Research for Design to Improve Authentication in Stores

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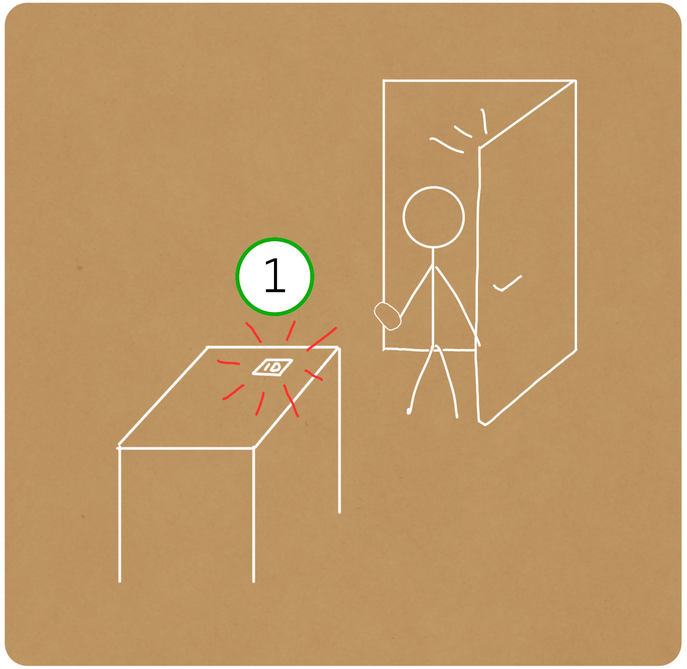
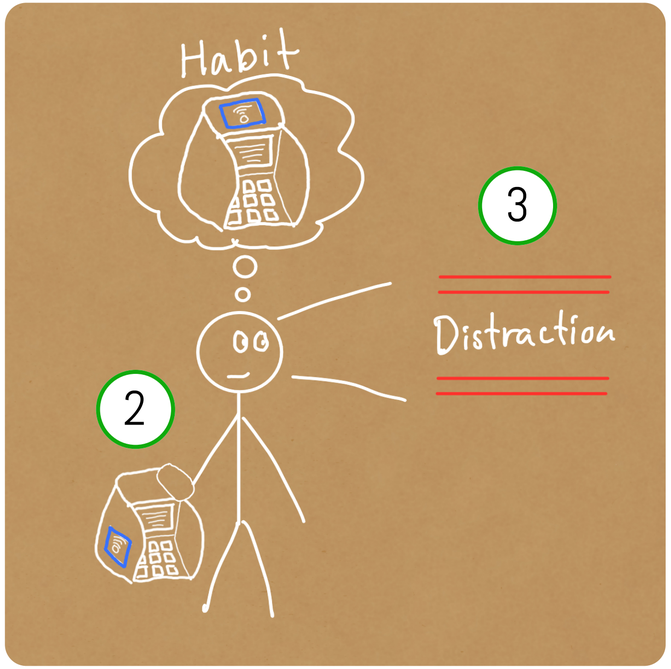
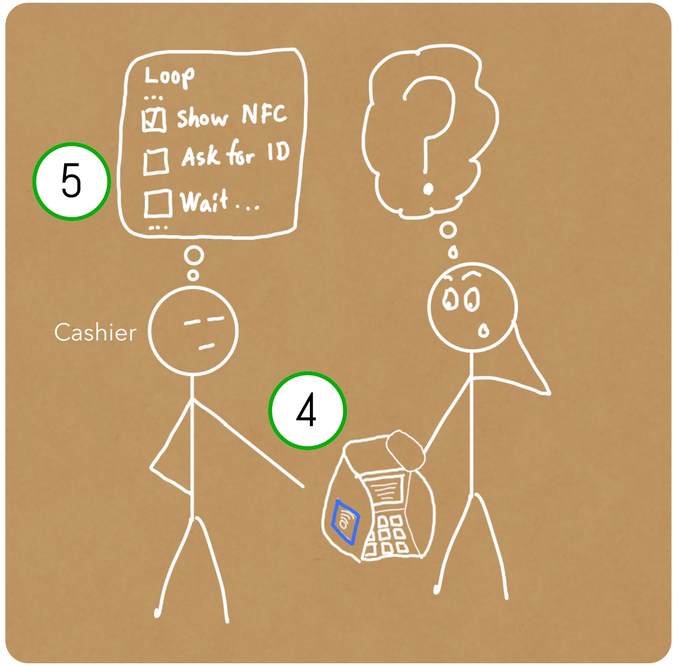
How the Process looks Today



