

Assignment 3 - Group 5

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C: Changelog

To describe the changes made to existing sections in assignment 2, this does not include the addition of new sections.

| Date | Change | Motivation |
|-------|--|--|
| 14-05 | Changed Hosting Organisation to Development and Support Actor. | To provide extra clarity related to the responsibilities of this stakeholder with the envisaged system. |
| 19-05 | Removed references to the previous Voxeo application. | To avoid some possible confusion as to which weblinks and phone numbers belong to the Kasadaka application |
| 19-05 | Updated the description of the prototype and usage scenario. | To match the current state of the Nònò Kènè service as developed over the recent weeks. |
| 19-05 | Updated the Pointer to Access the Application Code | To match the current location of the Nònò Kènè application code. |
| 19-05 | Updated the Pointer to How to Access the Application. | To match the current accessing method of the Nònò Kènè service as developed over the recent weeks. |

0. Name

The envisaged name for the use case is "Nònò Kènè". In the local language Bambara, the word "nònò" (written as nɔnɔ) refers to *milk* and "kènè" (written as kɛnɛ) refers to *fresh*. Together, these form "fresh milk", in which the service aims to connect buyers and sellers of this product.

1. Summary of key idea

Currently, milk producers in rural Mali are struggling with connecting to potential customers before their fresh milk is spoiled¹. They are struggling because they lack information on who and where potential buyers are, and travel for door-to-door sales is slow due to the lack of infrastructure. Local milk cooperatives exist that buy from milk producers, pasteurize it for longer storage (four days), and sell milk to resellers and other customers. However, fresh milk must reach the cooperative within 48 hours before spoiling. As such, milk producers and local milk cooperatives require a system to set up the sale of their milk to the cooperative in a timely manner. In an effort to address this situation, the business idea of Nònò Kènè is a phone-based voice service which is able to facilitate these connections in a remote and timely manner. Milk producers are able to create advertisements in which they combine the amount of available milk to sell (e.g., in liters) with a short voice message containing basic information (e.g., their phone number). Customers (in this use case the cooperative) interested in buying milk are able to listen to these advertisements and contact the milk producer to buy their product.

¹ Information on the use case provided in Bon et al. (2020) - "Use cases/Services Co-created for/with farmers and radio stations in Ghana, Burkina Faso, Mali and DRC".

2. Actors and goals

The envisaged Nònò Kènè system has three actors. Firstly, the Development and Support Actor that will develop the software for the Nònò Kènè system and deploy the system at the cooperative in rural Mali. This actor could be an NGO focused on improving the dairy value chain in Mali, an ICT4D group, or a private ICT business. The second actor involved in the Nònò Kènè system are the milk producers who create their advertisements through calling the system. Lastly, the customer (in this use case the cooperative) which connects with milk producers through calling the system and listening to the available advertisements. Alternatively, the cooperative could access the advertisements through a local interface as envisioned in [Section 10](#). An overview of these stakeholders, their operational goals and responsibilities in the system is summarized in Table 1.

Table 1. Stakeholders and their goals and responsibilities for the Nònò Kènè use case

| Stakeholder | Operational goal | Responsibility in the envisaged system |
|--|---|--|
| Development and Support (Private ICT Business / NGO / ICT4D Group) | Deploy and Maintain Nònò Kènè software. | Ensure that the connections between the producers and customers can be made. |
| Milk producer (Farmers) | Sell milk before it spoils. | Placing or deleting advertisements. |
| Customer (cooperative) | Buy milk and reach out to (unknown) milk producers. | Listen to advertisements and contact milk producers. |

3. Context and scope

As stated in Section 2, there are three main stakeholders involved in the Nònò Kènè use case. These stakeholders are the Development and Support Actor, Milk Producers and the Customer. Figure 1 provides an overview of how these stakeholders are connected within the envisaged system using a network configuration diagram. The Development and Support Actor maintains the Nònò Kènè code base (using the World Wide Web). In addition, the Development and Support Actor is responsible for providing the code that should be loaded onto the hardware solution for the Nònò Kènè system. This use case employs the Kasadaka systems, which consists of a hardware and software solution that offers decentralized voice-based services for rural communities [1]. The Kasadaka unit is deployed at the Customer (i.e., the local milk cooperative). Milk producers can access and use the Nònò Kènè service by using mobile phones without the need for an Internet connection, as mobile phones are the primary information sharing route between actors involved in the dairy value chain [4]. In addition, the customer is also able to access the Nònò Kènè service through a mobile phone without the need for an Internet connection. As mentioned in [Section 2](#), the customer could optionally use a local PC that is connected to the Kasadaka system to access the Nònò Kènè service.

