BXA VanGuard

Elevator Pitch for BVG: How can the safety of women in autonomous public transport be strengthened?:

An all-encompassing app geared towards informing women about neighbourhood safety, safe route planning, child-friendliness ratings, and displaying other safety indicators based on robust, verified, open-source map data.

The proportion of **female passengers** on Berlin's public transport network is around **58%** (SrV2018/Kantar).

Everyday 11 such incidents occur on an average.

Nearly **4000 incidents of sexual harassment and assault** on public transport have been reported in 2023 in Berlin. (DW, 2023).

50% of women have experienced some form of sexual harassment while using public transport. (ITF, 2022)

"I hope I reach home safely, why am I the only other passengers here..."

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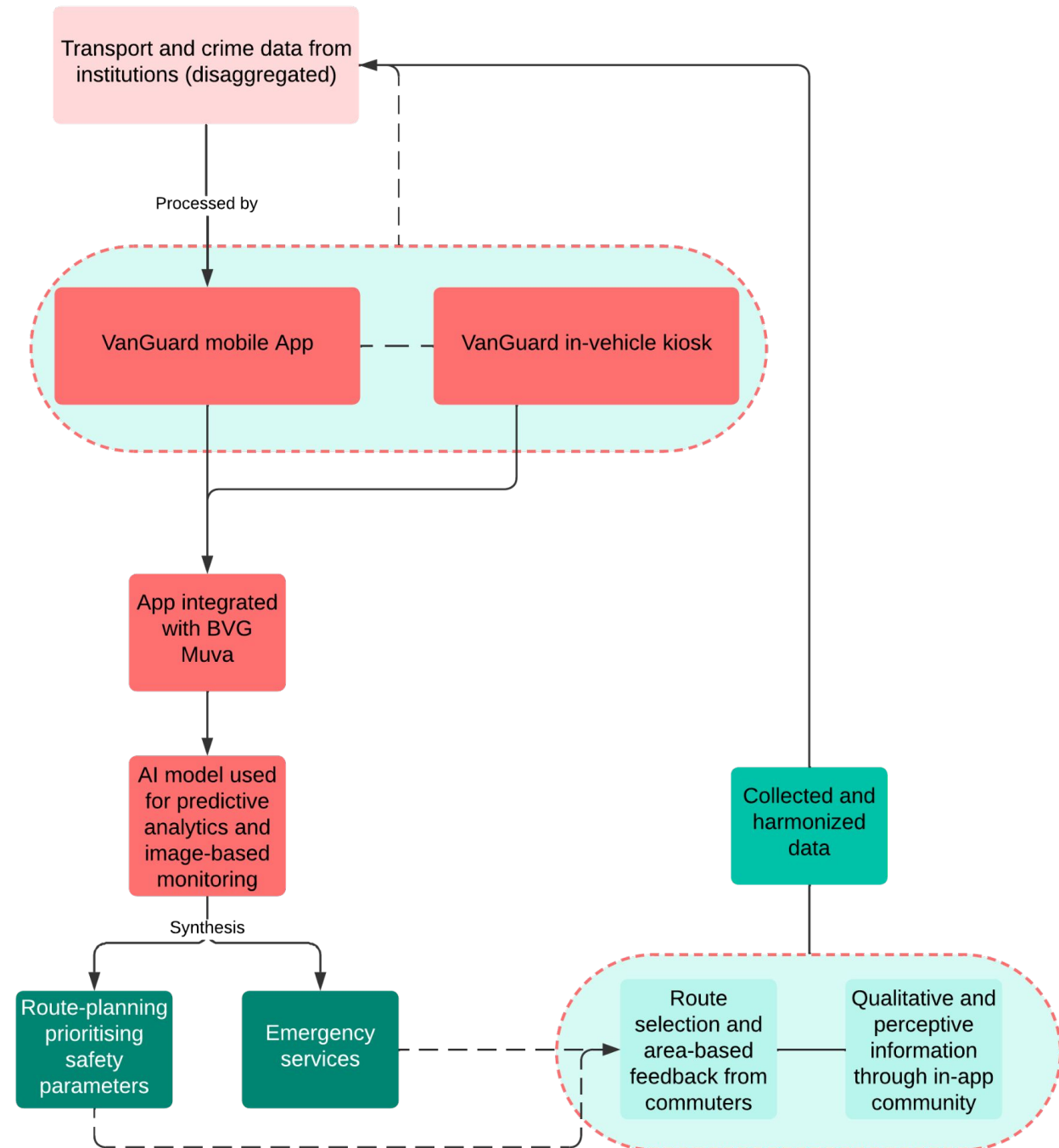
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VanGuard™ an all-encompassing, AV-integrated safety app that takes care of safety for women, children, elderly and gender minorities not only during travel, but before AND after their travel – through the power of data integrated with the AV console.

