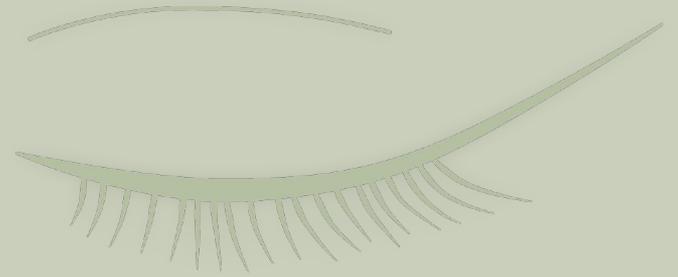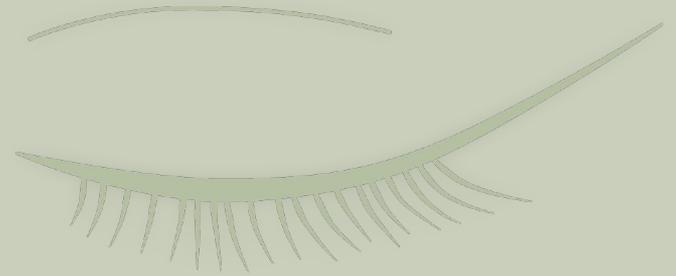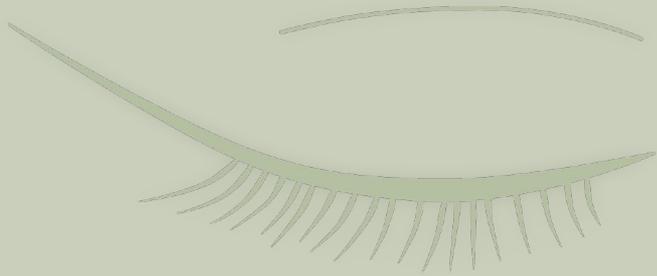# Cepi

Audio Evidence Gathering App for Domestic Violence Victims

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Project Descriptions in text have been added to the speaker notes session

Agenda

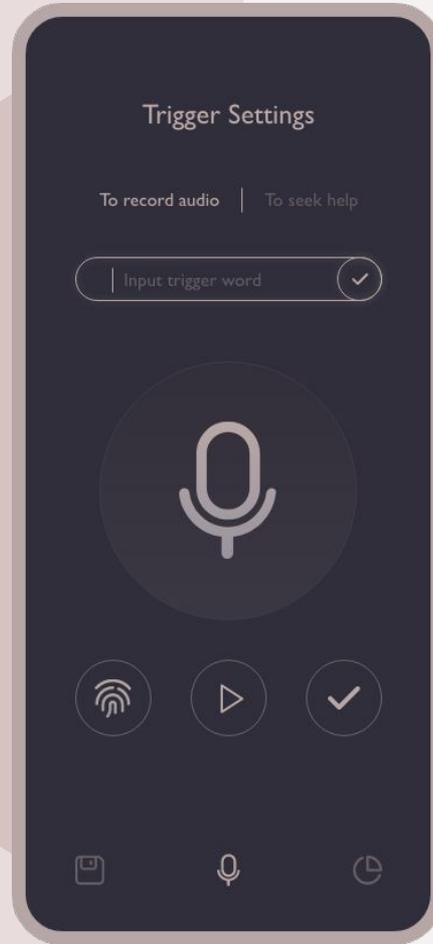What is the issue

Who is it for

How do we propose to solve it

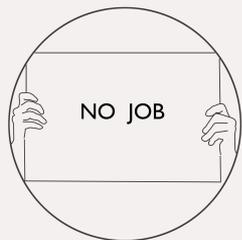Why is it needed

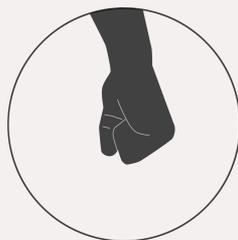When certain situations occur...