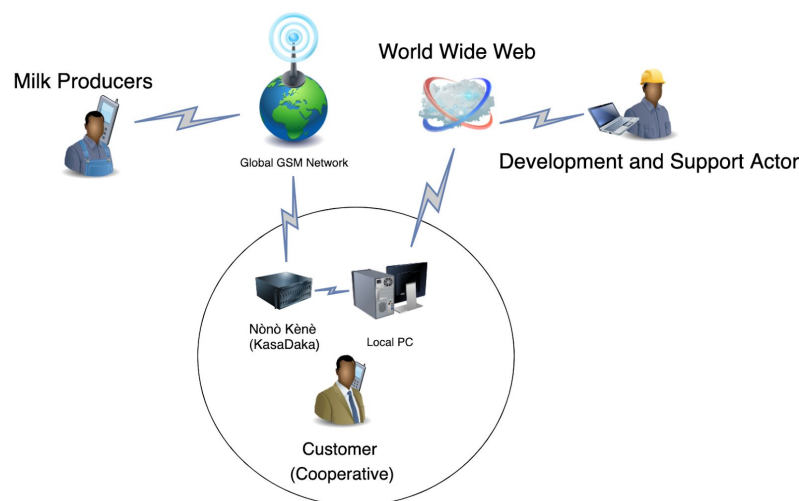


Figure 1. Network Configuration of involved parties in the Nònò Kènè use case

These three internal stakeholders all have specific concerns related to the use case. Firstly, the main concerns of the Development and Support Actor (ICT business / NGO / ICT4D Group) are the maintainability, sustainability and (given the low-income of farmers²) cost-efficiency of the service that they would have to develop and deploy. Secondly, the main concerns of the Milk Producers are the affordability, usability, and availability of the service as well as an improvement in their milk-sales (effectiveness). Thirdly, the customer (i.e., cooperative) is mainly concerned with the initial investment and operational costs of the Nònò Kènè system. In addition, concerns related to the availability and quality of the milk as well as the availability and clarity of the advertisements are of concern to the customer. Next to these internal stakeholders, one additional external stakeholder can be identified; the Local Phone Network Provider. The main concern of the provider is the maintainability, sustainability and cost-efficiency of the phone network.

The scope of the system and this specific scenario consists of the two main tasks the system needs to be able to perform. Firstly, the system needs to allow milk producers to place advertisements. Secondly, the system needs to allow customers to listen to these advertisements and call the milk producer if they are interested in buying milk. The service is therefore considered to be successful once the milk producers are able to store their advertisements and once the customers are able to listen to these advertisements.

There are two important (pre)conditions that must be or are assumed to be satisfied for this specific use case scenario. The availability of the service to both the milk producers and the potential customers requires a (stable) mobile phone network to be up and running. In addition to this, the local Kasadaka platform needs to be available and operative for the application given that the buyers and sellers are not reliant on an active Internet connection.

4. Use case scenario script

Table 2 gives an overview of the main use case scenario of the Nònò Kènè service. First, the milk producer calls the Nònò Kènè service. Second, the milk producer places his/her milk advertisement. Third, a potential customer calls the Nònò Kènè service. Fourth, the Nònò Kènè service plays back the advertisement to the customer. Fifth, the customer contacts the milk producer directly using a mobile phone. This scenario has been visualized in a storyboard as seen in [Appendix A](#).

Table 2. Narrative of the main use case scenario of Nònò Kènè

² Based on the Mali Country fact sheet of 2017 by the FAO, see: <http://www.fao.org/3/a-i7617e.pdf>

| Actor 1 | Interaction | Actor 2 |
|---------------|-------------------------------|---------------|
| Milk Producer | Calls | Nònò Kènè |
| Milk Producer | Places Milk Advertisement | Nònò Kènè |
| Customer | Calls | Nònò Kènè |
| Nònò Kènè | Plays Back Milk Advertisement | Customer |
| Customer | Calls | Milk Producer |

5. Interaction and communication

[Appendix B](#) gives an overview of the activities performed by the stakeholders using Nònò Kènè in the currently developed scenario.

6. Information concepts

Figure 2 provides an overview of the information concepts and their relation within Nònò Kènè. In this overview the *Milk Producer* and the related *Milk cooperative* both make use of Nònò Kènè to listen to or record advertisements. In the end, the *Milk cooperative* is responsible for contacting the *Milk Producer*.

