludes all the provided information into the short recording.

11.3 Data model

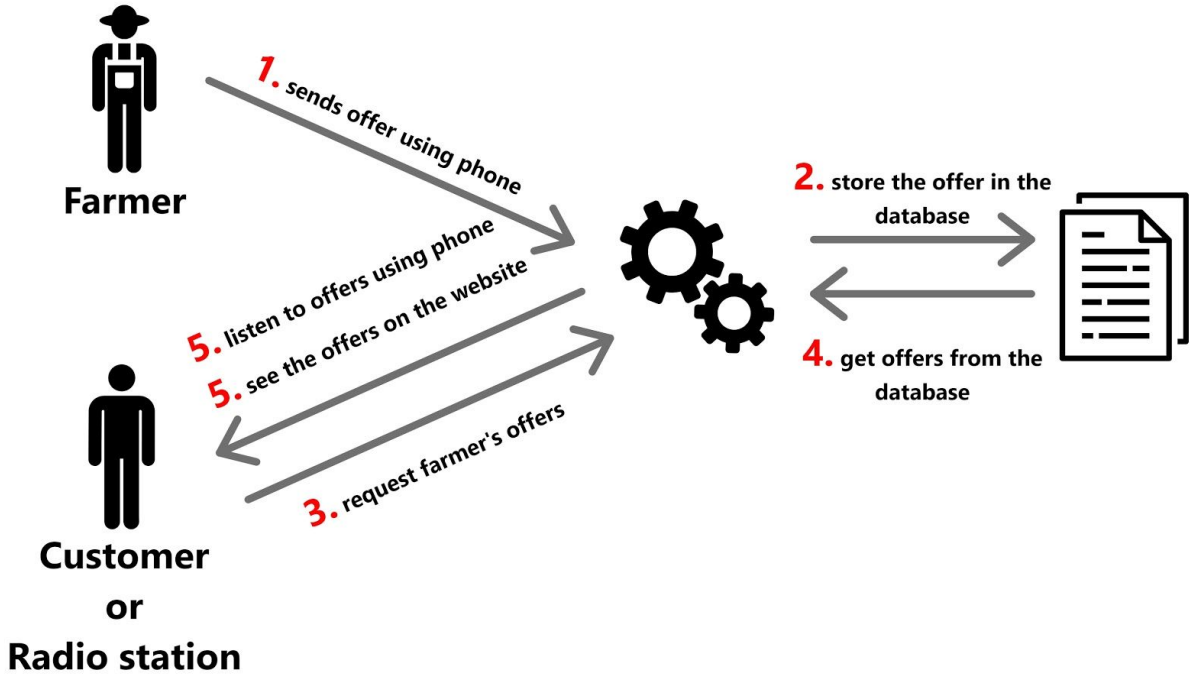


Figure 4. Data model of Seed Market Service

12. Pointer to the Application code

https://github.com/cabrenn/KasaDaka-VSDK

13. Pointer to how to access the application

Seed service was created using KasaDaka VSDK, Django, KasaDaka Raspberry PI and hosted on Heroku and FTP server.

The service is hosted on Heroku right now and can be tested using KasaDaka-ready Raspberry PI. The URL to access the start of the service is http://radiant-mountain-65892.herokuapp.com/vxml/start/2.

Moreover, we implemented a web application to browse **available** offers and play messages back. This is useful for farmers with smartphones or radio stations. You can both contact the farmer and play the recorded offer. The web application is available on http://radiant-mountain-65892.herokuapp.com/web

Usage recording of the application: https://www.youtube.com/watch?v=KedTiU72vVo.

14. Short Usage scenario

To see the short usage please watch the video above. To sum up, all the available options are functioning properly except that call transfer (for potential buyers to contact farmers) is not working on KasaDaka (as it is disabled).

15. Feedback questions

15.1 Assignment 1 feedback

- Is this enough user input with respect to metadata?
- Does the user need to specify location, name, seed type? Other data?
- No pre-recorded audio?

15.2 Mali feedback and Assignment 2 feedback

Customers

- Are farmers able to call the number if they heard it in the call? **They don't think so.**
- If no are they able to call the number they got in SMS? **Not if it is just an SMS, maybe in combination.**

System developer

- Is the price for sent SMS by system relevant part of the system costs? **Yes.**

Is it good to have natural competition in this market? **We didn't get any response.**
Can there be some real-life problems caused by this? **We didn't get any response.**

16. Discussion of Scope and Fidelity

Features we've already implemented: The user could select to sell or buy the seeds.

When selling seeds, the user can also enter how many bags he sells, and what the price he wants to set is, and how many days he wants to keep. After this, he could record his location by speaking it out and

the system will record it, where it will also say it again to confirm, and here the user would get another chance to modify it.

When buying seeds, the user could choose the seed type and number of bags to confirm the order.

Features we should have achieved: The buyer could press 1 to directly call the seed seller that he intends to buy from, which is not able to be implemented by KasaDaka. As a result, the user could not do so now.

17. User evaluation

We had a small-scale user evaluation for our application, here we will have a brief conclusion of it.

First, it is really convenient for users that they can also have other information about the seed they select by one more click (press 2 on keyboard) and have a comparison between the seeds and choose the cheaper and fresh one.