Action Plan

Further impacts

Issue

Unemployed

Manipulative
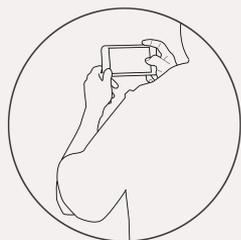
Hard to gain evidence

Cultural context

Victim-low self esteem

Target audience

Female victims

Access to phone
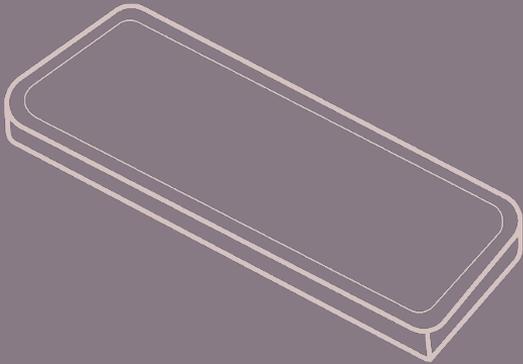
Cepi-Trigger words

Audio Evidence

Emergency Call

Trigger Settings

To record audio | To seek help

Input trigger word

Cepi-My evidence

Safe Storage

Context Description

My Audio Evidence

Recording 2
2020.12.12

Add Descriptions

Recording 1
2020.12.12

Add Descriptions

Description

In what context it happened?

Who can be heard in the audio?