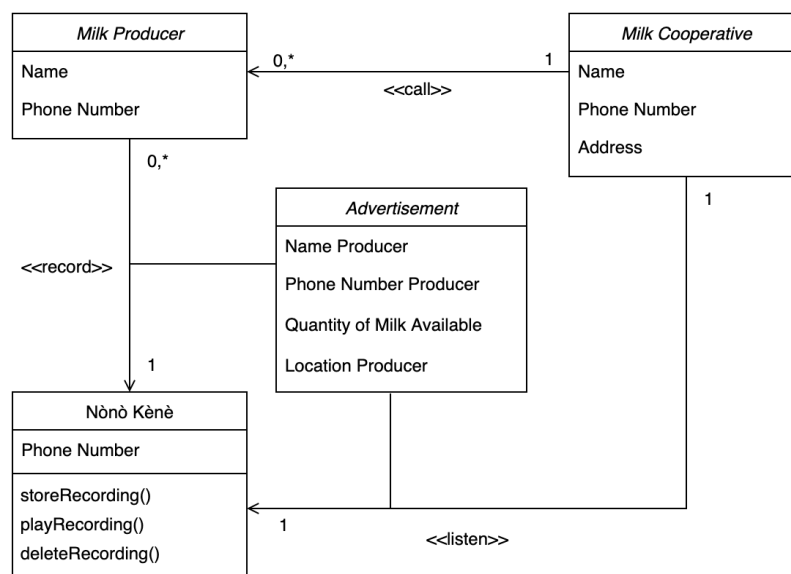


Figure 2. Overview of the Information Concepts of Nònò Kènè

7. Technology infrastructure

The Nònò Kènè system depends on the existence of a Mobile Phone Network. Farmers are assumed to be in possession of a basic mobile phone capable of voice communication. The region in which the application is deployed is assumed to have an adequate infrastructure to facilitate this voice communication via mobile phone.

While testing and developing this application relies on a stable Internet connection, the actual deployment does not depend on an active Internet connection. Owners of the Kasadaka unit from which the application is hosted, are also able to access the system using a mobile phone. In addition, the owners of the Kasadaka unit should be able to connect this unit to a local computer to access stored data. A simplified (non-formal) network diagram gives an overview of the envisioned infrastructure layout, and can be found in Figure 1.

8. Cost Considerations

An ICT4D project can only be sustainable if the costs associated with using the application are manageable in such a way that it returns something of equal or higher value for the end users³. Fortunately, the Kasadaka platform offers a solution to offer the Nònò Kènè system with minimal investments or operational costs required for both the milk producer as end users and the cooperative as the operator of the system [5]. Nevertheless, the system requires an initial investment and has operational costs, which must be clearly communicated to the stakeholders [2]. It is in their best interest to know upfront which costs are associated with the system for the long term [5]. Table 3 provides an overview of the estimated associated costs for the Nònò Kènè system.

Table 3. Overview of cost considerations associated with the Nònò Kènè system

| Operational | Investment | Development | Outsource |
|--|--|--|--|
| Calling costs for end users and cooperative | Kasadaka system (i.e., raspberry pi, GSM dongle, power solution, optional monitor) | Development of application | Local maintenance |
| SIM card costs for Kasadaka system | Deployment of system in local environment | Maintenance and incremental updates to Kasadaka system | Incremental updates of Kasadaka system |
| Electric energy consumption by Kasadaka system | | | |

The investment costs consist of deploying the Kasadaka system and are carried by the cooperative that will host the Kasadaka system. Although the Kasadaka system has a low power consumption [3], it still requires an energy source upon deployment. However, it is assumed that the cooperative has access to electricity. If this is not the case, the cooperative would have to include an energy source (e.g., solar panels) within the initial investment costs of the system.

The operational costs include the energy consumption of the Kasadaka system and potential SIM card costs that are associated with the GSM dongle of the Kasadaka system. These are carried by the cooperative. The costs of calling the system to place an advertisement are carried by the milk producers. The cooperative is charged for listening back to the advertisements if they decide to call the Nònò Kènè system. Alternatively, the cooperative could avoid these calling costs by accessing the placed advertisements through the local web interface.

The development costs could be carried by an NGO involved in improving the milk value chain of Mali. Alternatively, an open source ICT4D development group could develop and maintain the

³ Source: Stakeholder Interview with Victor de Boer 20-04-2020

application. Lastly, although the Kasadaka system has been created to be a low-maintenance system, local expertise would still be required to conduct incidental maintenance and be able to provide support when needed. The associated costs for this could be outsourced to other stakeholders such as an NGO.

9. Feasibility and sustainability

Currently, milk producers are struggling with connecting to potential customers before the milk is spoiled. They are struggling because they lack information on who and where potential buyers are. Connections that are made, are made using feature phones which are assumed to be generally available. This remains the same using the Nònò Kènè system except for the fact that connections can be made more efficiently (saving milk from getting spoiled and increasing sales). Therefore, it can be assumed that the Nònò Kènè system is interoperable with the current business process of producers and cooperatives. During the deployment stage, local stakeholders should be included in the decision process as much as possible in order to further enhance the interoperability and usability of the system [2]. The robustness of the technology involved and the carrying of the investment costs by the cooperative create a high level of sustainability of the project.

No changes in goal conflicts and dependencies between stakeholders can be defined for this specific scenario. Table 4 provides an overview of the main project risks related to the Nònò Kènè scenario. These risks relate to the technical, business and (socio-)economic aspects of the project.