Something distract the user's attention, which makes the user forget his/her physical ID at home



User may be distracted mentally or from environment, so places the phone by habit, incorrectly.



User is a little embarassed they didn't do the correct behavior, and then might feel stressed retreiving the ID

Opportunity for Improvement

1 The user potentially **forget to bring the ID**, which is an error we can try to help prevent by keeping it in the phone instead, one less thing to remember to bring

Opportunities for Improvement

2 There is too much variation in where the NFC tag is located, so easy to choose wrong location by habit and then get confused since the device doesn't give feedback

3 In addition to distractions it may be hard for visually impaired people, old people, children to find the NFC tag

Opportunities for Improvement

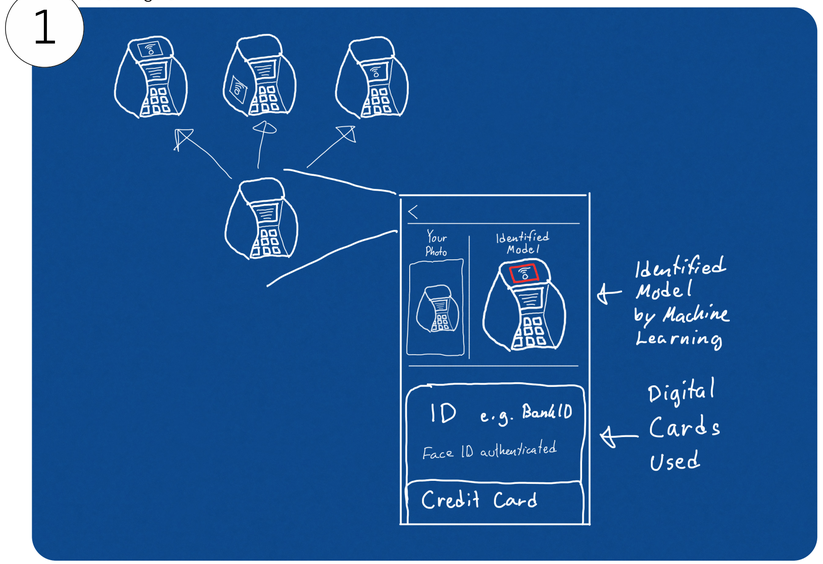
4 When you put the card in the wrong place you don't get feedback from the machine, only after a while from the cashier, which must be bad user experience for the cashier to have to repeat many times per day

5 When the user needs to provide ID, the **interaction to get the ID from e.g. pocket is slow** and if the user forgot his/her ID it might feel embarassing since other people stand in line are watching which might give a bad user experience

Interactions for digital authentication & access

1

See Page 3



When you've authenticated yourself on your phone (ID and Credit Card e.g.) the phone's camera identifies what kind of access point device and shows an image of where to put your phone to gain access.

