NanSee

CSE 440, Section AB

Bringing Parents and Babies Closer Together

Contribution Statement

Mitali (25%) - Created initial document + layout, wrote out problem + solution and testing results

Sarah (25%) - Wrote out Digital Design process, redesigned and rewrote presentation based on feedback given in Section, updated digital mockups to have devices, and cleaner designs

Daniel (25%) - Final Paper Prototype + Usability Test 1 + Appendix

Moein (25%) - Wrote out Testing Process, Discussion and initial prototype

Team

Mitali - Project Manager

Daniel - Product Manager, Designer

Sarah - User Designer, Prototype Builder

Moein - Write and Editor

Problem and Solution Overview

The problem that we are attempting to solve is reducing parents feeling of guilt and fear of missing out on raising their child after they return to their careers / work post maternity and paternity leave. More specifically, we want to **help parents spend time / interact with the baby while they are away.**

The solution that we propose is a mobile and voice assistant based application that enables an immersive experience for both parents and children. For parents, we create a mobile application through which they can interact with their children and read books / sing songs via video chatting, store memories of their baby's as well as learn statistical information about their baby's development through interacting with the NanSee voice assistant. For the child, we create an Amazon Alexa based screen that allows them to receive video calls about from their parents.

Initial Paper Prototype
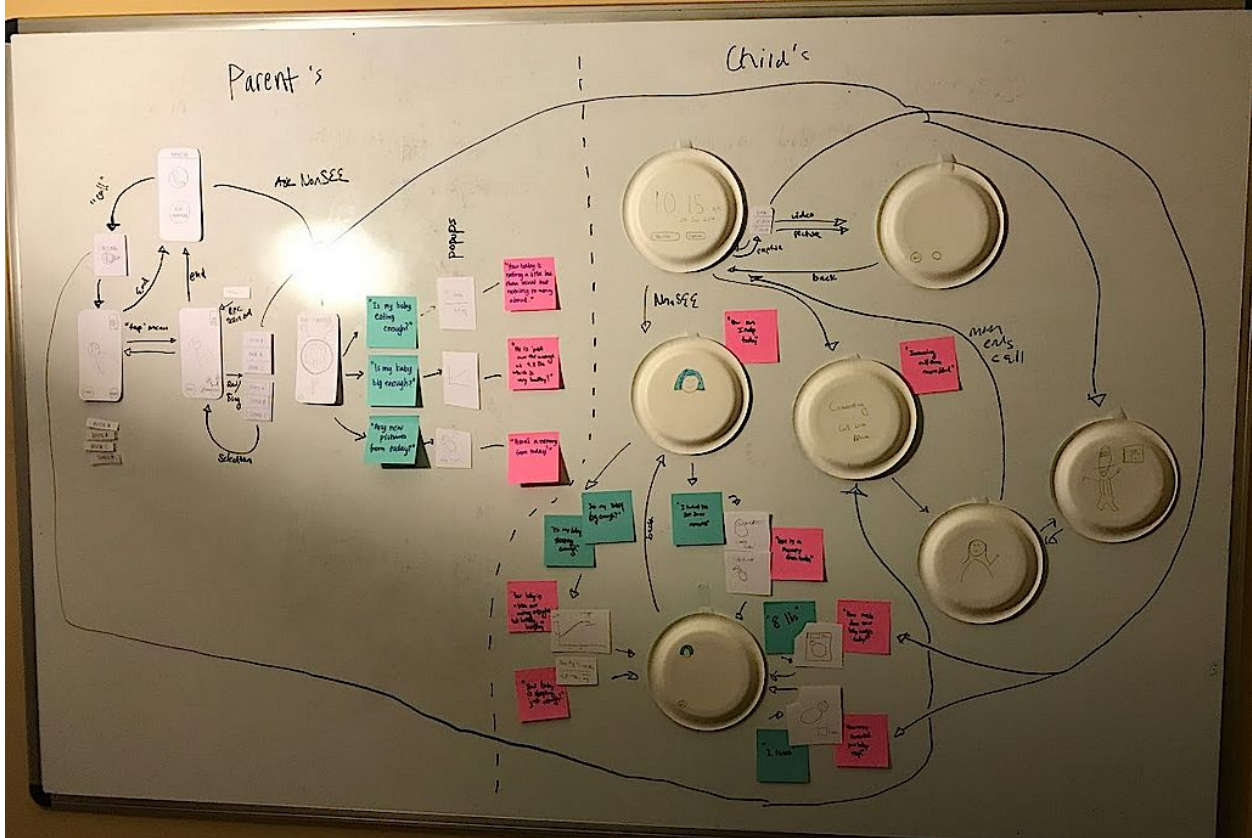
Our initial paper prototype had two components. The first component was a device that the parents kept with them at work and the second device stays at home with the child. The device that stayed with the parent Utilized reading books, singing songs, and tracking the babies growth. The device on the child's side did not have much functionality and mostly served as a monitor for the child to see his/her parent and view pictures of the books that the parents read to them. The prototype satisfied both tasks one: the parent communicating and interacting with the child. They do this by reading books or singing songs to the child. Task two: viewing and analyzing the child's growth.

Testing Process

Upon completion our paper prototype, we joined up with Steven and Tariq, from the LoudProof team, and Nigini, our TA, to do heuristic evaluations. Upon the completion of the evaluation, we noticed and fixed some key components of our prototype that were missing. For example, many of the pages of NanSEE did not have back buttons, there were some dead-end buttons that did not do anything, and there was not a way to end a call after having a conversation with the child. We also agreed upon our TA's suggestion: it is not necessary to have a separate device for NanSEE, and to incorporate it into the parent's cell phone.

Our first usability tester was a 27 years old mother of a one-year-old. We chose her because she is a potential user of our device and also since she is a mother she can give us essential feedback. The tester was asked to examine the device and explore its features. After doing so for 5 minutes she was asked to perform two specific tasks. First, to use NanSEE to read a book to her "child". second to use NanSee to sing a song to her "child". In this process, we learned that the computer needs to be more organized and know where each component of the prototype are located and play the role of "Wizard of Oz" very smoothly to make the prototype seem more realistic.

The second usability tester was a 21-year-old female CS student. Because of her background in CS, she was able to give us insight into technical solutions surrounding our device. We ran into several incidents. First, the screen that shows up after the "baby" button and the "Inbox" button was not intuitive. The User was confused what the "Talk to baby" button was for, and the "memory" button was mistaken for the camera option. We also noticed through this user test that the resulting UI screens for "help" and "inbox" buttons were not implemented. these were all very critical points that we fixed.

 Our third participant was a 21-year-old college student majoring in Early Childhood Studies. she was chosen because we hoped she could provide insights on child rearing. The main feedback that we received from her was the lack of appropriate navigation buttons - both the "Talk to NanSEE" screen and the "baby" screen lacked back buttons to the main navigation. Moreover, she also suggested that it would be a nice touch if there was a way to detect key moments of the child at home and then send them to the parents. From this usability test, we implemented

the appropriate back buttons as well as added functionality to capture key moments and send them as recordings to the parents.

Testing Results

Based on the feedback that we received during our heuristic evaluation as well as the usability tests, we changed our prototypes immensely. As such, many of our final prototypes are vastly different that initially. A summary of the main feedback points are presented below

Heuristic Evaluation

The main feedback that we received during this stage centered around the mediums that we were using for our prototypes as well as how we enabled navigations across the various screens. More specifically:

- **Medium on the parents end:** One of our evaluators suggested that we should change the tech medium on the parents side from a screen-based Amazon Alexa to a mobile application within the parent's smartphones. This would ensure that the prototype was easily portable as well as hassle free for parents.
- **Navigation across Screens:** We had not considered how the parent might want to go back to previous screens and so many a times parents would get stuck at various screens.
- **Baby's Screens:** We had not fleshed out how the screen would look on the baby's side in terms of video chatting and development data gathering.

Usability Test 1

On this usability test we did not have a lot of experience testing our prototype so we learned how to properly test.

- **Learning how to properly test:** During this test we mostly familiarize ourselves with the process of testing and perfected our skills.

- **Failing to reverse certain actions**: We also discovered missing reversals from certain screens

- **Certain screens/menus/options not implemented**: We also discovered that some features that we had planned had not yet been implemented into our prototype.