Table 4. Overview of the main risks of the Nònò Kènè project

| Risk | Probability | Impact | Severity | Mitigation Action |
|--|-------------|--------|----------|--|
| Incorrect Requirements | Possible | High | Major | The inclusion of local stakeholders during the deployment and decision process. Basing the requirements on local needs and context. |
| Late Changes in Requirements | Unlikely | High | Moderate | The inclusion of local stakeholders during the deployment and decision process. Basing the requirements on local needs and context. |
| Retirement (or Quitting) of Key Users / Stakeholders | Possible | Low | Moderate | Construct satisfactory instructions on usage for users; preferably based on user studies. |
| Data Deletion | Rare | Medium | Minor | Construct satisfactory instructions on usage for users; preferably based on user studies. Error-handling and confirmation before deletion. |
| Underestimation of Budget | Possible | High | Major | Different parties carry different costs in terms of the Nònò Kènè system. Development costs can be made by NGOs or ICT4D development groups. |
| Limited Use of System | Possible | Medium | Moderate | Allow cooperatives to contact local milk producers to inform them of the service. Construct satisfactory instructions on usage for users. |
| Unavailability of GSM Network | Rare | High | Moderate | Due to the limited influence possible on the network, the mitigation strategy for this risk has been left out of scope. |
| Malfunction of local Kasadaka infrastructure | Rare | High | Moderate | Instruct local stakeholders on how to provide support and conduct incidental maintenance. |

10. Key requirements

The following requirements have been determined using the MoSCoW model, and can be found in Table 5. These requirements consider various aspects of the system, ranging from the User Experience (UX) for end users of the system to requirements regarding the local Kasadaka infrastructure. The requirements implicitly take into account the availability of a mobile phone network infrastructure as described in [Section 7](#). In addition, the requirements are aimed at making use of the Kasadaka system to be implemented at the location of the milk cooperative [3]. Aspects regarding the UX of the system are aimed towards the end user's mobile phone.

Table 5. Key requirements of the Nònò Kènè system using the MoSCoW method

| Must Have | Should Have | Could Have | Won't Have |
|--|---|---|--|
| Local language support | Ability to add additional languages by cooperative | Time-based advertisements with automatic deletion from the system | A speech-to-text interpreter to convert advertisements |
| Instructions on usage for users | Error handling when users make a mistake | Instructions for local web interface for cooperative | Visual based instructions to provide to end users or cooperative |
| Ability to store and retrieve advertisements | A local web interface to alert cooperative of the number of available advertisements on Kasadaka | A local web interface to convert voice-based advertisement data to text for local cooperative database | A web interface that is accessible through the Internet |
| A UX that works with feature phones | A UX that requires minimal DTMF | Call transfer system to act on advertisements | Support for multiple simultaneous phone connections |

11. Prototype description

As shown in Appendix B, the presented prototype of Nònò Kènè is able to:

- Allow the user to select a language (for now this has been limited to English or Dutch).
- Allow the user to select if they want to sell or buy milk.
- Correctly record and playback and store the advertisements of milk producers.
- Allow the user to re-record the advertisement.
- Allow the user to listen to and repeat all stored advertisements only if there is an advertisement available.
- Allow the user to go back to the main menu or end the call if required.
- Prevent errors throughout the system by asking for confirmation after the user makes a choice.

Following versions of Nònò Kènè should include:

- The trimming of the voice recording of advertisements in case the user stays silent at the end for a specified time (5 seconds).

- Allowing only one or a couple advertisements per seller, or automatically deleting an advertisement after a period of time, or allowing cooperatives to manage the advertisements.
- An overview of the amount of advertisements available.
- A “No more advertisements”-message prompted when there are no more advertisements left.

We have made the decision to focus on the development of the currently implemented features of the prototype based on the priorities learned from the collected information and requirements. As stated in [Section 6](#), Figure 2 provides a graphic overview of the information concepts and their relation within Nònò Kènè.

12. Pointer to the application code

Github: https://github.com/stheyounG/ICT4D2020_Assignment2

Heroku: <http://safe-escarpment-61074.herokuapp.com/vxml/start/2>

13. Pointer to how to access the application

The current Kasadaka application is accessible on the web by visiting (or sending a GET-request using an application like Postman⁴) <http://safe-escarpment-61074.herokuapp.com/vxml/start/2>. To call the service, set the above “start” link as the active server on <http://ict4d.kasadaka.com/index.php> (Username: *mali*; Password: *bamako*). After this is done, calling *020-3697664* (and ensuring that our application is being forwarded to the Asterisk server) will give you access to the service.

The local interface that cooperatives have access to is accessible through the following link: <http://safe-escarpment-61074.herokuapp.com/vxml/interface>.

The repository from the Github link provided in [Section 12](#) differs slightly from the git on which the Heroku app runs. The only thing that needs to be changed in order to get the full functionality of the buy-flow is to change the “*correct_buy_start_id*” found on line 29 in https://github.com/stheyounG/ICT4D2020_Assignment2/blob/master/vsdk/service_development/view_s/vse_message.py to the ID of the “*correct BUY Start*” Message Presentation Element.