What did they say?
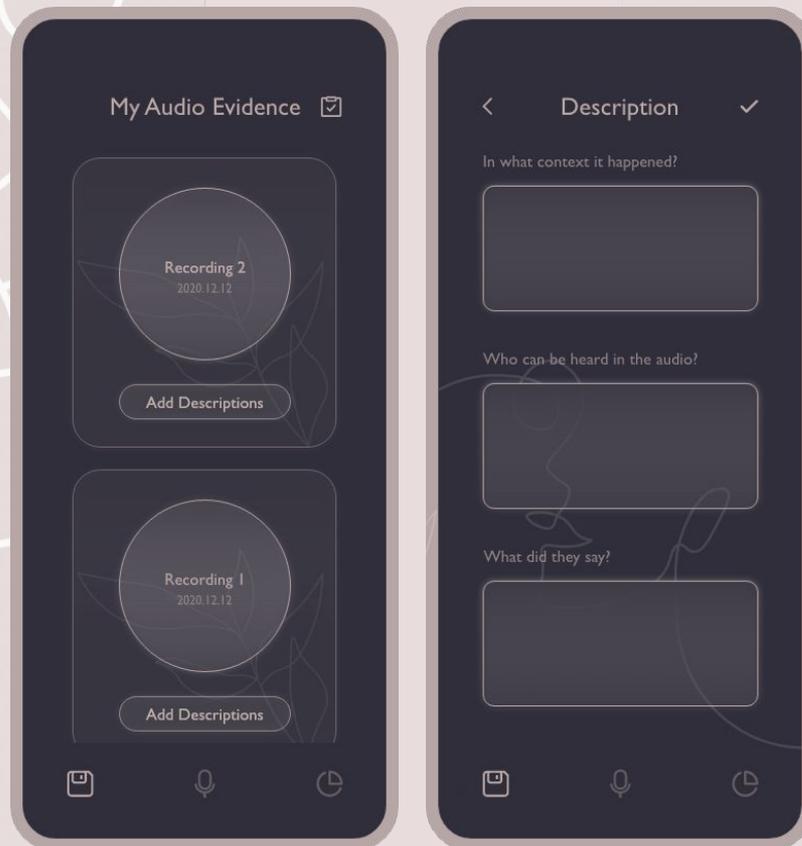
Cepi-AI analysis

Abusive language detection

Emotion cues

AI analysis

Recording 2
2020.12.12

Abusive words detected

| Threatening: | hit, kill |

| Insulting: | idiot |

| Manipulative: | your fault |

Emotions detected

Fear | Anger

Estimated Usage in Trial
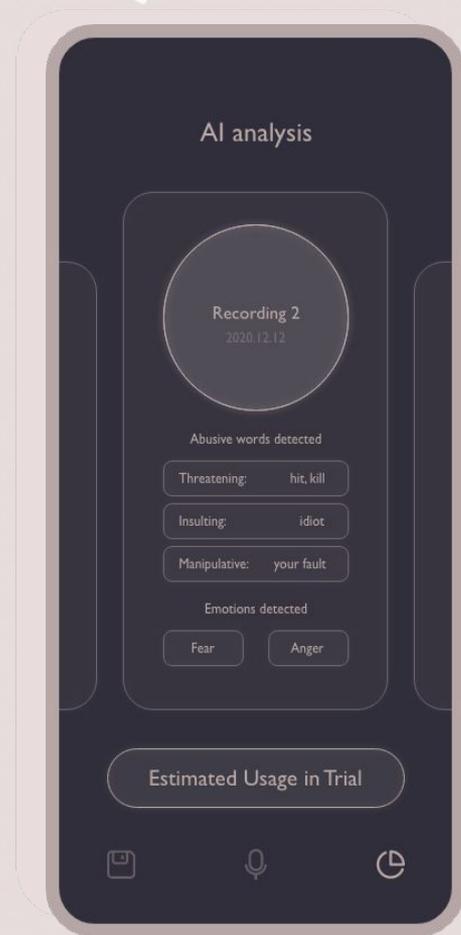
Cepi-What peers achieved

Trial result of peers

Inform decision making

What Peers Did

Report

85% of people having evidence with similar validity reported their cases

got a protective order

100% of people having evidence with similar validity got a protective order

got a conviction

80% of people having evidence with similar validity got a conviction

got increased payout in divorce
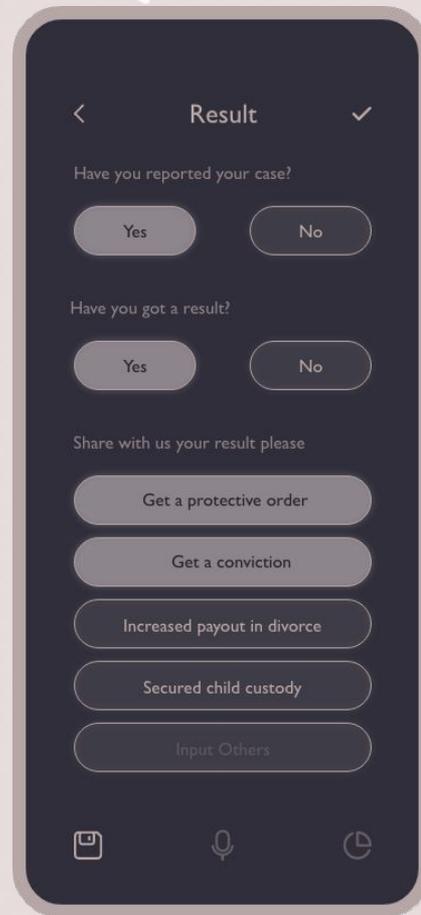
Cepi-Trial result sharing

Help others make decisions

Collectively smarter and stronger

Result

Have you reported your case?

Yes   No

Have you got a result?