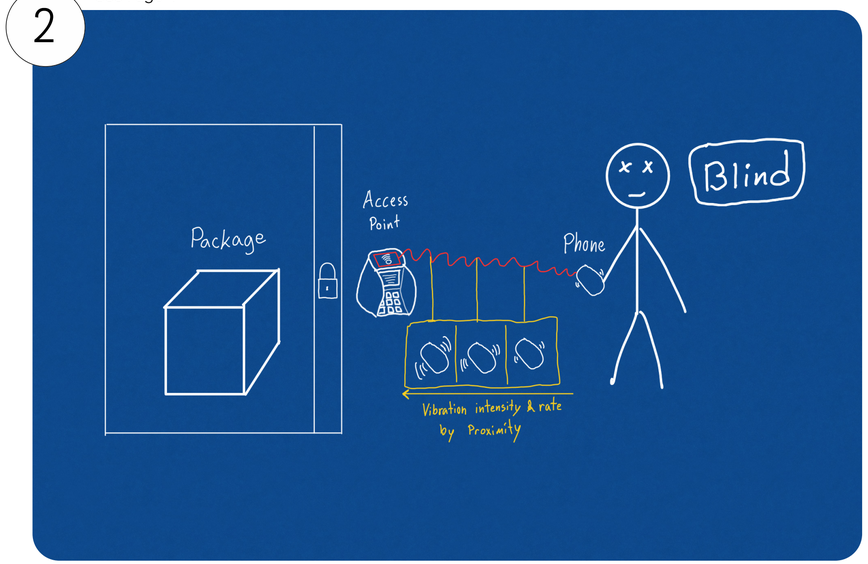
Potential Problems to investigate

The user have to point the camera to the device which perhaps is slower than to just look for the symbol

Authenticate ID must happen soon before you access at the NFC tag with the device, otherwise somebody could've stolen it, i.e. held it to real ID person's face, store the authentication until they've gone bought something

2

See Page 4



Phone vibrates more often and more intesively the closer it is to the NFC chip, in order to help the user find the access point

Potential Problems to investigate

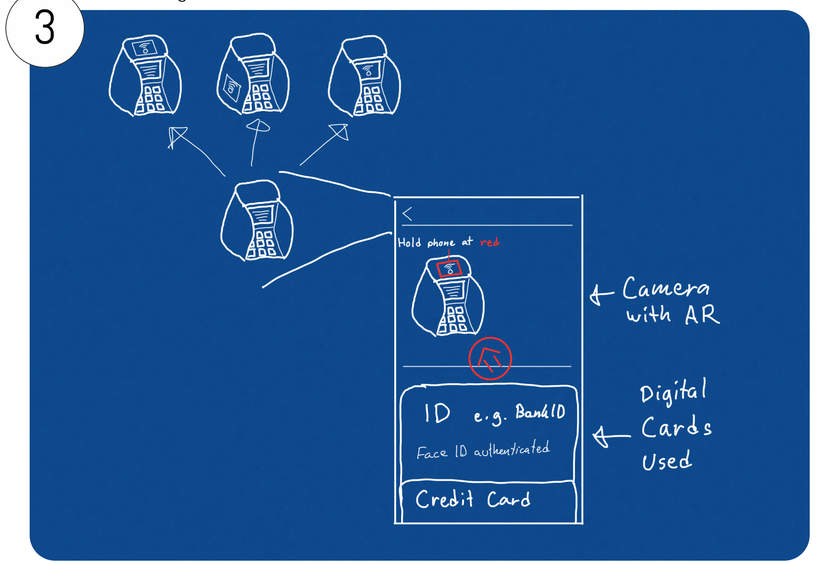
Hardware to be able to track proximity?

Would users feel privacy when the device can track exactly where they are? Need good software security etc

Enough with more intensity and rate the closer you are, or do you need some kind of directional guidance too, e.g. a "compass" on screen (wouldn't work for blind people obviously).