14. Short Usage scenario

The current application supports the following scenario:

After calling the service, you get to select a language (English or Dutch). After the selection, you can choose whether you want to buy or sell milk. If you select sell, follow the prompts to successfully create an advertisement to sell your milk. After recording, you will hear a playback of your entered details. Then, you can confirm this information. Lastly, you are able to go back to the start of the menu or end the connection. If you select buy, you will hear all the available advertisements. After each advertisement you are able to repeat it, go to the next advertisement or exit the buy menu. Lastly, you are able to go back to the start of the menu or end the connection.

If you want a detailed (step-by-step) description of the optimal usage scenario of all the available features while contributing to the improvement of the service; it is still possible to participate in the user evaluation of Nònò Kènè by clicking on the following link <https://forms.gle/R3kWdY3VyOj6xHt4A>.

15. Feedback questions

On Monday 20-4, we had an interview with Victor as the case "Mali Milk" case owner. In this interview, we wanted to establish a better understanding of the actual interactions between the milk

⁴ <https://www.postman.com/>

producers, local cooperative, and other possible parties that are (currently) involved in the use case. We discovered that local milk producers only sell milk if they have a surplus. In addition, the milk producers sell their milk to the cooperative, which was contrary to our initial understanding of how the cooperative operated. In essence, the cooperative operates as a business entity and buys milk from milk producers to then pasteurize and sell in small bags of a predefined quantity (e.g., 500ml). The interview questions and answers can be found in [Appendix C](#).

16. Discussion of Scope and Fidelity

Currently, practically all of the envisioned features necessary to turn Nònò Kènè into a minimum viable product (as described in [Section 10](#) and [Section 11](#)) are implemented. However, some features were left out of scope due to time constraints. Firstly, time-based advertisements with automatic deletion from the system are not implemented as of now. This could be implemented by defining a function that would check the age of placed advertisements, and automatically call this function every couple of minutes. Secondly, the trimming of the voice recording of advertisements in case the user stays silent at the end for a specified time (5 seconds) is not yet implemented. This could be implemented rather straightforward by utilizing one of the many audio manipulation libraries for Python. Thirdly, the messages stating the amount of advertisements available and the “No more advertisements”-message to be prompted when there are no more advertisements left are currently not implemented. Adding an additional voice label for this purpose would be a sufficient implementation. Fourthly, an automatic call transfer system to act on advertisements was left out of scope for this specific prototype. This could be implemented by placing the advertisement caller ID into a VXML transfer tag⁵. Fifthly, a local web interface to convert voice-based advertisement data to text for local cooperative databases has not been implemented. The advertisement data is available for display in the developed interface, but this interface is not connected to any external database. This could be implemented by creating a form element in the interface with which cooperatives could input and send relevant advertisement data. Sixthly, preferably the service would allow only one or a couple advertisements per seller, or allow cooperatives to manage the advertisements. However, this feature has not been implemented as of right now. This feature could be implemented by further expanding on the registered caller ID, for example by keeping a counter of the number of advertisements per caller ID.

17. User Evaluation

A small-scale user evaluation was held to test the final prototype. A total of 7 users participated in the study. The questions and the corresponding form can be found by clicking the following link: <https://forms.gle/R3kWdY3VyQj6xHt4A>. Table 6 presents an overview of the received feedback and the corresponding feature of the service.

Table 6. Overview of the received feedback from the user evaluation of Nònò Kènè.

| Feature of Nònò Kènè | Received Feedback |
|---|--|
| Correctly record and playback and store the advertisements of milk producers. | Limited knowledge of what a hash (#) symbol is, which is making it difficult to end the recording of an advertisement. |
| Allow the user to listen to and repeat all stored advertisements only if there is an advertisement available. | There is no “No more advertisements available” message prompted once all the advertisements are played. |

⁵For more information on the transfer element, see: <https://www.w3.org/TR/voicexml20/#dm12.3.7>

| | |
|--|--|
| Prevent errors throughout the system by asking for confirmation after the user makes a choice. | The confirmation menu sometimes does not repeat the question but only the selected option and “is this correct or incorrect?”. This made confirmation difficult after making an error. |
|--|--|

18. Conclusion

Based on the defined use-case, a sustainable and feasible minimum viable product version of Nònò Kènè was developed and evaluated. The service is able to connect milk cooperatives with milk producers in a timely and user-friendly manner. Suggestions for improvements to the service were presented in the user evaluation. A natural progression of this work is to analyse the extent to which a third language can be added to the system using the Slot and Filler method. Furthermore, the iterative and user-centered deployment of the service could be a fruitful area for future work as well.