Yes   No

Share with us your result please

Get a protective order

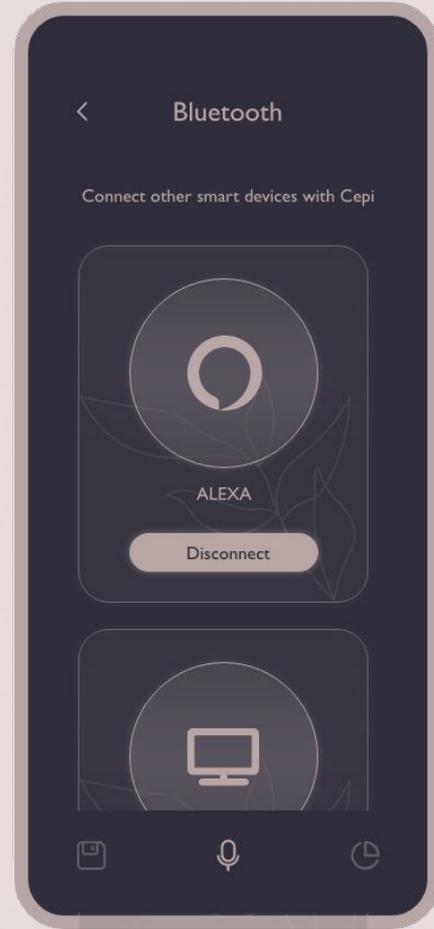Get a conviction

Increased payout in divorce

Secured child custody

Input Others

Cepi-Connect other devices

Suspicious abusers?
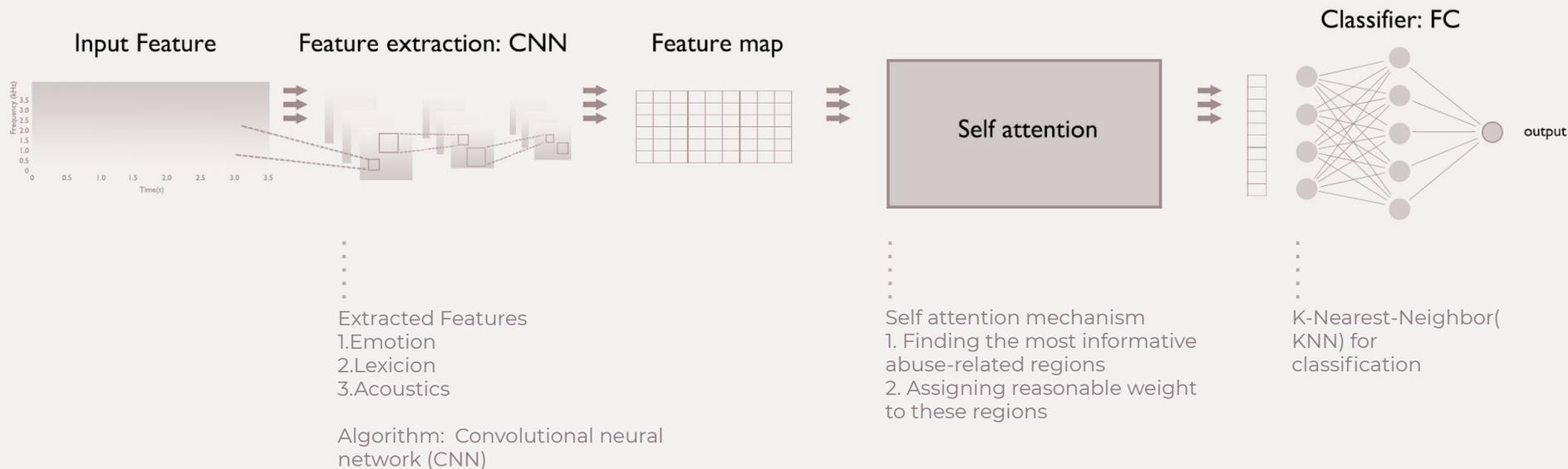
Trigger word detection demo
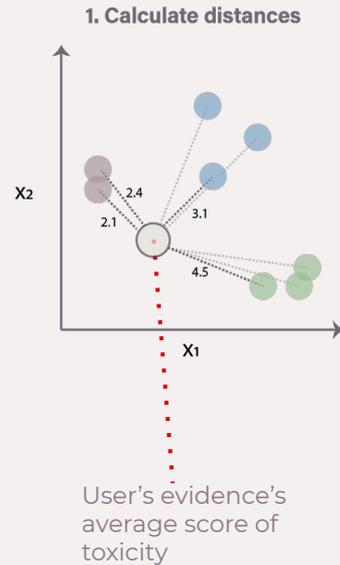
Please check "demo" video in the folder if it is not playing properly here
https://drive.google.co m/drive/folders/1O0dHB Bkdvep EYMLTy-McJ08- s5ryLRwr

Algorithm

Record wake up word

Wake up word Detection

Microphone Input

VAD

No

Someone Speaking?