3

See Page 5



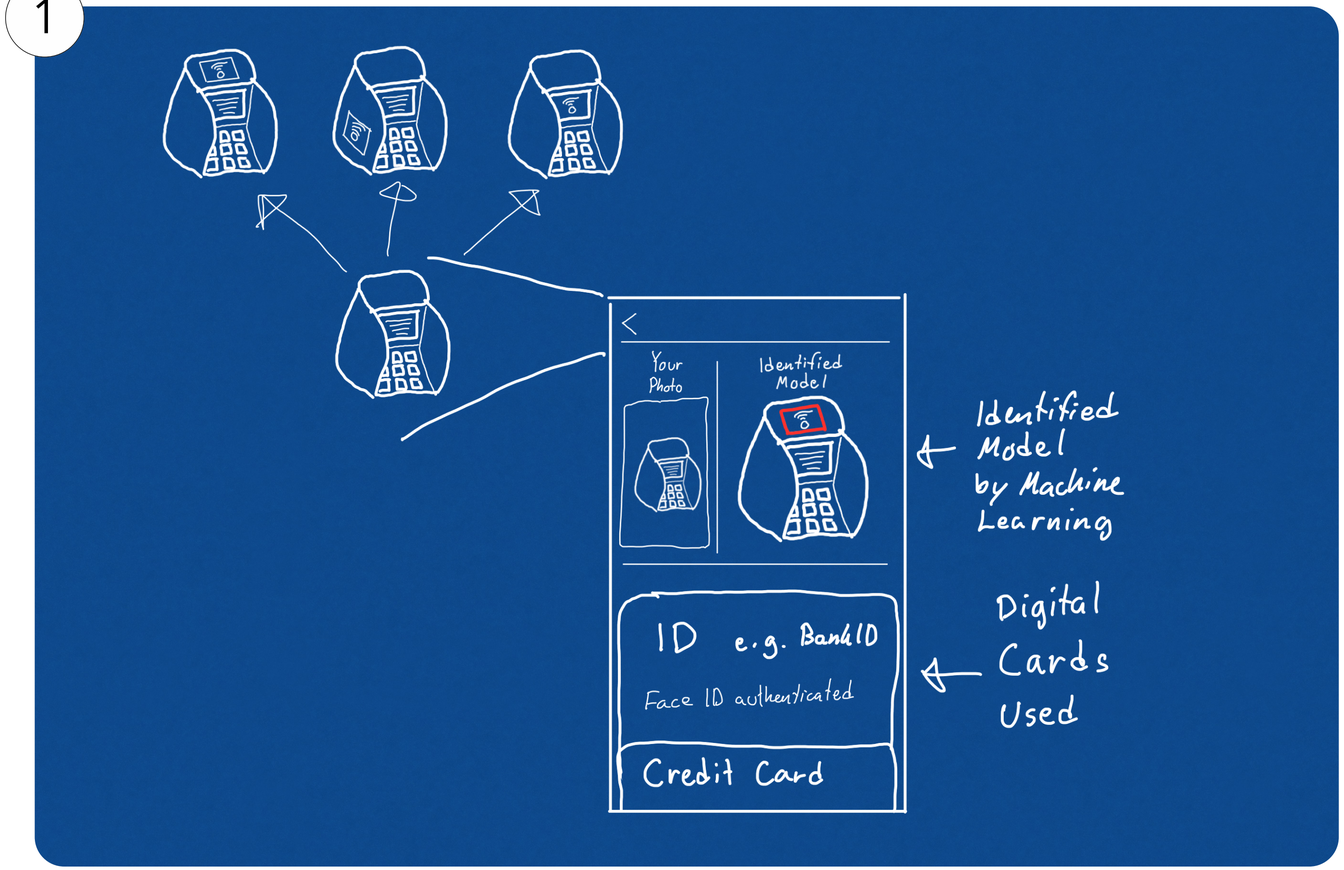
When you've authenticated yourself on your phone (ID and Credit Card e.g.) the phone's camera identifies a pattern, highlights the pattern through AR technology and clearly shows where the NFC tag is in order to assist the user.

Potential Problems to investigate

The user have to point the camera to the device which perhaps is slower than to just look for the symbol. However if the AR location of the tag is available the navigation arrow might be able to show which direction to hold your device

Authenticate ID must happen soon before you "blip the device, otherwise somebody could've stolen it, i.e. held it to real ID person's face, store the authentication until they've gone bought something

1



When you've authenticated yourself on your phone (ID and Credit Card e.g.) the phone's camera identifies what kind of access point device and shows an image of where to put your phone to authenticate.

Desirability

Judging from the obsevartions, it does seem to be an issue, people are not sure where the NFC tag is and it creates confusion, especially among elderly people. Thus it seems to be needed and the idea solves the issue.

Feasibility

Considering this is a unique and innoative idea, there are things we need to learn in order to implement, it will not be easy and we might have to find a slightly easier problem to have time to finish. Feedback on how well this needs to work, or if concept is enough is welcome!