Usability Test 2

On this usability test, we focused a lot more on the layout of our screens and discovered major issues with how certain aspects were laid out:

- **Buttons on the screen:** Our user was confused about several buttons on the screen such as the middle button on our main pag as well as the memories option.

- **Screen Navigation:** The screen that shows up after our "baby" button that is on our starting screen is not intuitive and that was also something that we fixed after this usability test.

Usability Test 3

This usability test gave us a lot of ideas on additional features that we could potentially implement.

- **Lack of Navigation buttons:** Both the "Talk to NanSee" screen and the "baby" screen lacked back buttons to return to the main navigation. This was something that had been pointed out earlier and something that we had forgotten again as we reimplemented newer user interfaces.

- **Additional Features:** The user participants suggested that it would be a nice touch if there was a way to detect key moments of the child at home and then send it to the parent - for example, if child was showing signs of taking its first steps, the camera could use AI to detect such activities and then actually start a video feed or recording to parent.

Design Critique

Within this phase we realized that some of our designs did not match well established design patterns and as such, we were reinventing the wheel on things that were not really that pertinent. As such, within this phase we realized that several of our icons such as the "Ask NanSee" icon, the messaging icon and the chatting icon were all different from well-established design patterns and so we changed our designs to match those patterns.

Final Paper Prototype

After a significant overhaul of our initial paper prototype, we arrived at a **mobile phone interface prototype** that would condense functionality of our original pod-like design into a mobile application. The motivation for this change was a realization from our **heuristic evaluation** that made us realize that there was, in reality, no feature that necessitated having a separate device for the working parent. Our design converged into a application that would allow the parent to accomplish the tasks specified in our original prototype all through a mobile interface.

Another pivot that we made in our design is the functionality offered in our home device. We realized that all we really needed was **automated video and audio capture and a screen** from our home device rather than having the data collection and voice assistant feature. We still recognized that the physical caretaker of the child while the parents are away working would need a stake in our final design, so we included a **camera interface** to our mobile application as a method of allowing caretakers to contribute to the memories stream of the baby. We kept the video call mechanisms of the home device, but we came up with a new idea to make this device more intelligent. Now the home device would have a feature to leverage machine learning technology to passively and locally observe the baby. When a significant **milestone** is detected, it would proceed to activate recording and securely provide an option to the parent's application to view the event in real-time or alternatively store for later.
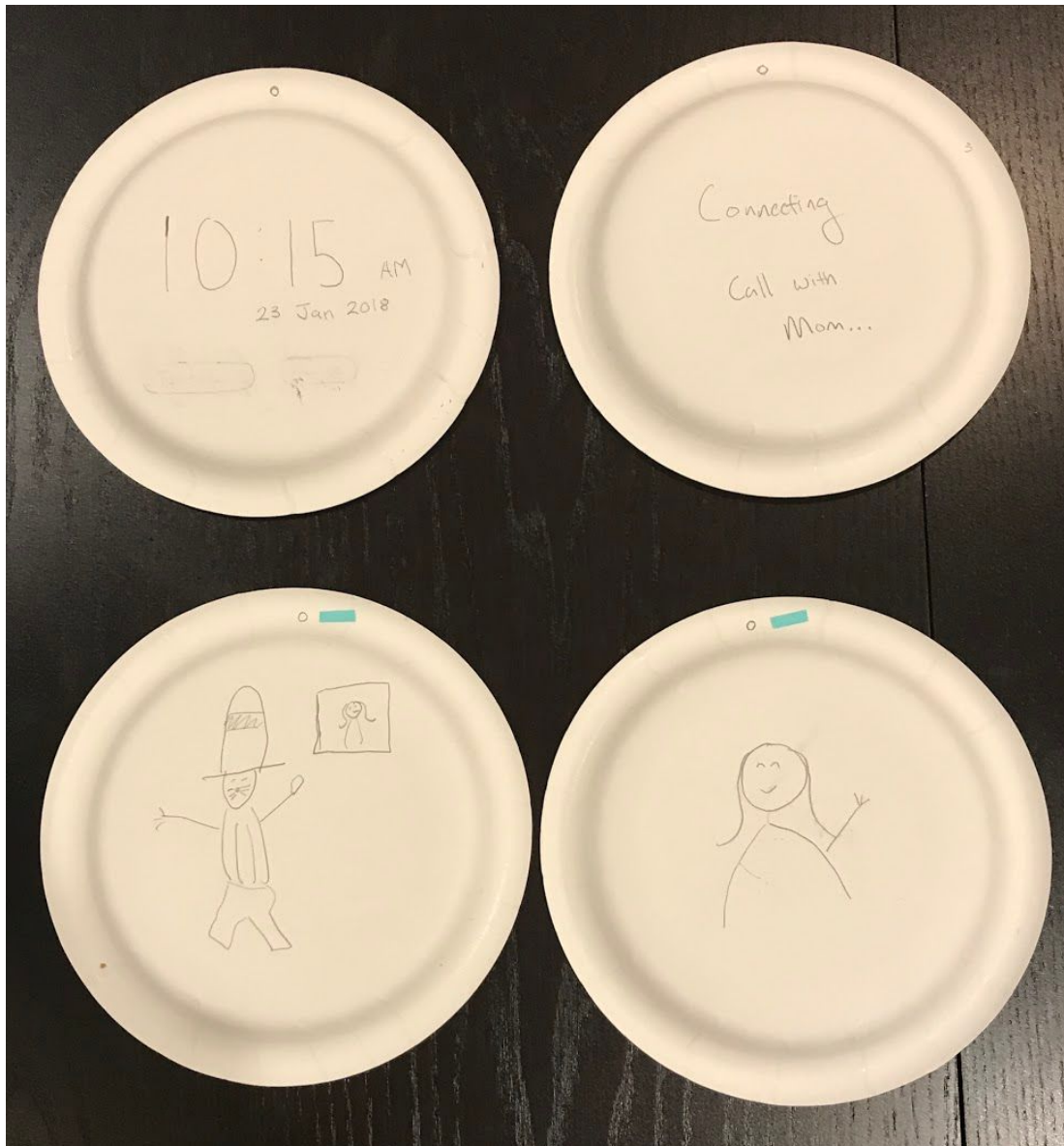
Overview

Parent mobile application prototype
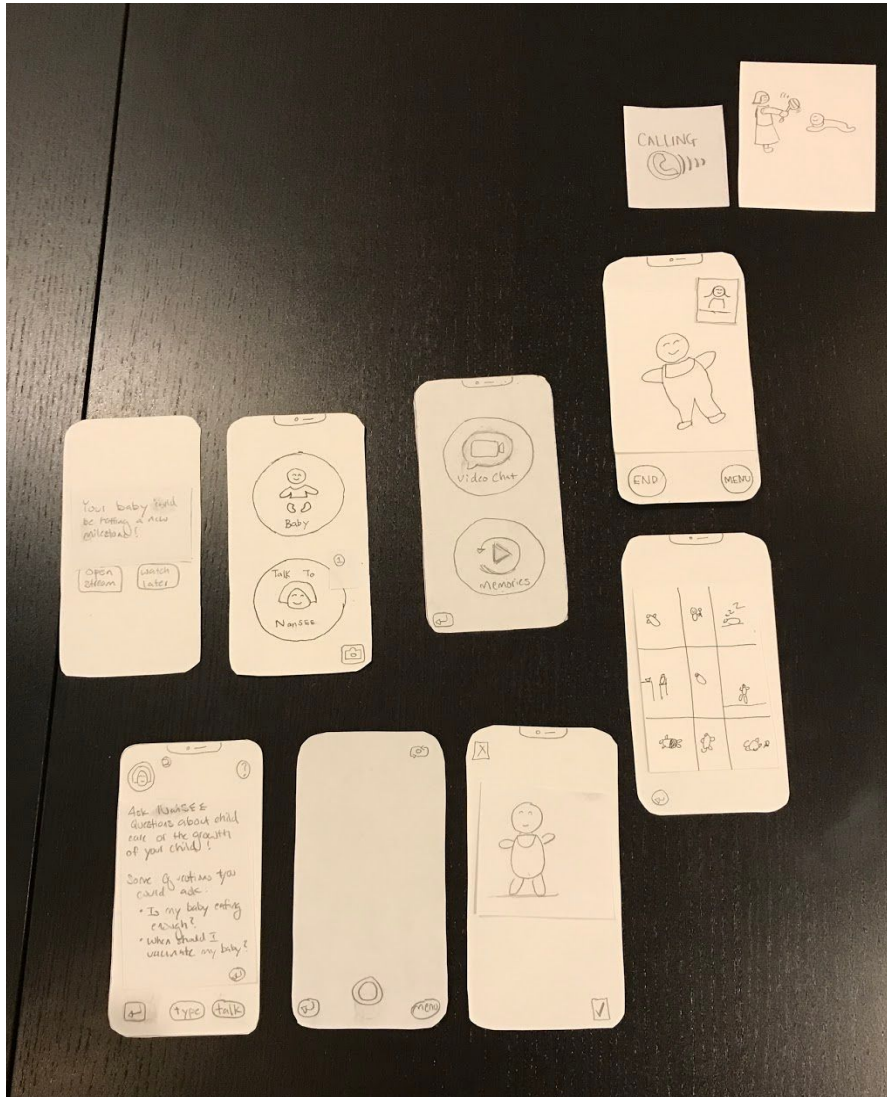
Home device interface prototype