Then, sellers think it is a good function that they can set the days that they want one information to last, otherwise they have to delete the information by themselves again, and it will take more time. Also, with this function, they can make sure about the freshness of the seeds.

Other than these, the voice is pretty clear to recognize, and the recording duration is long enough. The confirm function is smart that they can change just the part which they made it wrong, and do not need to record the whole message.

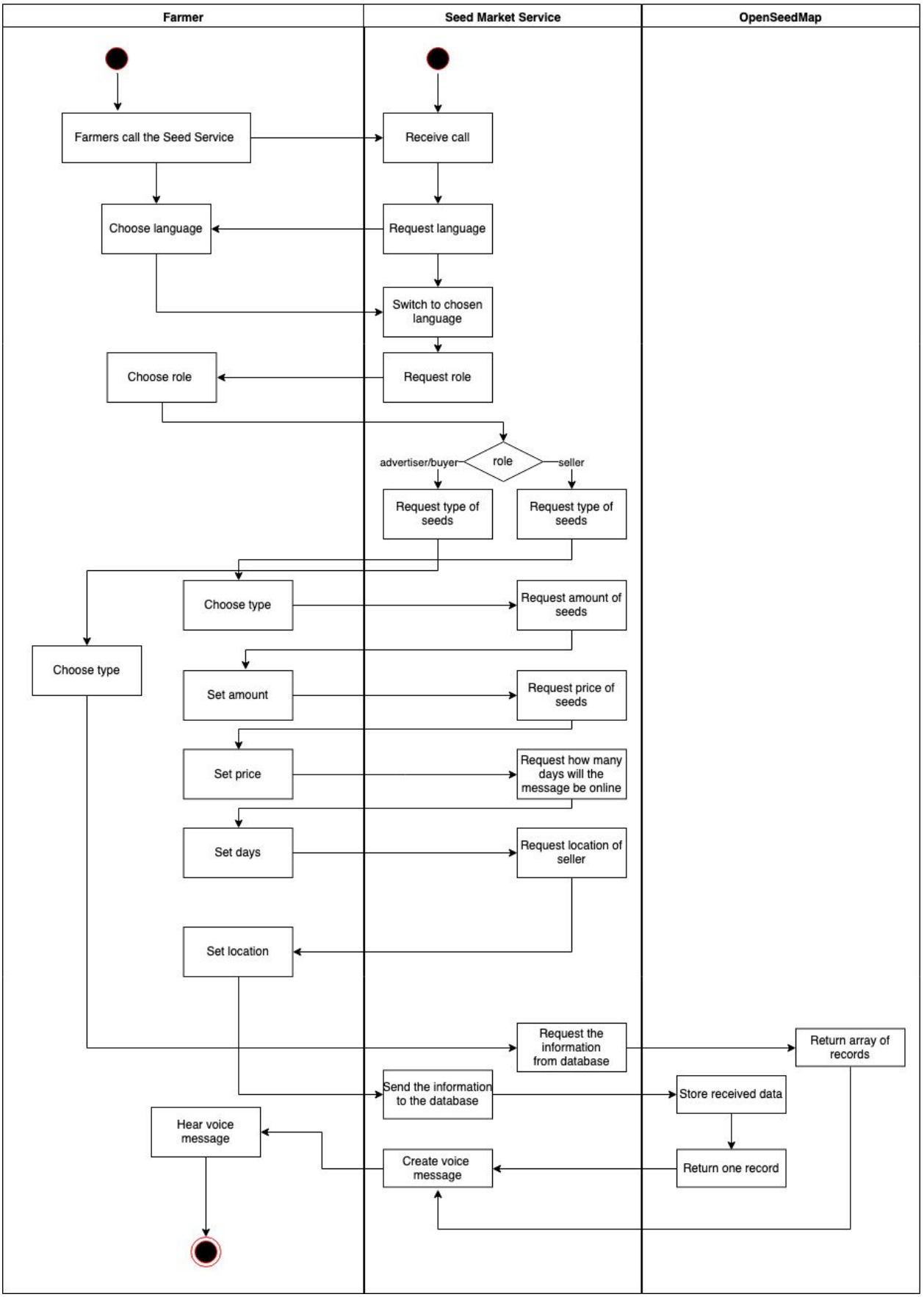
18. Conclusions

With this two-months study on this course, we have learned a lot not only about coding and work with Kasadaka, but also the normal lifestyle in rural Africa. It is the first time for us to make an application for real-life use cases, and we feel excited that this application can really help the people living in rural Africa. When we got the first feedback from them, everything started to be more real, and we had more motivation to modify our application. Also after we finished the application, we were happy that everything was working well as we expected. All the time we spent on this application is worth it. We are glad that we attended this course and learned a lot from it.

Bibliography

[1] KasaDaka VSDK, abaart, ONLINE, 2019, url: https://github.com/abaart/KasaDaka-VSDK

Appendix 1.


Farmer
Seed Market Service
OpenSeedMap
Farmers call the Seed Service
Receive call
Choose language
Request language
Switch to chosen language
Choose role
Request role
role
advertiser/buyer
seller
Request type of seeds
Request type of seeds
Choose type
Request amount of seeds
Choose type
Set amount
Request price of seeds
Set price
Request how many days will the message be online
Set days
Request location of seller
Set location
Request the information from database
Return array of records
Send the information to the database
Store received data
Hear voice message
Create voice message
Return one record