Yes

No

Check the word
Good or not

Yes

Make GMM HMM

Word
Model
Pool

Model 1
Model 2
.
.
.
.

Microphone Input

VAD

No

Someone Speaking?

Yes

Make GMM HMM

Check Model

No

Wake up successful

Algorithms Audio-based Toxicity Detection

Input Feature

Feature extraction: CNN

Feature map

Self attention

Classifier: FC

output

Extracted Features
1.Emotion
2.Lexicion
3.Acoustics

Algorithm: Convolutional neural network (CNN)

Self attention mechanism
1. Finding the most informative abuse-related regions
2. Assigning reasonable weight to these regions

K-Nearest-Neighbor(KNN) for classification

Audio-based Toxic Language Detection
(Microsoft Research, 2020)

Algorithms *"Peer" Grouping*

0. Look at the data

X_2

X_1

Other users

1. Calculate distances

X_2

2.4

2.1

3.1

4.5

X_1

User's evidence's average score of toxicity
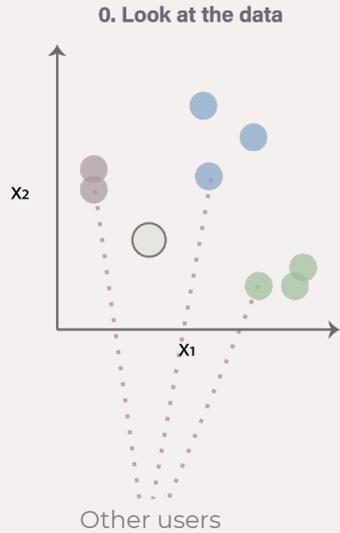
2. Find neighbours

Point	Distance	
	2.1	→ 1st NN
	2.4	→ 2nd NN
	3.1	→ 3rd NN
	4.5	→ 4th NN

3. Vote on labels

Class	# of votes	
	2	Class ⬤ wins the vote!
	1	→ Point ⬤ is therefore predicted to be of class ⬤
	1	

Photo via kdnuggets.com

Why is it needed?