Task 1: Interacting and engaging with baby's life

Video calling functionality

The base interactive engagement for our design is the video calling functionality. The parent begins the call on their interface through the "video chat" button (A) and the call is accepted automatically on the home device (B). This is to almost mimic a video monitor but the call aspect aims to help emotional connections to home by humanizing this experience. In addition, the one way theme of this feature makes practical sense as the parent would not want distractions from home. Rather, they should begin these interactions when their work schedule makes it appropriate.

Figure A
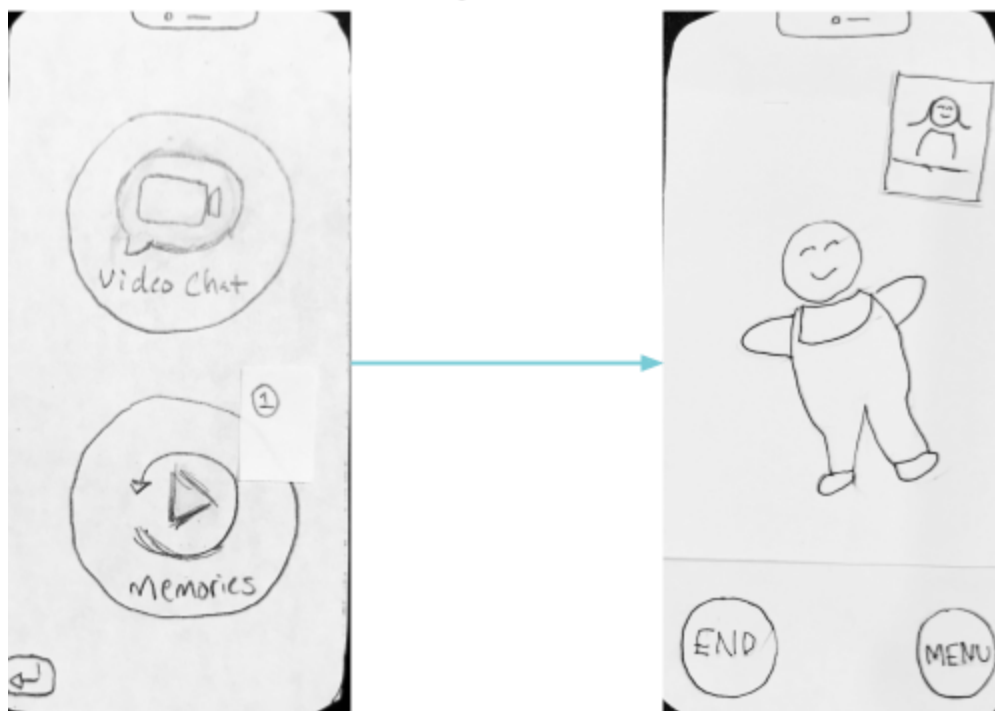
Figure B

Immersive video call

Video calls are a feature on many communication platforms so we wanted to personalize this feature further for the context of a working parent and their baby at home. To achieve this we made the video call experience much more immersive by adding activities such as reading a book and singing a song. These activities were specifically identified for their relative low barrier to participation and potential benefits to baby's growth.

On the parent's application, we can have them select a book or song and the words or lyrics will display as an overlay onto the video call (C).

On the home device we play either the pictures of the book or the melody of the song as the parent either reads or sings along.

Figure C
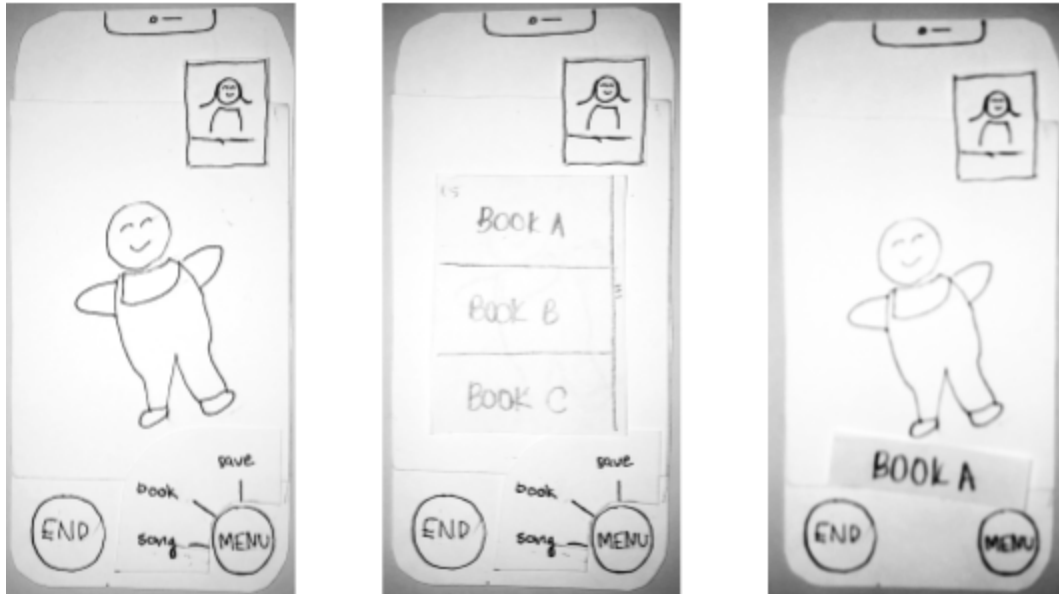
Figure D

Task 2: Tracking and Evaluating Child's Development

Milestone Detection

The diagram below shows the flow of information as the baby accomplishes a milestone (E). This allows the device to automatically fill in the parent in on the baby's development.

Figure E

Stream of Memories

All stakeholders, from the parents to the caretaker, along with the intelligent milestone capturing of the home device, we can all save interactions and events experienced of or with the baby to produce a unified stream of memories. This is to forever cherish moments with the baby and look back on such moments when facing emotional challenges of being apart while working.