19. References

- [1] A. Baart, A. Bon, V. de Boer, W. Tuyp and H. Akkermans, "Kasadaka: A Voice Service Development Platform to Bridge the Web's Digital Divide." [Accessed 18 May 2020].
- [2] A. Bon, H. Akkermans and J. Gordijn, "Developing ICT Services in a Low-Resource Development Context", *Complex Systems Informatics and Modeling Quarterly*, no. 9, pp. 84-109, 2016. Available: 10.7250/csimq.2016-9.05 [Accessed 18 May 2020].
- [3] A. Baart, "KasaDaka: a sustainable voice-service platform." [Accessed 18 May 2020].
- [4] S.M. Thiam, J.W. Matofari, The Role of Information and Communication Sharing Pathway in Improving Peri-Urban Dairy System of Bamako, Mali, *American Journal of Science, Engineering and Technology*. Vol. 3, No. 1, 2018, pp. 21-28. doi: 10.11648/j.ajset.20180301.13
- [5] A. Baart. et al.: Affordable Voice Services to Bridge the Digital Divide: Presenting the Kasadaka Platform. In: Escalona, M.J. et al. (eds.) *Web Information Systems and Technologies*. pp. 195–220 Springer International Publishing, Cham (2019).

Appendix

Appendix A. Original storyboard of the main use case scenario

Step 1: Milk Producer connects to Nònò Kènè

- The milk producer Moussa calls the Nònò Kènè service.
His phone does not require an active internet connection. Solely, a microphone and a keypad are needed.



Step 2: Milk Producer places an Advertisement

- <<Do you want to Buy or Sell milk?>>
 - Sell
- <<What is the quantity of the milk that you want to sell (L)?>>
 - 14L
- <<Please enter a voice message in which you state your name, location, phone number and a general advertisement>>
 - "Hi, my name is Moussa and today I have 14L of milk available for you. I am located in Goundam and my phone number is +223-12345678"



Step 3: Potential Customer connects to Nònò Kènè

- A potential customer named Nyala calls the Nònò Kènè service.
Her phone does not require an active internet connection either. Solely, a microphone and a keypad are needed.



Step 4: Nònò Kènè plays advertisement to customer

- <<There is 1 advertisement available for 14L. Would you like to hear the advertisement?>>
 - Yes
- <<"Hi, my name is Moussa and today I have 14L of milk available for you. I am located in Goundam and my phone number is +223-12345678">>