Viability

It solves an issue but it is hard to tell how it will look in the future, it can be adapted as products evolve.

Plan

Create an app that with the help of the camera component and some machine learning(library/plug in) learns to identify the machine model that has an NFC chip and then show a picture from that manual that clearly describes where to put your phone

This is done by providing machines with different location on the NFC tag, just like it is normally and then train the model. This approach assumes the user has a smartphone and a functioning camera.

Research question samples

Is it possible to integrate ID into a phone?

Is possible to use face recognition to authenticate digital ID?

Does there exist any ML libraries that support this approach?

Methods

Sharp, H., Rogers, Y., & Preece, J. (2019). 8. Observation. In Interaction design: Beyond human-computer interaction. Indianapolis, IN: Wiley.

Observation

Direct Observation in the Field

Go to some stores, observe what problems in the process people have.

Direct Observation in Controlled Environment

Make a cardboard box prototype that represents the NFC access point, and then let people try our prototype.

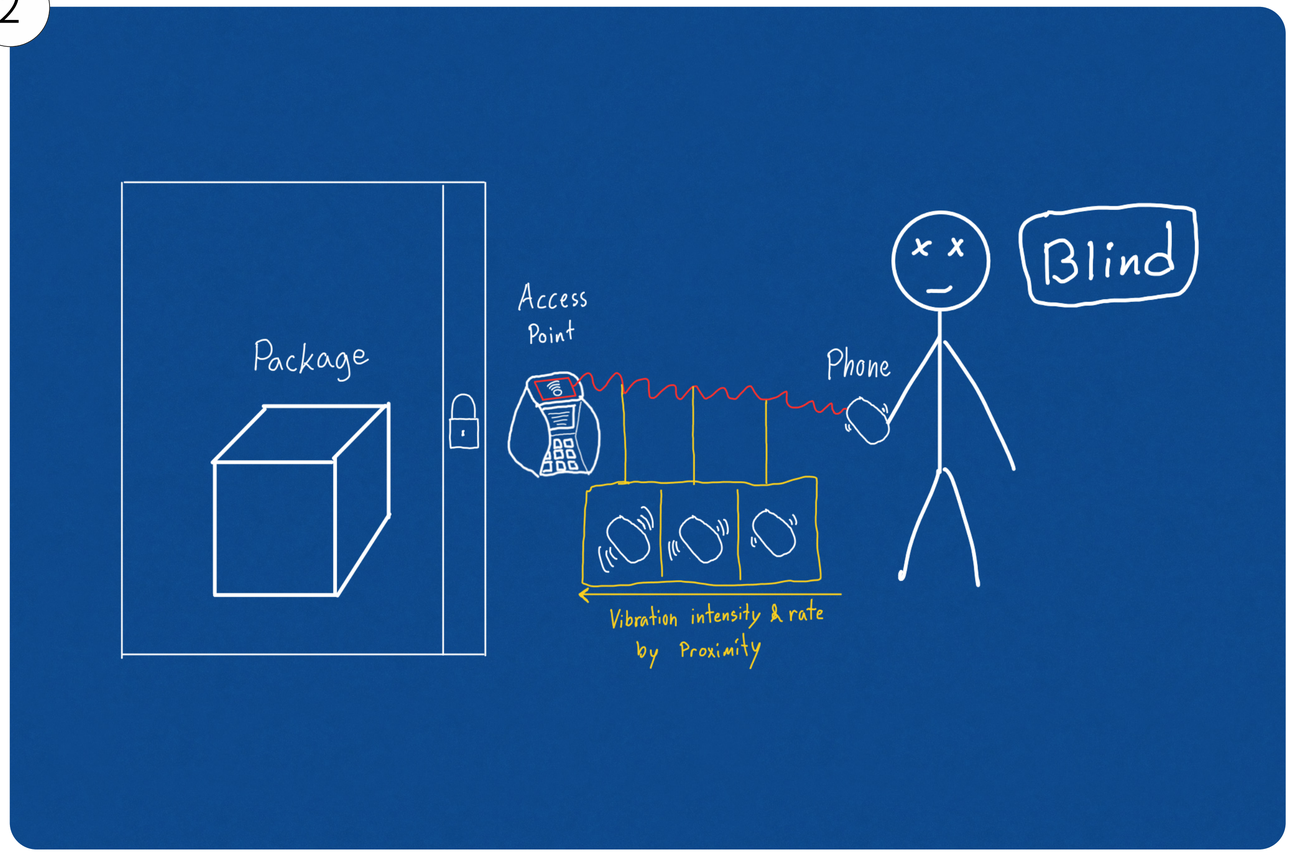
Participation

Use past experience to recall lacking interaction experiences.