Figure F

Nansee the voice assistant

In order to further support the task of how parents track and evaluate their child's growth, we envisioned a voice assistant, Nansee, that would act as a nanny-like source of truth. Nansee would respond to questions asked about the baby such as questions regarding the health of the baby. We felt this conversational approach would humanize and speed up the process of having to keep track of how well their baby is developing. Also Nansee would periodically pose questions to the parent or caretaker as a mechanism for collecting necessary data points about the baby.
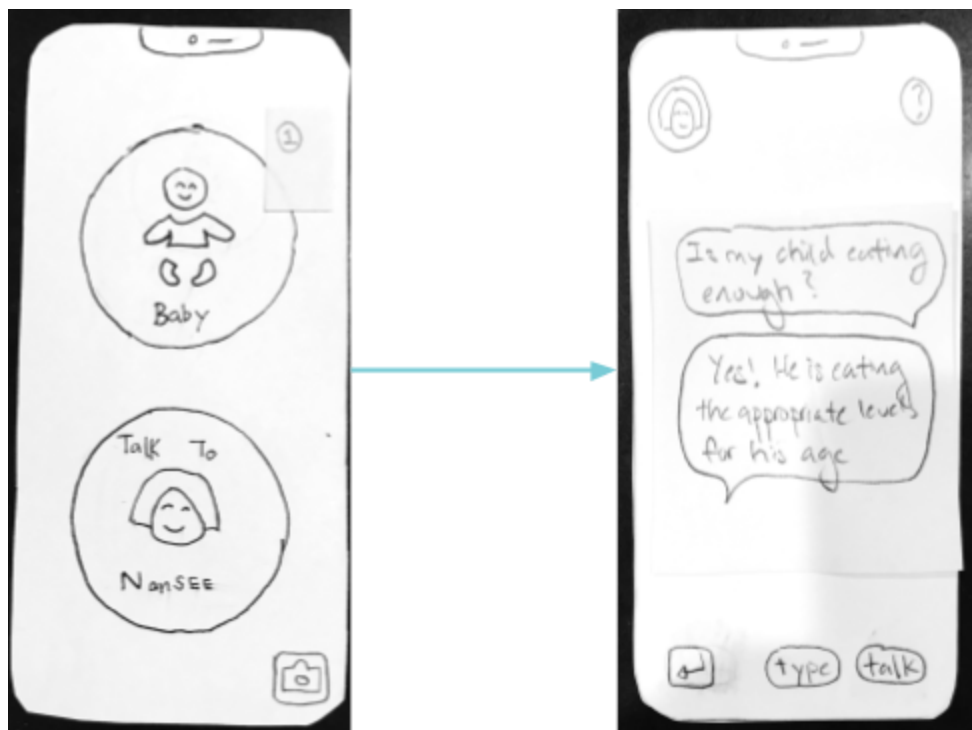
Digital Mockup

Task 1: Experiencing & Capturing Key Child Milestones

Through our research, we realized that it is important to parents that they are able to capture and experience key moments in their child's life. Many parents that we interviewed were afraid that they might miss out on the early years and key milestones in their child's life because of their work commitments and careers.   We first present everything from the parent's side.
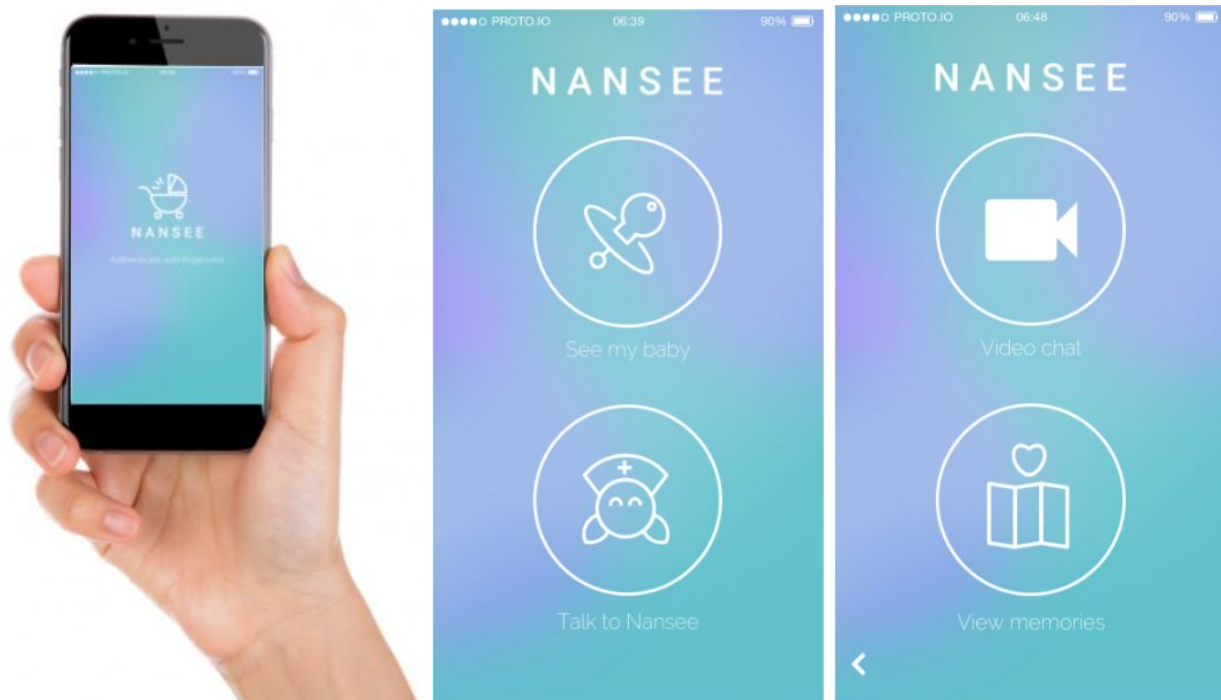
The first screen automatically brings to you the second screen once you authenticate the app. From the second screen, select: **See my Baby.** This brings you to the third screen where you have two options.

Selecting Video Chat

We come to the screens below which allow us to Read, Sing, or Save. The question mark in the upper right allows the user to understand how to interact with their baby (Shown in the 3rd Figure).
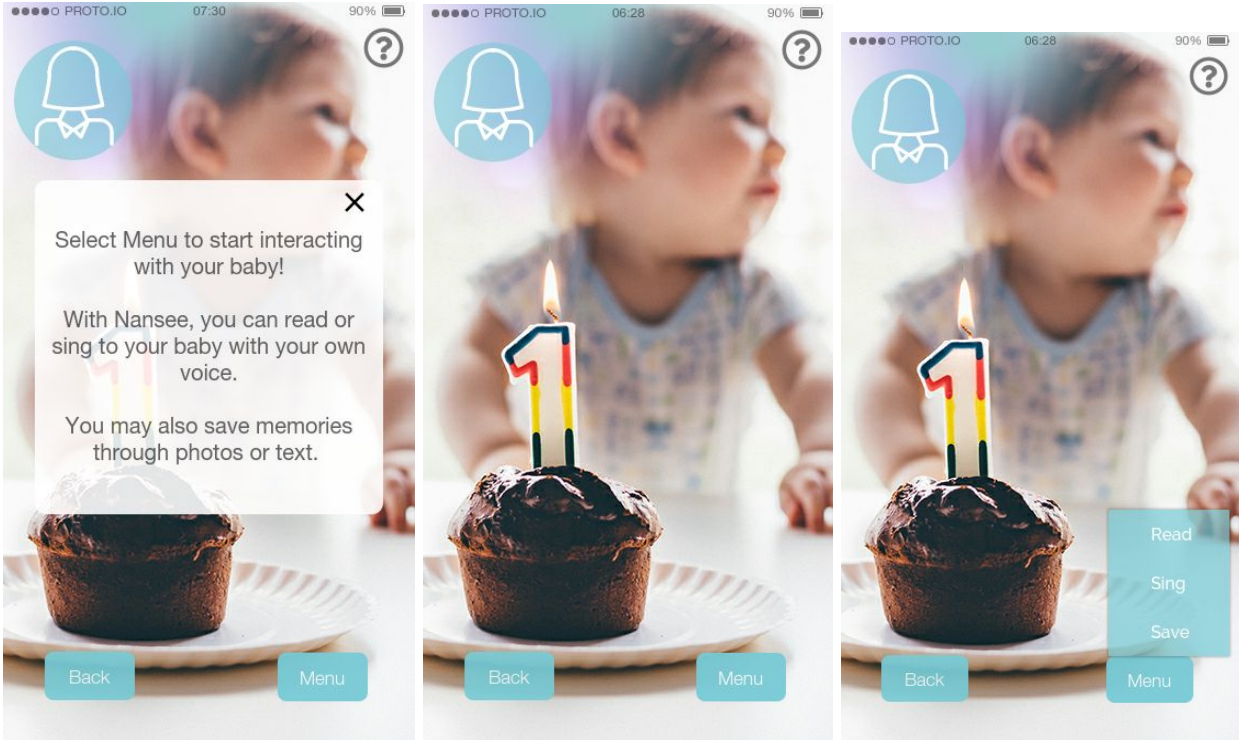
Selecting Read:

Upon Selecting Read, we show a list of books, once the user has selected the book, it loads that book and you can read to your child through the application.
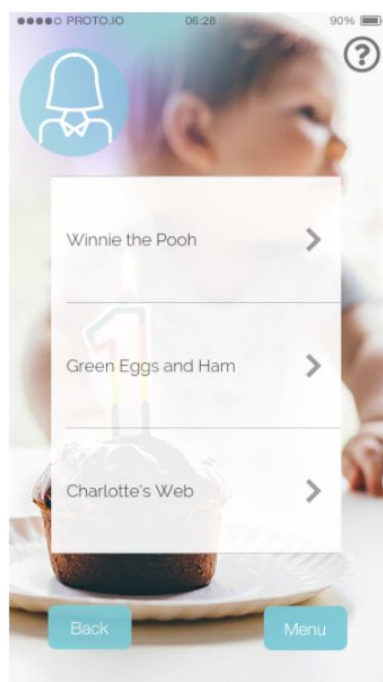
Selecting Sing:

Upon Selecting Sing, we show a list of songs, once the user has selected the song, it loads the song and you can sing to your child through the application.
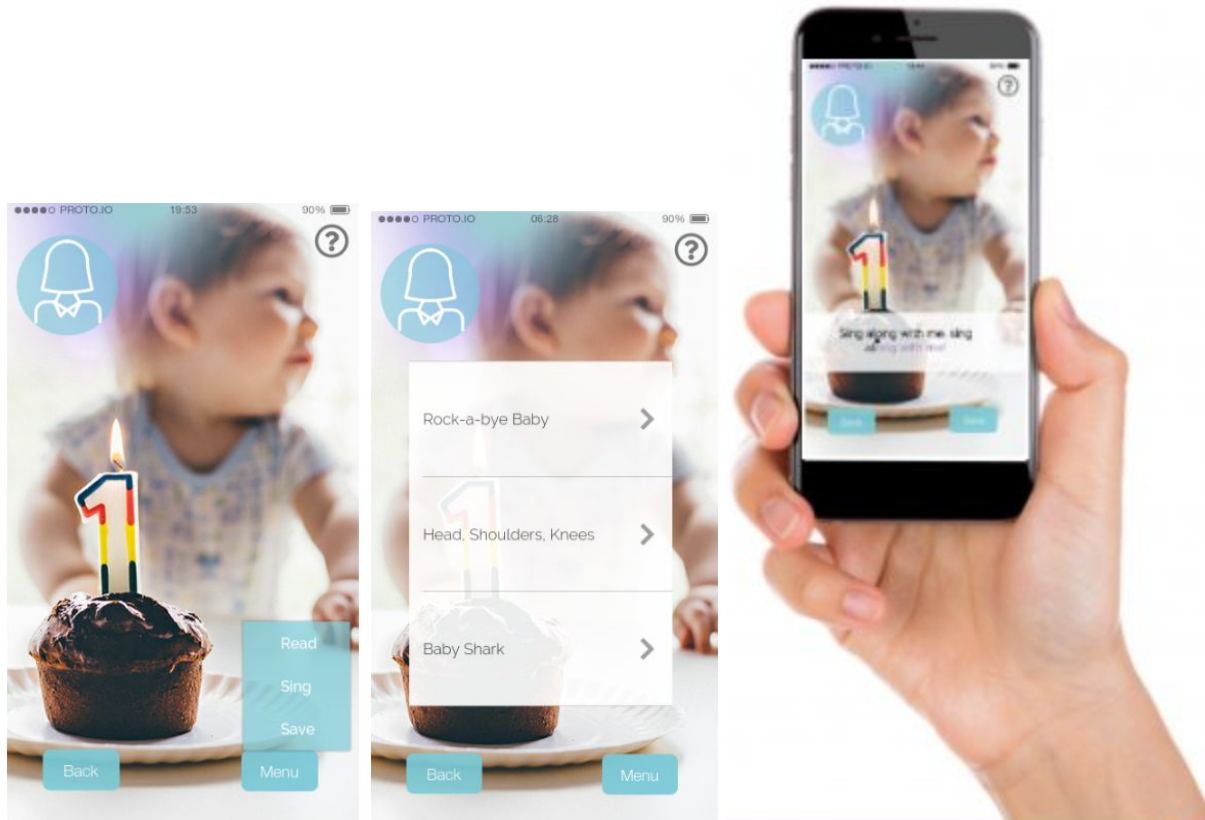
Selecting Save or View Memories:

You can also select save from the main menu above. Doing so allows you to save memories of your baby. Memories can be accessed from the start screen.
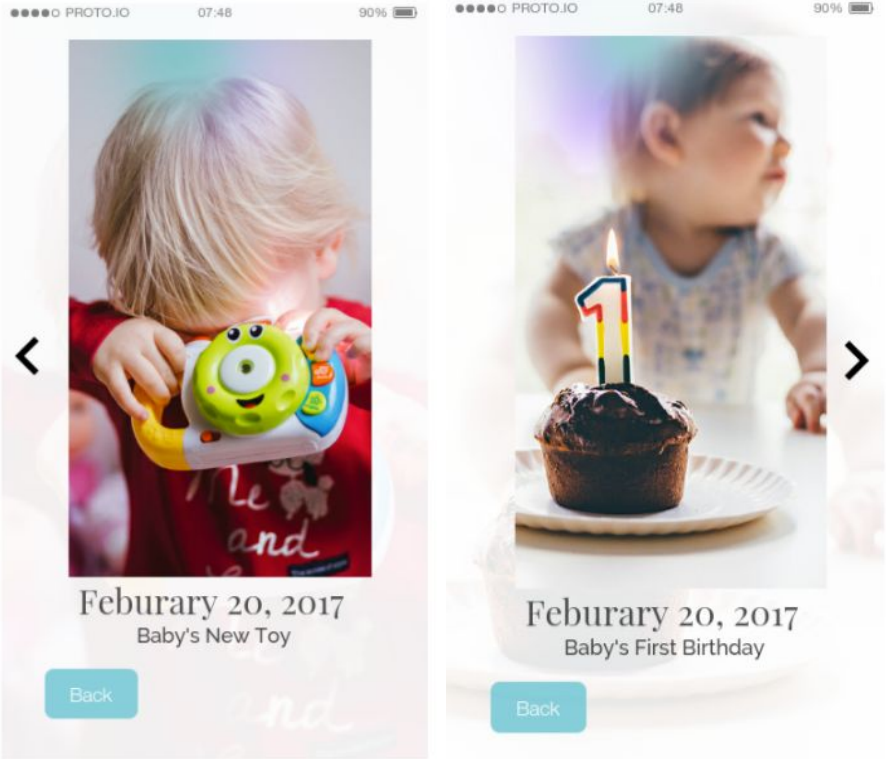
Additional Call Screen Features:

From the menu bar, you may select "Save" to save a memory at anytime of the call, including while you are reading or singing. In addition, Nansee detects "Milestones" such as first steps and records these in memories (described and shown above)
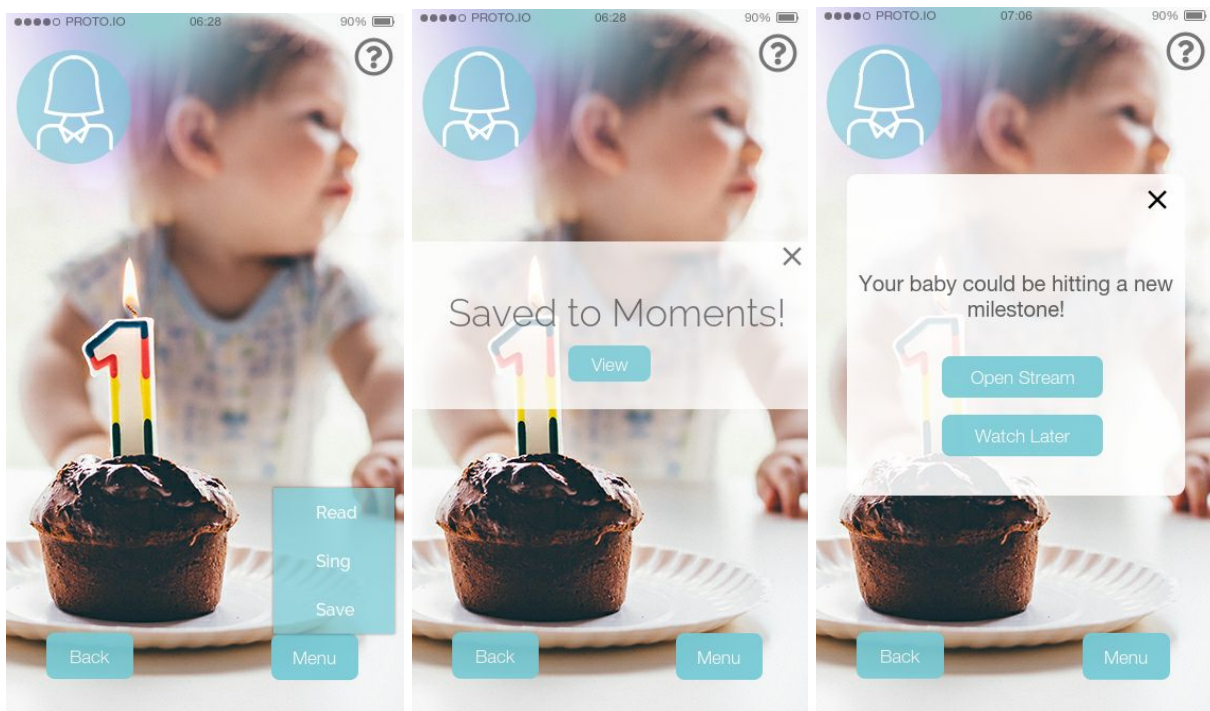
The Child's Side

The main idea of the child's side is an application.It is a pod that stays at home with the child and his/her caretaker. When there is no activity the following screen is shown. The idea is that it acts as an immersive portal to home for the parent while they are away from home at work.

Pictured above: at home device that works through voice assistance and tapping. Our assumption is that there is a nanny or family member capable of operating this device.

When the parent makes a phone call, the following screens are shown. First, the phone call connection is made then the parent can see the baby. The second screen is seen in normal video chat mode.

If the parent decides to read to the child a book or sing, the following screens are shown.

Task 2: Tracking Growth and Development of Child

Many parents of newborns keep track of their children's development and analyze it to see if their child's mental and physical growth is healthy. Taking weekly pictures or videos, keeping a log of child's growth, or simply drawing marks on the wall to indicate child's height are some of the ways that parents keep track of their child's development. We transition back to the parent's side application.

The first screen automatically brings you to the second screen once you authenticate the app. From the second screen, select: **See my Baby.** This brings you to the third screen where you have two options.
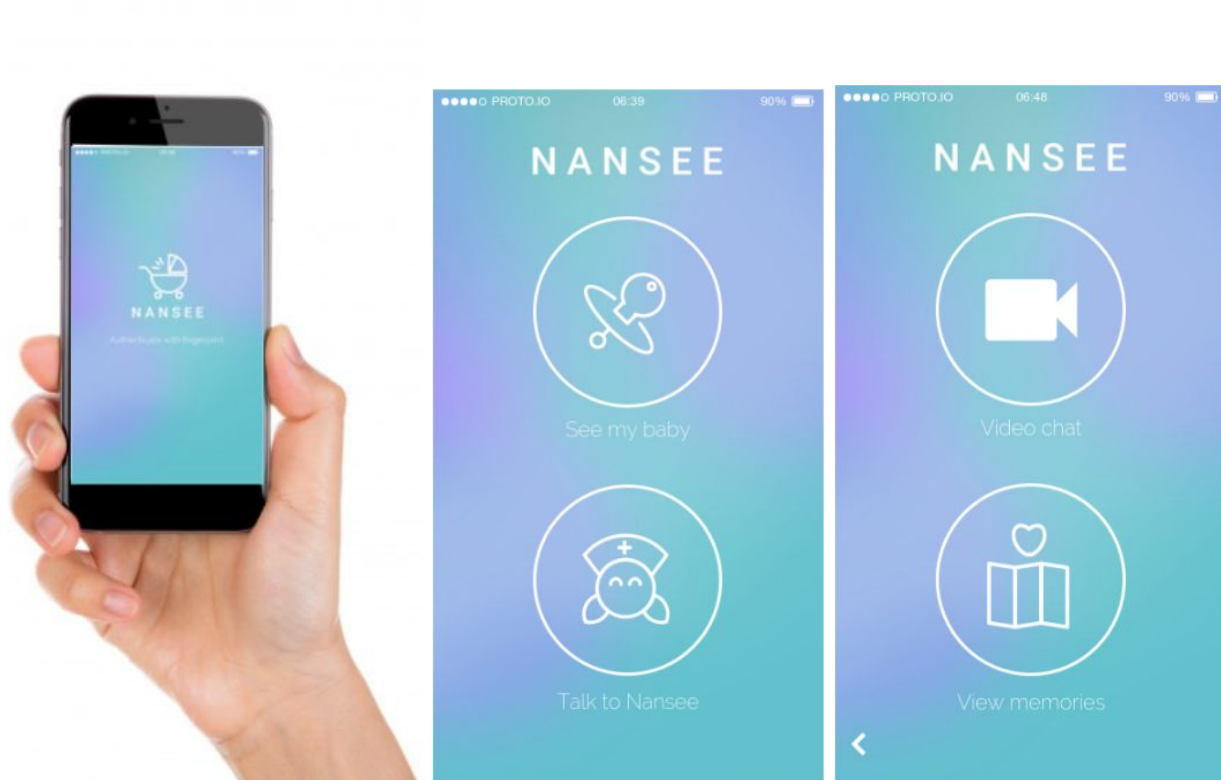
Asking Nansee questions:

To ask Nansee questions you choose the "Talk to Nansee" button. This then leads you to a new screen where you can either talk to Nansee or text Nansee. The question mark in the upper right allows the user to understand what Nansee does.
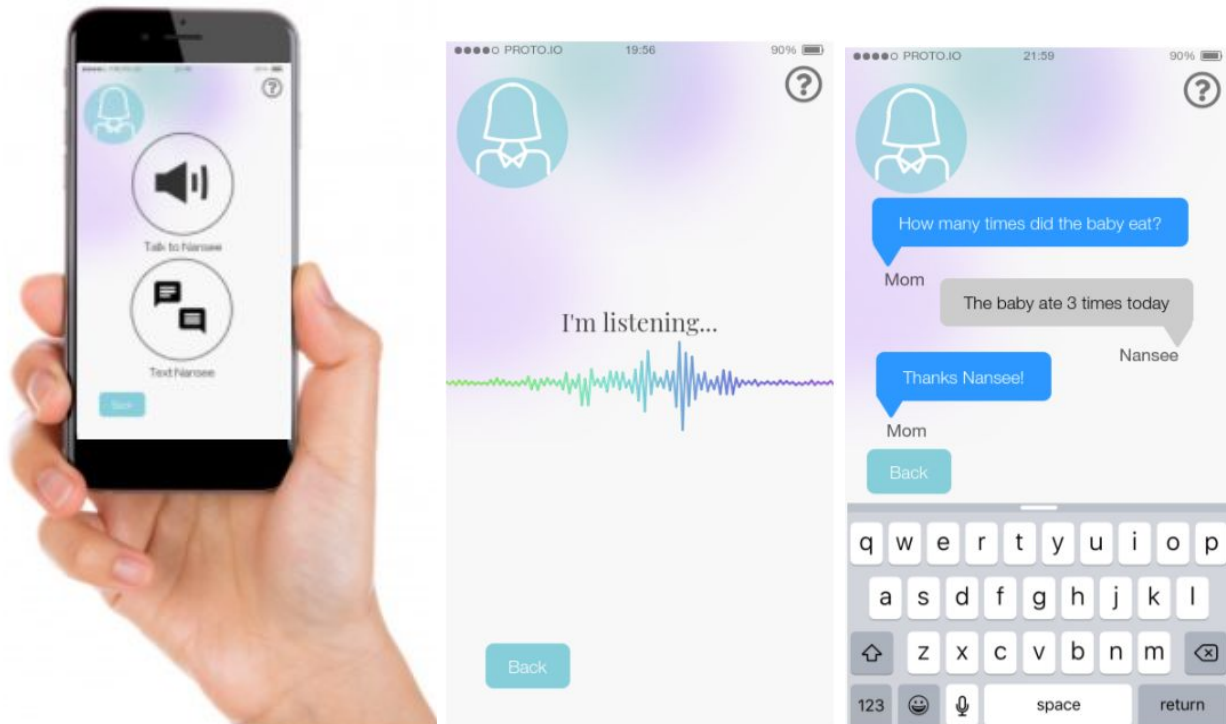
Upon selecting 'Type' the user can type up questions for Nansee (as shown in the 2nd screen). By selecting "Talk" it will bring you to a screen where the user may talk to Nansee about the baby (as shown in the 3rd screen).