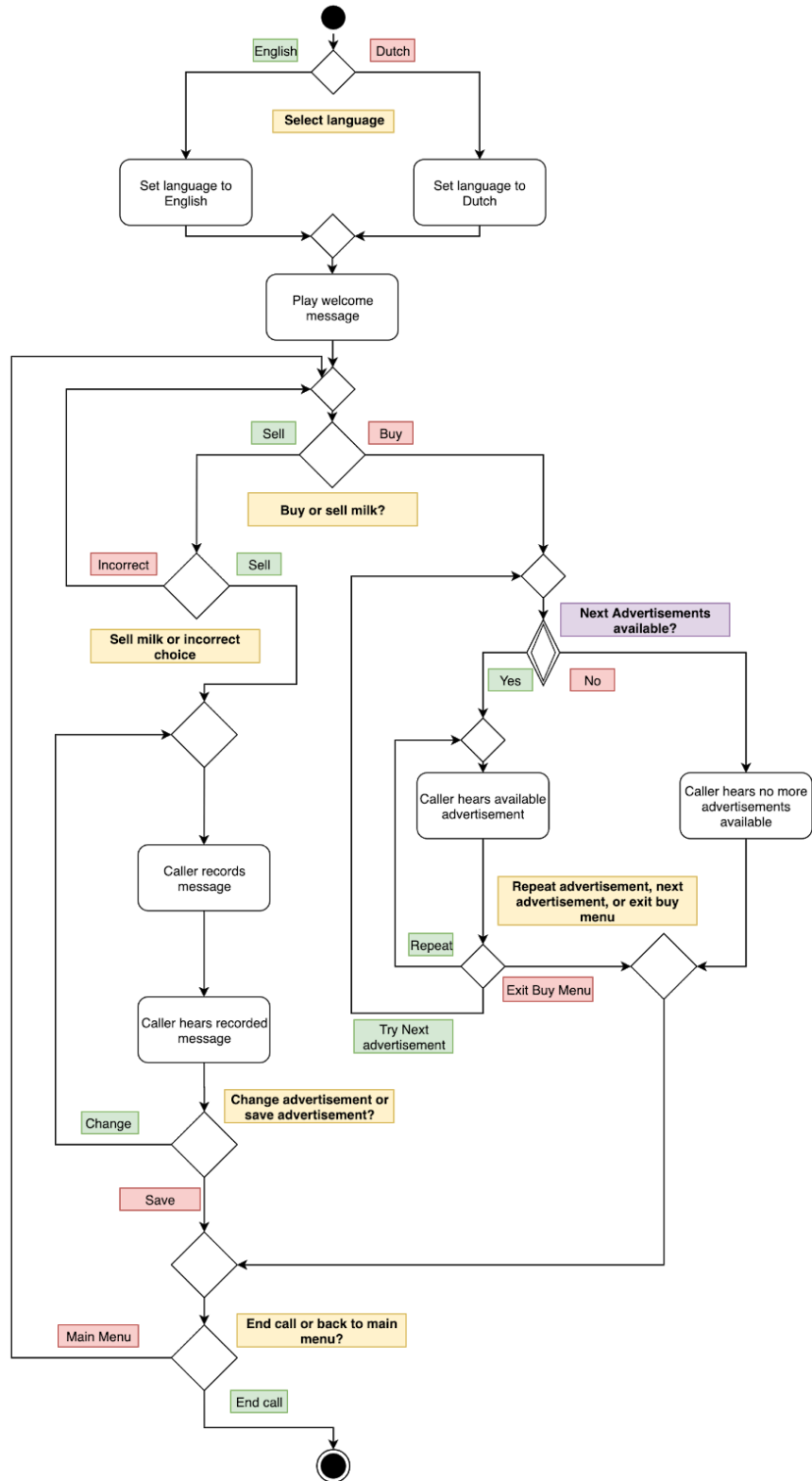


Step 5: The customer calls the Milk Producer

- Nyala calls Moussa to finalize the deal and agree to a travel arrangement.
The specifics of a potential deal are not handled through Nònò Kènè, but via a direct phone call from the customer to the milk producer.



Appendix B. Activity diagram of the currently developed scenario for the Nònò Kènè use case



Appendix C. Stakeholder questions

Interview ICT4D - Victor de Boer (20-04-2020) [DUTCH]

General meeting notes

- VB antwoorden op vragen mali milk case vorig jaar:
 - Distance is the main challenge here, in the months of overproduction (late-summer aug-oct), the animals are quite far away.
 - The logistics of getting the milk to the right place on time are thus the main challenge.
 - Every farmer can be assumed to have a (simple) mobile phone
 - Voor pasteurisatie gelden regels (melk moet binnen ~48 uur in een bepaalde temp gepasteuriseerd worden)
 - In principe zijn coöperaties te klein voor de productie van melkpoeder
 - Door gebrek aan (logistieke) informatie kunnen coöperaties niet plannen waar en hoeveel melk geproduceerd zal worden. Opkopen van melk gebeurt dus eigenlijk meer "per toeval".
 - "Vraag gestuurde" melk orders
 - SMS is geen optie, alleen voice
 - Kopers hebben op dit moment de macht om de prijs te bepalen, verkopers moeten hiermee akkoord gaan (anders drinken ze vaak de melk zelf op)
 - DTMF voor kleine dingen zoals (hoeveel heb je) is **mogelijk**, maar voor langere interacties zou dat lastig worden.
 - Sommige farmers gebruiken speakerphone, waardoor achtergrondgeluid een grote rol kan spelen.
- VB: eerst voice message kan, en daarna splitsen in dtmf voor data extractie.
 - scope van je systeem bepaald de scalability van een menselijke stap in het process
 - gebruikers experimentje is een goede validatie stap
- VB: dingen die we niet weten kan je aannames van maken, zolang je het maar beargumenteerd en gedocumenteerd.

Case specific questions:

Advertieren

1. Hoeveel (liter) melk wordt er over het algemeen aangeboden door de milk producers?
 - a. **VB:** Meeste mensen met koeien produceren melk voor hun (extended) gezin, verkoop is voor overproductie. Coöperaties bieden services om deze overproductie melk op te kopen.
 - b. **VB:** Meeste mensen hebben geen koe, 1 of 2 koeien. Het is een grote investering voor een gezin en ze nemen de koeien en melkproductie dus als een grote economische investering.
 - c. Zou DTMF (of multiple digit entry) een optie zijn om deze waardes op te nemen?
 - d. **VB:** Uit eerdere feedback is gebleken dat dit inderdaad een optie is. Echter wel pas na het opnemen van de algemene (alles bevattende) advertentie.
2. In welke eenheid werken de melkboeren wanneer ze hun product verkopen?
 - a. Zijn ze bekend met liter?
 - i. **VB:** niet zeker, ze werken vooral met "zakjes" (van ongeveer een halve liter)
 - b. Of gebruiken ze een andere unit?
 - i. **VB:** Zakjes van een halve liter (die worden verpakt bij een coöperatie uit een voorbeeld)

3. Qua de functionaliteit van de advertenties; is het plaatsen, terugspelen en verwijderen genoeg? Of zijn de users ook op zoek naar een wijzigings functie (om te voorkomen dat men vaker een menu door moet).
 - a. **VB:** in belminuten kan je 2 dingen doen, je bellen en je laten bellen door het systeem (bij systeem).
 - b. **VB:** als systeem kan je eventueel efficiënter je belminuten inkopen
 - c. **VB:** in radio marche, was er geen optie voor gebruikers om een advertentie te wijzigen of verwijderen.
 - d. **VB:** toen het systeem populair werd bleek dat als de koop (48 uur max want dat is de houdbaarheid van de melk)

Feedback

4. Wat is de huidige feedback vanuit de users? Is er een duidelijke klacht, of juist een nieuw idee / richting om uit te werken?
5. Wat zijn de mogelijkheden om structureel data op te slaan? In welke mate gebeurt dit momenteel al (op papier)?
 - a. **VB:** per dag wordt bijgehouden hoeveel melk er wordt verwerkt, en hoeveel er gepasteuriseerd.