Reflects on the abusers' true
personality and intentions

Physical, tangible and almost
unimpeachable evidence
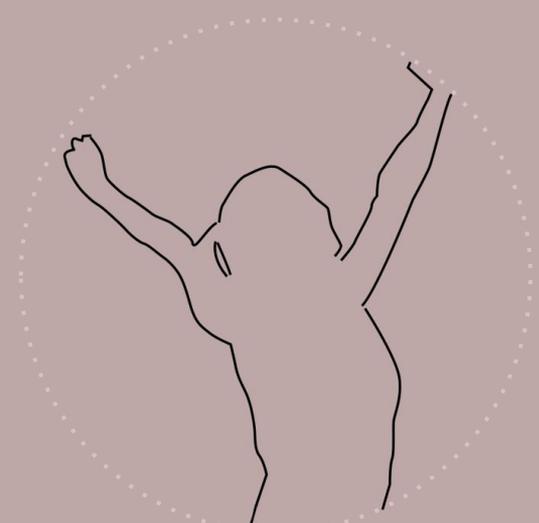
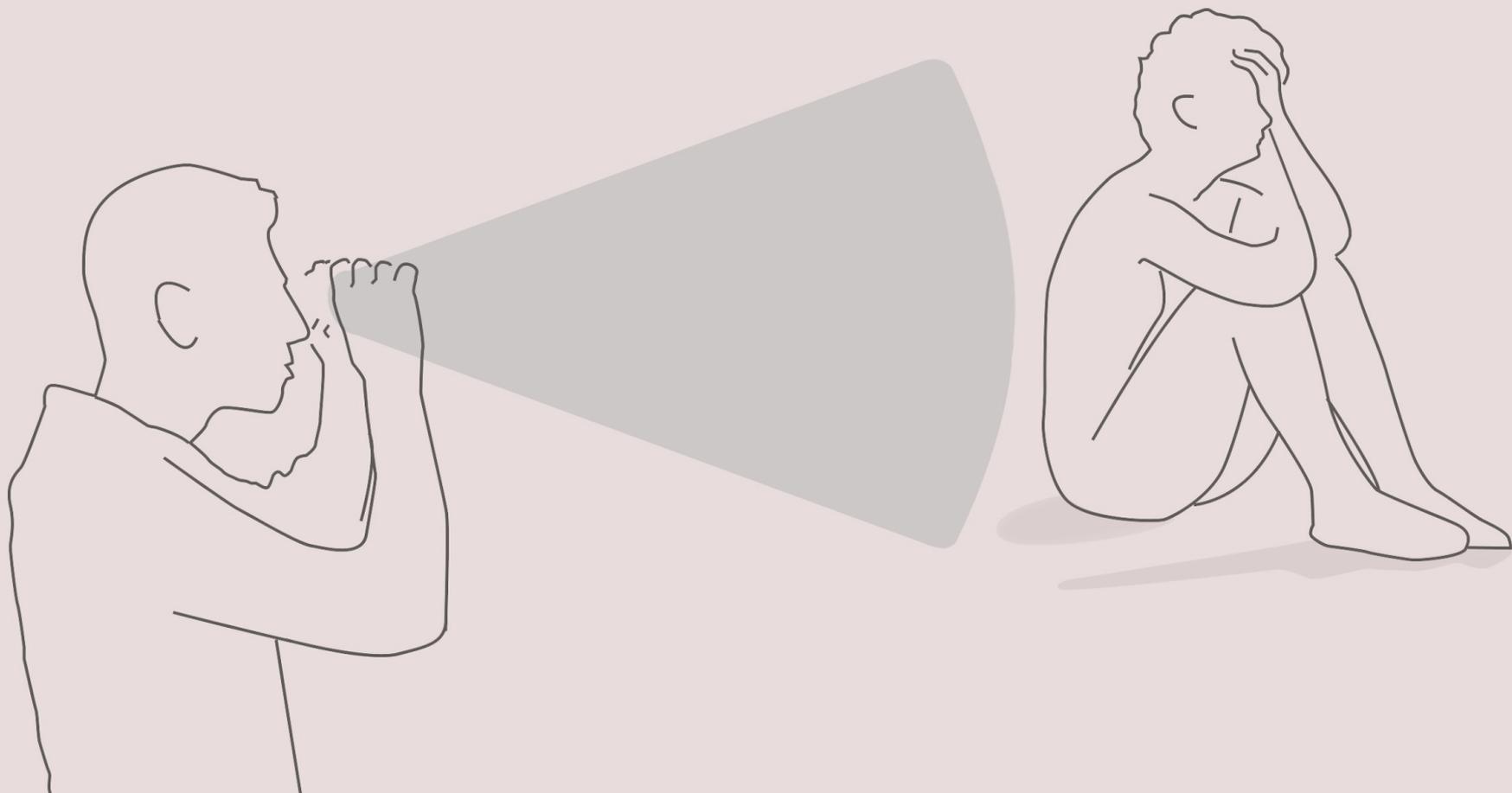Build and gain back confidence

What can recordings do?