User Guides:

For documentation, we like to show a (?) on the upper right hand side of each task screen. Every task screen explains the function of each task and how the user can interact with Nansee. This help documentation is only if the user needs it. Below are the help menus for Calling as well the nested actions of reading and singing. [Task 1]
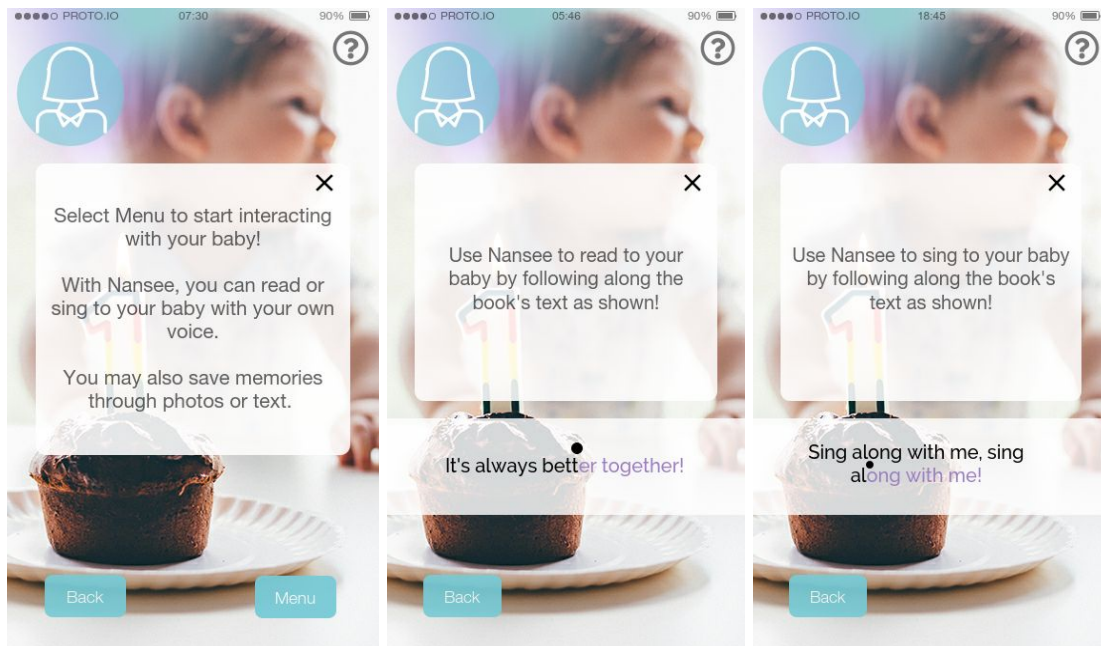
We also included documentation for the Talk to Nansee task [Task 2]
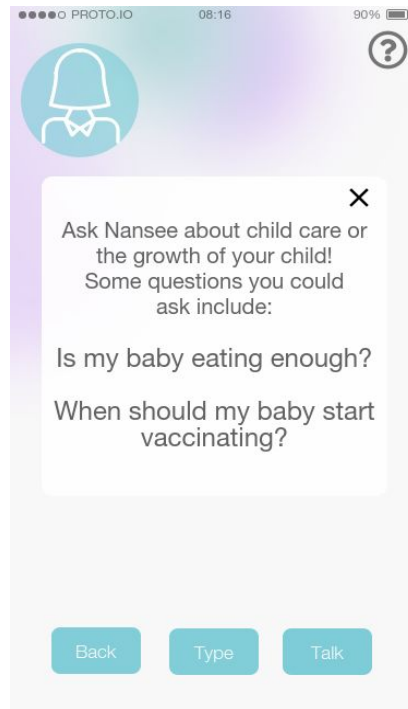
Discussion

What did you learn from the process of iterative design?

The process of iterating between prototyping, testing, and receiving critique was very productive. Through this process, we were able the make many improvements to our prototype. Every time that we changed our prototype we felt it is now complete and functional, but upon doing more testing, we found new errors that needed to be fixed. Also having different testers was very crucial because every person has different ideas and we were able to incorporate many good ideas from different people into our design.

How did the process shape your final design?

Final design was very different from what we original imagined our product would be. During the process of iterative design, we were able to improve our design drastically. At each iteration of testing and receiving critique we were able to add useful functionality to our prototype. There were also times that we had to scarpe some ideas because they no longer served a purpose in our design. It was extremely useful to start with a low fidelity prototype because at the beginning we made a lot of design changes. This was easy to do with a low fidelity prototype because we had not invested too much time or money into it.

How have your tasks changed as a result of your usability tests?

Our tasks stayed fairly consistent throughout the usability tests. The only minor change was that at the beginning of our design we wanted to incorporate a feature for taking care of child responsibilities into our design. However, after doing usability testing we realized that there is more need for communication and capturing child's key moments so we mainly focused on tasks related to this.

Do you think you could have used more, or fewer, iterations upon your design?

We believe that we did the right amount of iteration for our design. If we have done any fewer iterations we would miss critical advice from our testers, peers, and TAs. Also doing more iterations would have been too time-consuming.

Appendix

Usability Test Scripts:

Hello and welcome to this usability test. I just want to let you know right from the beginning that it is totally fine to feel uncertain about how to accomplish certain tasks. There really are no right or wrong answers. We want you to feel very comfortable talking out what you are thinking and if you are confused please let us know. In fact, anything you say, even confusion, helps us immensely in improving our final product.

Now, I will set the scene first for this test. Let's say that you are the parent of a newborn child, around three months old. You have taken a three month maternity leave but are returning back to a full time working schedule. It has been very stressful figuring out how to manage and schedule your time around your baby's life. In addition, you are feeling guilty for not being home with your child and having to work on your career. That is where this application comes in. This application will provide a method of interacting with your baby. In addition, it will help track and evaluate your child's growth. Any questions?

[Answer questions]

Let's begin. This is the starting screen.

[Show initial screen]

Tell us a little bit about what you would expect from each button.

[record response]

Great. Now let's say you want to make a interaction with your baby through this application. Which button would you select.

[See how user can gets to video call]

Great. Now you are in the video chat. How might you try some virtual activities with your baby?

[Observe]

How might you save this interaction?

[Observe]

Was anything confusing about this process?

[Record]

Now let's switch gears a little bit. How would you go about figuring out getting a question about baby vaccinations answered?

[Observe]

What do you expect to be able to do on the nansee page?

[Record]

A numbered notification badge has popped up on the nansee icon. What do you think this means?

[Record and hopefully they understand nansee has a notification for the user]

How would you address this notification?

[Observe]

Now let's try something else again. How might you go about taking a look at saved memories of your baby in this application?

[Observe]

Was anything confusing about the second half of this test?
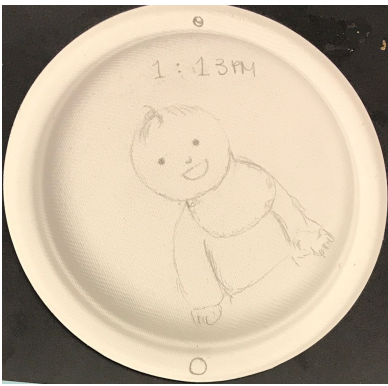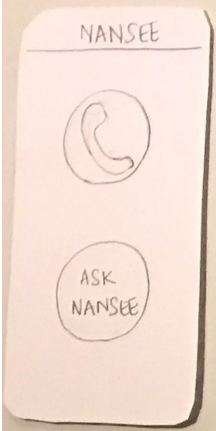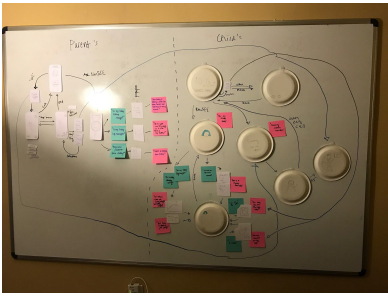
[Record]

Great, thank you for your time! This was very helpful.