Our USP: The VanGuard™ app takes a holistic view of safety, and ensures the same before, during and after each trip a passenger takes.
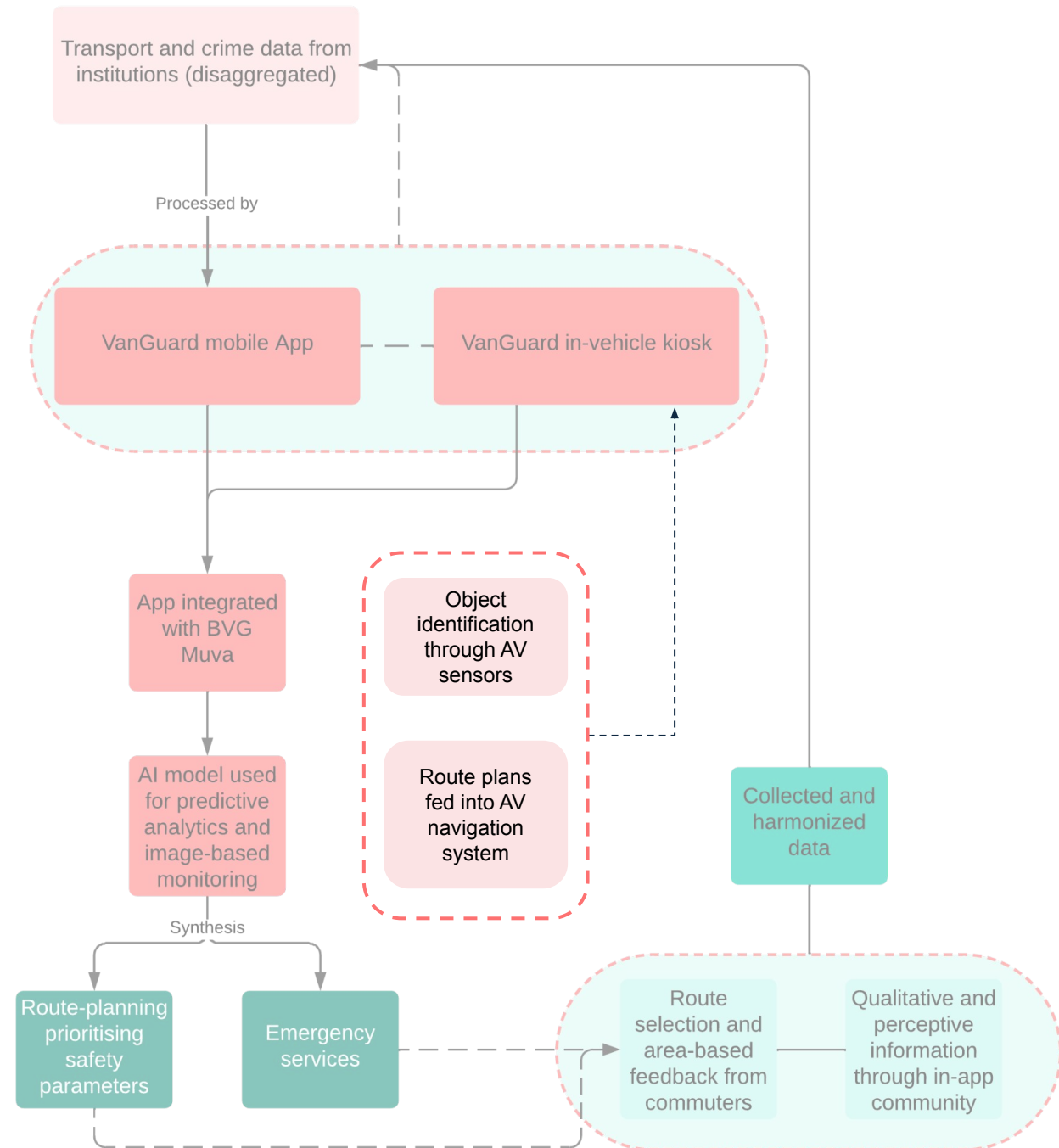
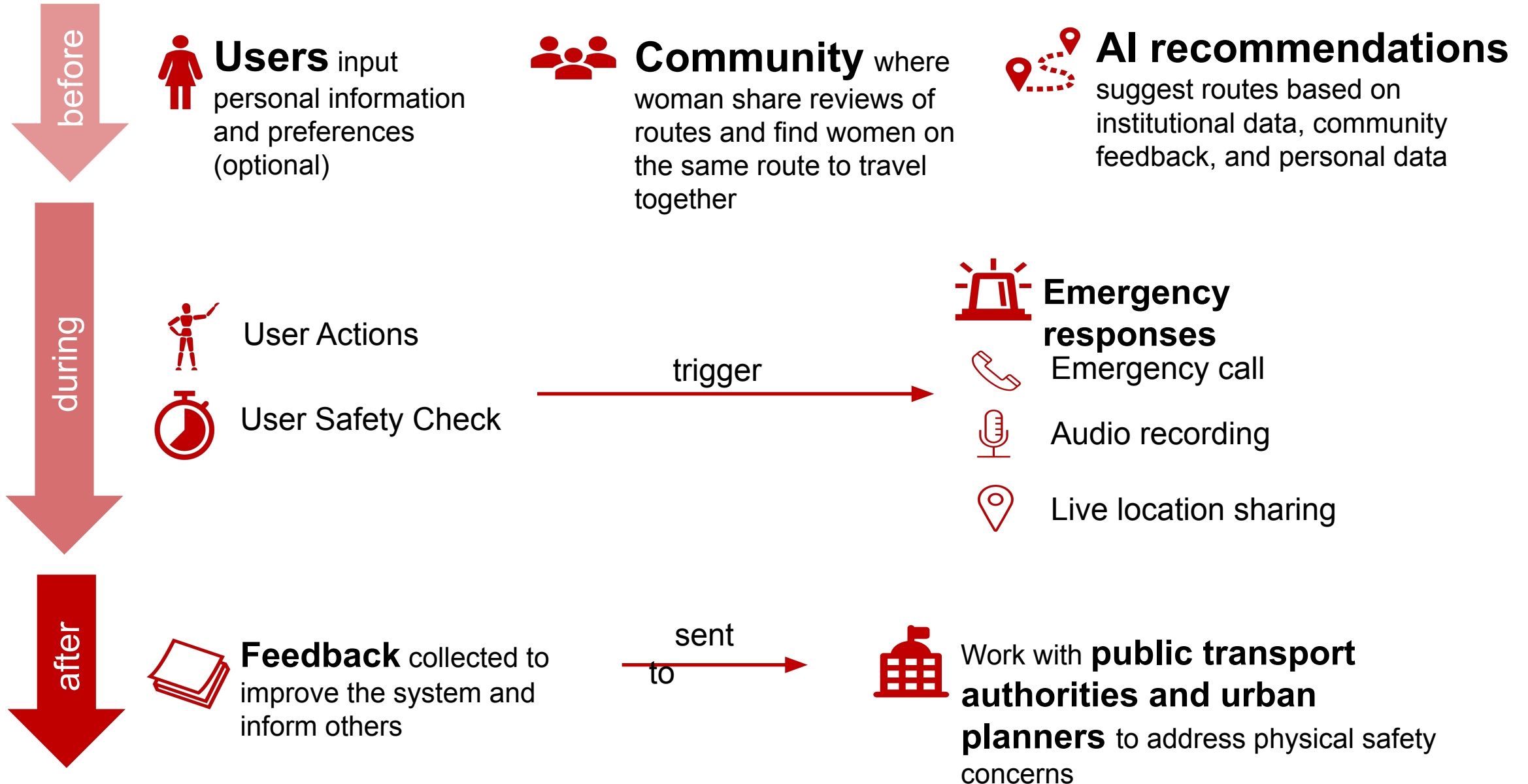"I hope I reach home safely, why am I the only other passengers here..."