Protective order

Conviction

Longer jail sentence
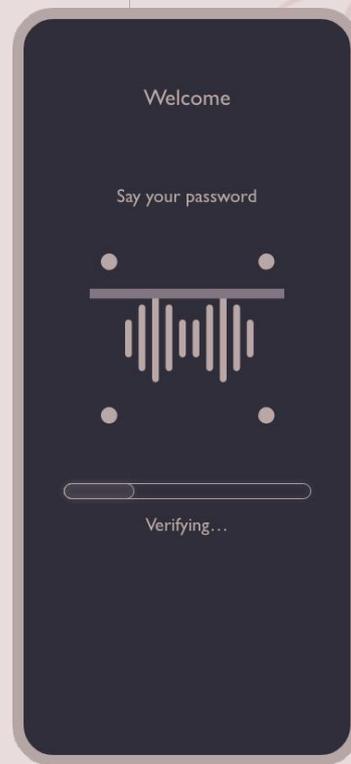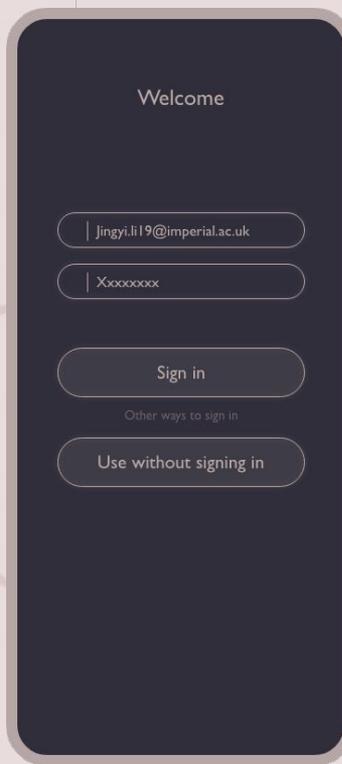
Increase payout in a divorce

Scenario

Scenario
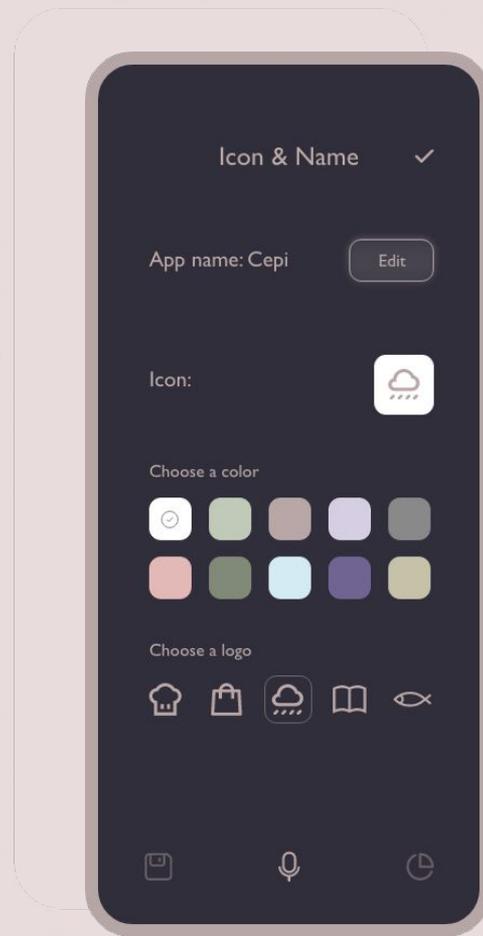
Disguise- cooking app

Two ways to sign in for cooking app

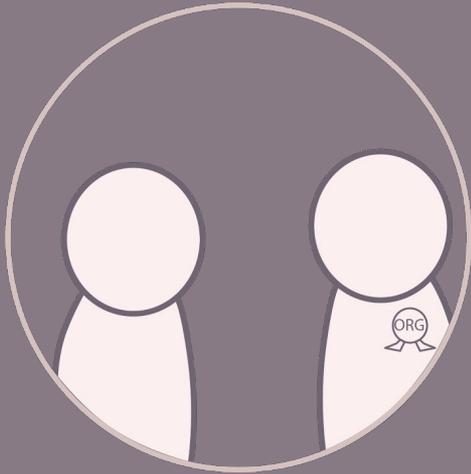Actual sign in using voice recognitions
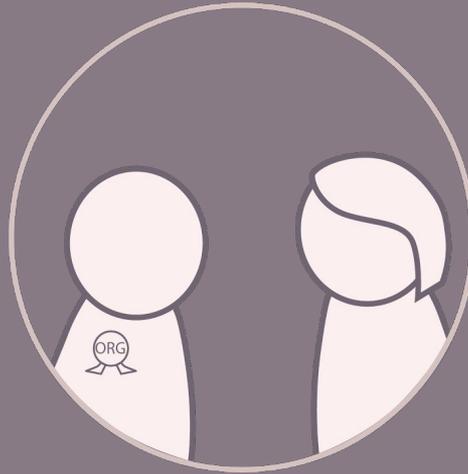
Scenario

Change icon name and colors

Action Plan

Initial: Offline Advertisement

On going: word of mouth (WOM)

Co. to Org.