Coopérative de producteurs de lait Ouelessebouyou

6. Wat is op dit moment de status van de "cooperative" m.b.t. het verbeteren van de value chain?
 - a. **VB:** omdat coöperaties op grotere schaal in kunnen kopen kunnen ze met betere marges werken dan individuele boeren. Dit prijsverschil kunnen ze doorrekenen naar de boeren door ze een betere prijs te bieden, of niet.
7. Op welke manier kunnen we de "cooperative" verwerken in onze huidige use case?
 - a. (i.v.m. kostendekking voor hosting organization)

Overige ervaringen

8. Wat zijn in jullie optiek de meest voorkomende kosten bij dit soort projecten?
 - a. In welke mate kunnen we deze kosten op de melkproducenten plaatsen?
 - i. **VB:** het een soort inkoop (dus wanneer de melkboer de melk afstaat dan krijgt hij daar direct zijn geld voor)
 - ii. **VB:** meestal 1 coöperatie in de buurt, over het algemeen vertrouwd bij de boeren maar het blijft wel een commerciële partij
9. Wat zijn mogelijke conflicten die ontstaan als gevolg van de implementatie van het systeem:
 - a. op socio-economisch vlak
 - b. cultuur/context (man/vrouw verdeling, wie doet er voornamelijk de zaken?)
 - i. Als de vrouw voornamelijk hierbij is betrokken; hoe pakken we een divide aan in de kwaliteit van de beschikbare hardware.
 - ii. **VB:** 90% van de mannen en 48% van de vrouwen hebben een telefoon.
 - iii. **VB:** koeien zijn echt een mannenproduct, die zijn ook verantwoordelijk voor de geldzaken.
 - c. technische aspecten (stabiliteit van het beschikbare netwerk + de geportte applicatie)

Feedback Francis on Assignment 2:

General Feedback on all groups (without naming specifics):

- Some groups are still using TTS, please start using your own voices
- Record after the beep bug: make your own beep recording after the voice message, VSDK is probably bugged.
- Don't terminate the call without allowing the user to go all the way back:
 - **TODO:** change "end call" prompt to, exit menu, as we have already properly implemented it but the voice prompt in the **buying menu** would suggest ending the call even though the user is still forwarded to the "main menu or end call" choice.

- Make sure that the audio going out to the caller is as short as possible.
 - They are thinking about their credit, and so a shorter call is always preferable.
- Remember that we are catering to a group of users who are accustomed to **speaking** instead of reading and writing.
 - From experience, most of the rural people would not use too much of the DTMF functionality. Otherwise it becomes too difficult for them.
- Consider looking at the database structure:
 - You could modify the database externally to achieve certain functionalities without having to modify the internal Kasadaka data model.

Advice for expanding Assignment 3:

- Three basic ideas for expanding:
 - **First:** Expand Kasadaka itself with a new view, template, and model (new functionalities).
 - **Second:** Create a web interface to access Kasadaka itself.
 - **Third:** Conduct a small user study.

Table 7. Voice Label Script for Nònò Kènè

| | Voice Label | Message |
|---------------------------|------------------------------------|--|
| Welcome Message | <i>Welcome Message Nono Kene</i> | “Welcome to Nònò Kènè.” |
| Language Selection | <i>Please select your language</i> | “Please select your language.” |
| | | “For English press X, for Dutch press Y.” |
| Buy or Sell flow | <i>Buy or sell milk?</i> | “Would you like to buy or sell milk?” |
| | | “To select, buy milk, press X.” |
| | | “To select, sell milk, press Y.” |
| Sell flow | <i>Chosen to sell milk</i> | “You have chosen to sell milk.” |
| | <i>Record advertisement</i> | “Please record your message containing your name, phone number, location, and the quantity of milk for sale in liters and end by pressing hash, after the beep.” |
| | | “Your message is:” |
| | | “If you are satisfied with your message, press X, or press Y, to retry.” |
| | | “Your message has been stored successfully” |
| | | |

| | | |
|-----------------------------------|---|--|
| Buy flow | <i>Chosen to buy milk</i> | “You have chosen to buy milk.” |
| | <i>Repeat, next or exit buy menu choice</i> | “Would you like to listen to the advertisement again, go to the next advertisement, or exit the buy menu?” |
| | <i>No advertisement available</i> | “Sorry, there are no advertisements available.” |
| Exit menu or end call | <i>End call or back to the beginning?</i> | “Do you want to end the call or go back to the beginning?” |
| | | “To select, end call, press X” |
| | | “To select, back to the beginning, press Y” |
| Correct or Incorrect Menus | <i>Is this correct or incorrect?</i> | “Is this correct or incorrect?” |
| | | “To select correct, press X.” |
| | | “To select incorrect, press Y.” |
| Error handling | <i>No response voice</i> | “Sorry, we did not hear what you said, please repeat your message.” |
| | <i>General error message</i> | “Sorry, an error has occurred” |