Designer Lens

Cognitive Walkthrough of the process with different personas in mind to find additional "bugs"

2



The user's phone vibrates more intesively and more often the closer it is to the NFC chip in order to help the user find the NFC chip to authenticate and access.

Desirability

Judging from the obsevartions, it does seem to be an issue, a blind person who would like to do his/hers own shopping is limited as unless they memorize the location, have no idea where the NFC tag is and requires help.

Feasibility

Considering this is a more hardware approach, further research has to be done in order to assess if it indeed is feasible, this is definitely an out of comfort solution.

Viability

It is a solution that is directed towards a miniority and very niche, however it has the potential to upgrade the user experience for a group of humans greatly.

Plan

To create an app that with the help of sensors can sense where the NFC tag is(direction) and vibrates in order to alert the user when it's getting closer

This approach assumes the visiually impaired does their own shopping and has a smartphone, the app will help locate the NFC tag and make the process both quicker and smoother.

Research question samples

Can we test if these problems are significant enough to make it worth to add more features to help?

Can vibration help you locate effectively? How do people interpret it?

Do visiaully impaired people do their own shopping?

Methods

Sharp, H., Rogers, Y., & Preece, J. (2019). 8. Observation. In Interaction design: Beyond human-computer interaction. Indianapolis, IN: Wiley.

Observation

Direct Observation in the Field
Go to some stores, observe what problems in the process people have.

Direct Observation in Controlled Environment
Make a cardboard box prototype that represents the NFC access point, and then let people try our prototype.