Org. to Victim

Victim to Victim
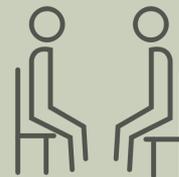
Additional Impacts

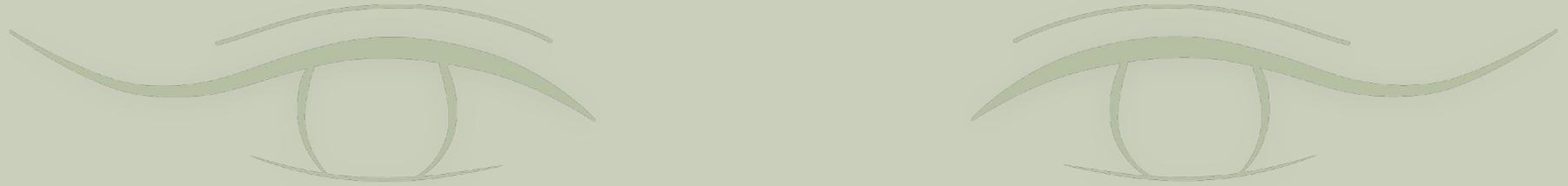Generating new data to gain insights

Law enforcement

Researchers

Psychiatrist

Questions?

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Appendix 1-Technical Handover

In another powerpoint

Appendix 2-Information Architecture

Private platform for victims to collect admissible evidence

Who am I?

Sign in

Trigger Word Settings

Trigger A (Normal)

Trigger B (Emergency)

Set up a new trigger

How could trigger word help you?

Read a sentence in a normal tone

Type your word

Record the word/excited utterance

My Recordings

Add description

My previous

AI Analysis

Toxicity (Lexicons & emotions)

What people having evidence with similar validity did

Appendix 3-User Testing

Appendix 4-Existing Apps and Platforms

Appendix 5- Categorizing Existing Apps and Platforms

Wake-up Call	Rick Assessment Info collecting	Witness	Evidence	Report	Support & protection
	How to decide if I'm in a dangerous relationship?	Private context lack of bystanders	Difficulties to collect evidence when being monitored, threatened, isolated, and even injured	'Reporting might create more problems than it solves'	How do I go about my life after leaving a toxic partner?
	Aspire News		Victim Voice	One love	Safe Night
	Sojourner Peace		platform for victims to upload text and images		Love Is Respect
	One love				Sojourner Peace
	My Plan				Danger Assessment
	Love Is Respect				
	Danger Assess-ment				

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• https://www.nhs.uk/live-well/sexual-health/help-after-rape-and-sexual-assault/
•https://www.rsna.org/en/news/2019/February/Identifying-Domestic-Violence-Victims

Helplines:
• https://www.itv.com/thismorning/articles/sexual-harassment-helplines

Guide for friends and family:
• https://www.pcar.org/sites/default/files/resource-pdfs/friends_and_family_guide_final.pdf

Data:
• https://www.nsvrc.org/sites/default/files/publications_nsvrc_factsheet_media-packet_statistics-about-sexual-violence_0.pdf
•https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/domesticabuseinenglandandwalesoverview/november2019#:~:text=According%20to%20the%20Crime%20Survey,last%20year%20(Figure%201).&text=The%20remaining%2057%25%20(746%2C219),as%20domestic%20abuse%2Drelated%20crimes.
•https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/domesticabusevictimcharacteristicsenglandandwales/yearendingmarch2019

Screening tools:
• https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2688958/

Charity:
• https://www.mind.org.uk/information-support/guides-to-support-and-services/abuse/sexual-abuse/

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• https://zhuanlan.zhihu.com/p/110667989

• https://acpinternist.org/archives/2009/03/abuse.htm
• https://www.nj.gov/oag/dcj/njpdresources/dom-violence/module-four-student.pdf