Usability Test Results:

**Incidents from Test One:**

Before	After	Incident
		No Return button (Severity 3) When we were doing our usability testing we noticed that our prototype has no return button, thus the user could not return to the previous page. We added a return button to the new prototype. (bottom left)

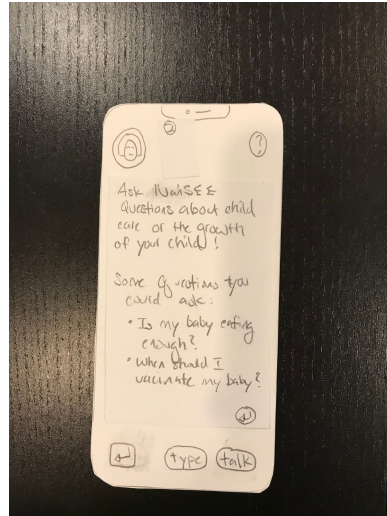|		
		Using a Smartphone App (Severity 3) We realized that using a separate device is not necessary and is not as portable as a smartphone, so we decided to use a smartphone app.
	N/A	**Straightforward interface (Positive)** While doing our testing we noticed that out interface is very simple and easy to use, and there was not much explaining involved.

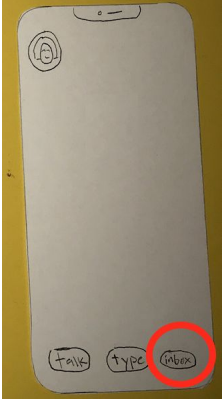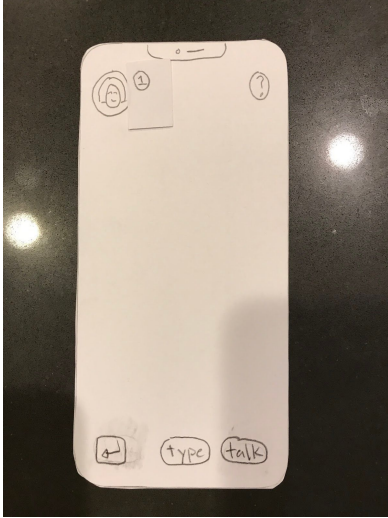**Incidents from Test Two:**
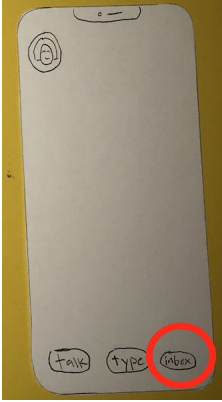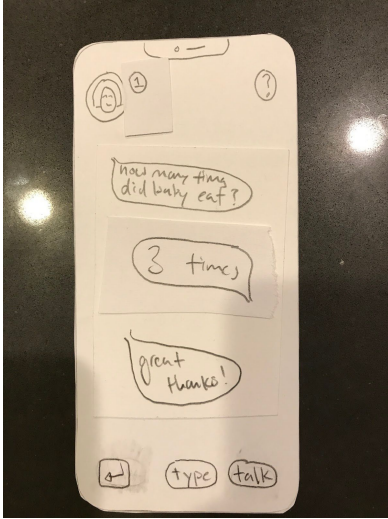
Before	After	Incident
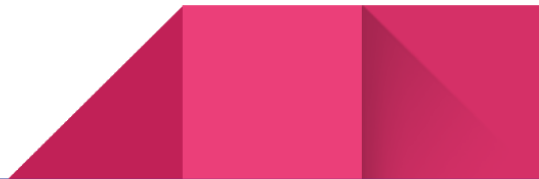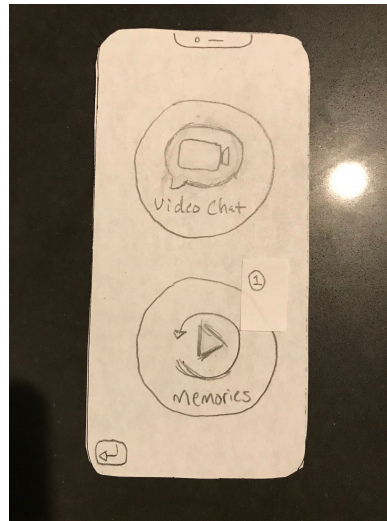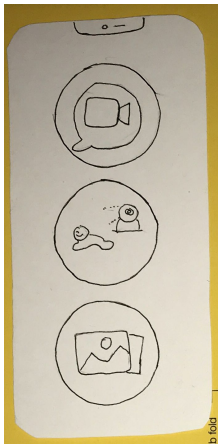
|		**Unclear Icons (Severity 2)** the following three icons were unclear to the user so we decided to add text below them to make it more clear.
		No Resulting UI (Severity 3) The resulting UI screens were not implemented for the help buttons on the following screens (Circled in red) so we implemented them. The resulting screen shows a list of questions that you can ask NanSEE.

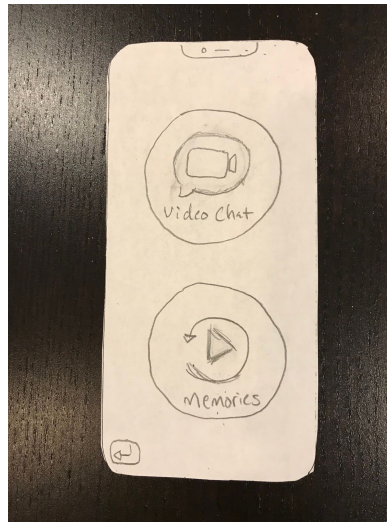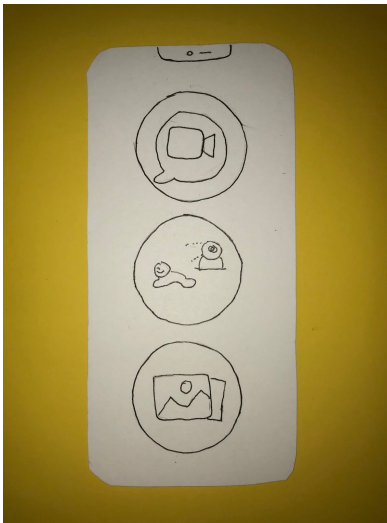|		
		Inbox Button changed to "About Child" **(Severity 3)** It was unclear what the inbox button did. Since it brings up the screen that shows the questions that NanSEE has about the baby we put a notification badge on to NanSEE when new questions are needed to be answered by the parent.
		No Resulting UI **(Severity 3)** The resulting UI screen was not implemented for the About Child buttons on the following screen (Circled in red) so we implemented them. The resulting screen shows a list of questions that NanSEE will ask you about your child.

Incidents from Test Three:

Before	After	Incident
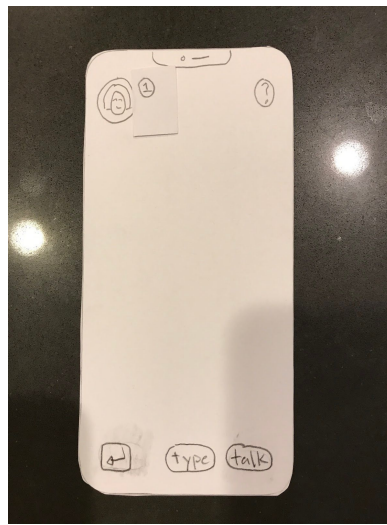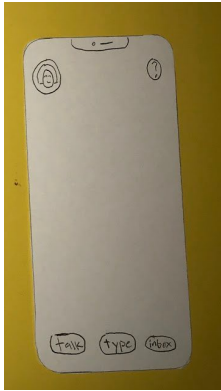
		No Return button (Severity 3) no return button on the following screen. We added a return button to the new prototype.
		No Return button (Severity 3) no return button on the following screen. We added a return button to the new prototype.