Interview

Interview a blind person to get their opinion and experience

Extremes

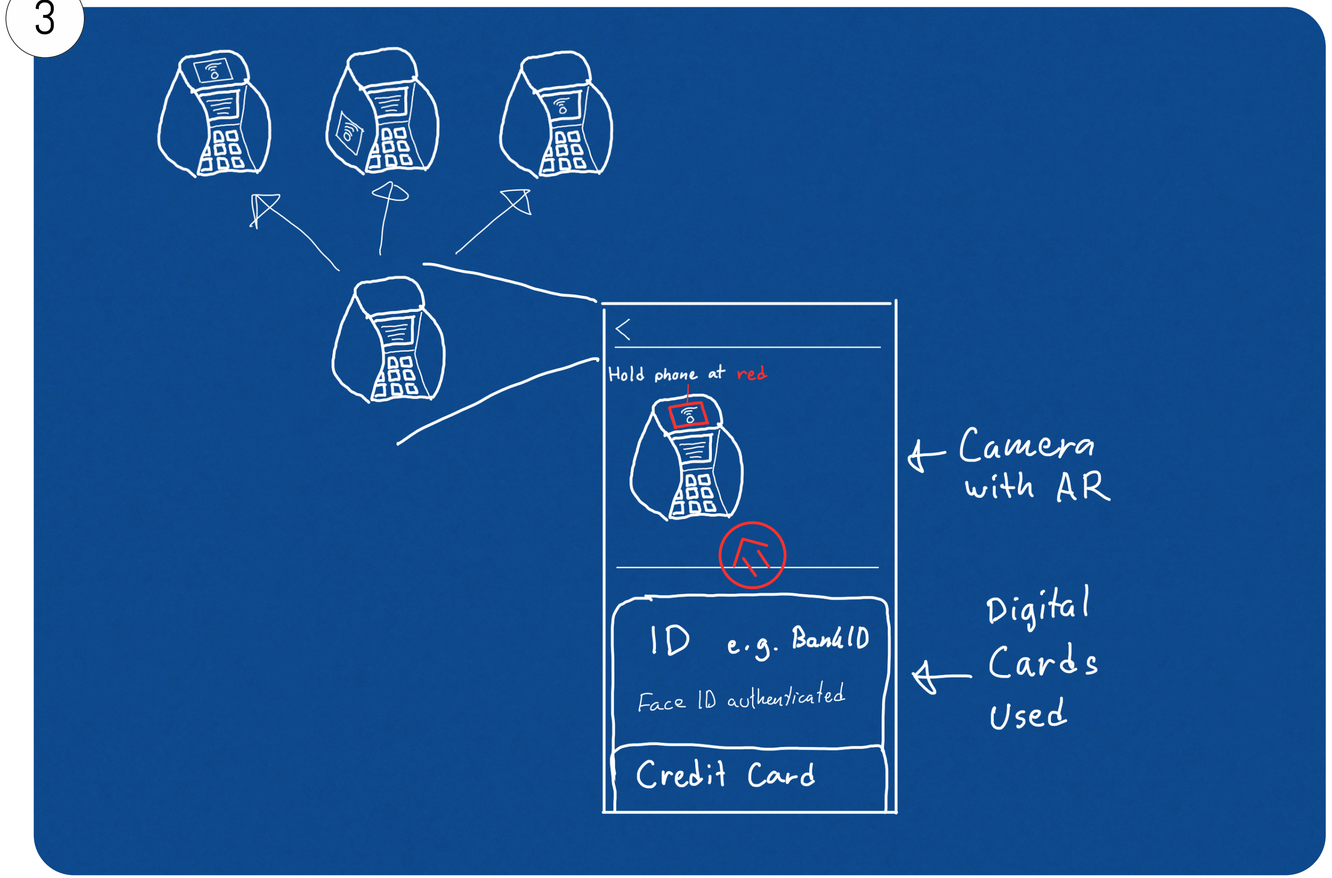
Research if blind people even go to stores and if they don't, would their life satisfaction increase if they could? Is it something they want to be able to do?

Initially close our eyes and try to do the interactions without seeing,
then perhaps later do direct observation in controlled experiment for a blind person.

Participation

Use past experience to recall lacking interaction experiences.

3



When you've authenticated yourself on your phone (ID and Credit Card e.g.) the phone's camera identifies a pattern, highlights the pattern through AR technology and clearly shows where the NFC tag is in order to assist the user.

Desirability

The concept does solve the alleged issue, it would clear up the confusion about where the NFC tag is located and its usable at "Fast check-out counter" which is even more desirable as there is no cashier to help.

Feasibility

Considering this is a unique and innoative idea, there are things we need to learn in order to implement, it will not be easy and we might have to find a slightly easier problem to have time to finish. Feedback on how well this needs to work, or if concept is enough is welcome!

Viability

AR technology is fairly new and has potential, this is definitely something that could be used in the future the way technology is headed now.

Plan

Create an app that with the help of AR techonlogy and the camera, is able to distinguish, with the help of machine learning, between the different models of access point device and show with AR where the NFC tag is placed.

This approach assumes the uses has a smartphone available with ARcore technology and has a functioning camera, with the help of machine learning the application will locate the NFC tag and through AR technology highlight where the correct area is.

Research question samples

Is it feasable to assume people have phones with ARcore?

Is this a feasable technology to use, will it be too time consuming?

Are people comfortable with using AR in public in order to find the NFC tag?

Methods

Sharp, H., Rogers, Y., & Preece, J. (2019). 8. Observation. In Interaction design: Beyond human-computer interaction. Indianapolis, IN: Wiley.

Observation

Direct Observation in Controlled Environment

Make a cardboard box prototype that represents the NFC access point, and then let people try our prototype.

Direct Observation in the Field

Go to some stores, observe what problems in the process people have.

Extremes

Someone without a smartphone will not be able to use the product, it is directed towards smartphone users.

If the phone has taken damage, the camera might be broken and the user will be unable to user the product.

Participation

Use past experience to recall lacking interaction experiences.