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Transport and crime data from institutions (disaggregated)

Processed by

VanGuard mobile App

VanGuard in-vehicle kiosk

App integrated with BVG Muva

AI model used for predictive analytics and image-based monitoring

Synthesis

Route-planning prioritising safety parameters

Emergency services

Collected and harmonized data

Route selection and area-based feedback from commuters

Qualitative and perceptive information through in-app community

How our solution works

Transport and crime data from institutions (disaggregated)

Processed by

VanGuard mobile App — VanGuard in-vehicle kiosk

App integrated with BVG Muva

AI model used for predictive analytics and image-based monitoring

Object identification through AV sensors

Route plans fed into AV navigation system

Synthesis

Route-planning prioritising safety parameters

Emergency services

Collected and harmonized data

Route selection and area-based feedback from commuters

Qualitative and perceptive information through in-app community

before

Users input personal information and preferences (optional)

Community where woman share reviews of routes and find women on the same route to travel together

AI recommendations suggest routes based on institutional data, community feedback, and personal data

during

User Actions

User Safety Check

trigger →

Emergency responses

Emergency call

Audio recording

Live location sharing

after

Feedback collected to improve the system and inform others

sent to →

Work with **public transport authorities and urban planners** to address physical safety concerns

Safety before the trip

Getting Started

📱 **Mobile app**

🚹 Log in

Without user information

Upload user information

- *"Elderly women, low-income women, and mothers with children face greater challenges."*
- Including: age, accessibility needs…

🚋 **In-transit kiosk**

- Without personal information
- slightly limited functions
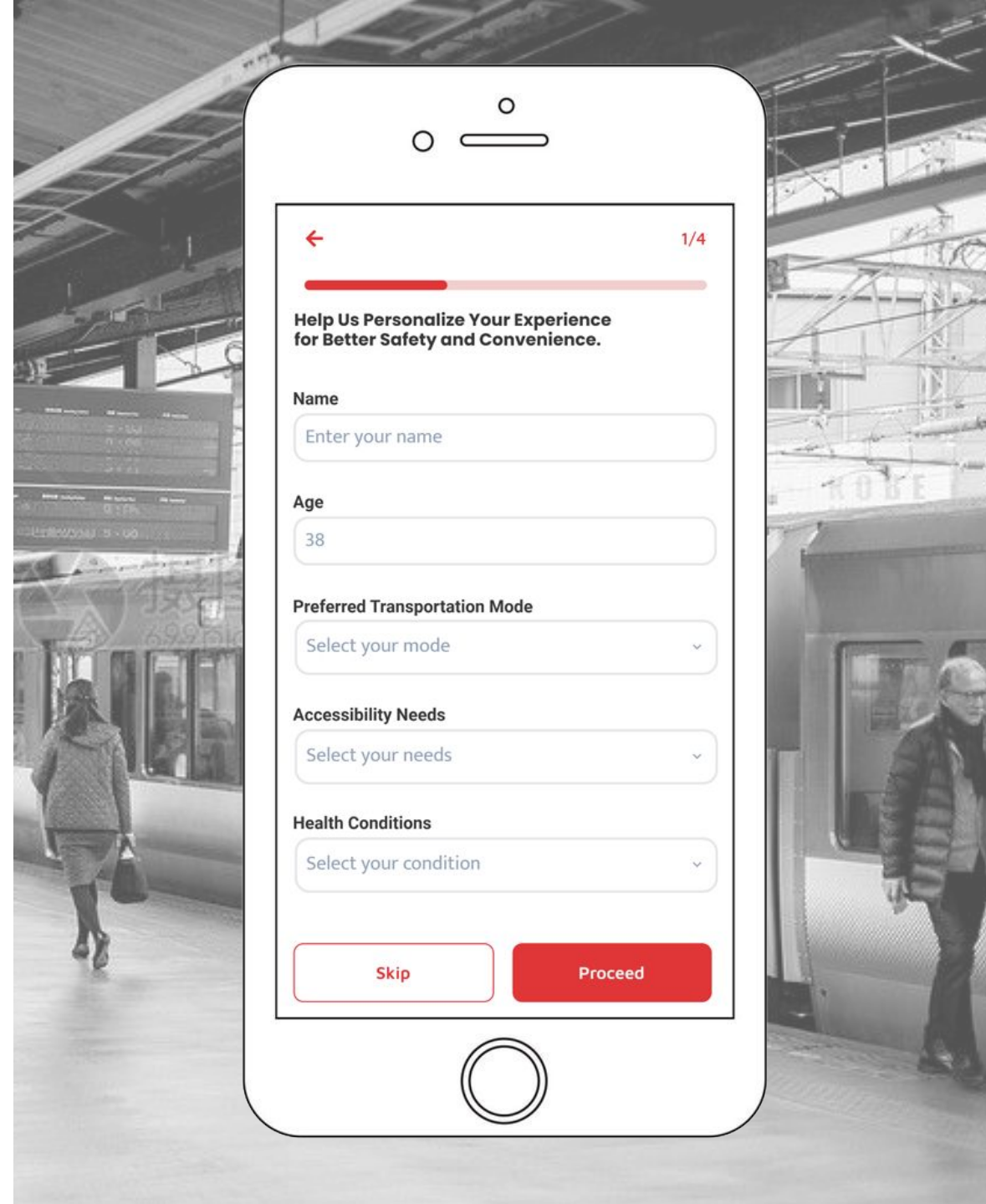
Woman Community

Comments and advice

- Comments of specific routes, highlighting safer options

- Realtime comments on route while traveling

Travel together?

woman sharing the same route can travel together to keep safe
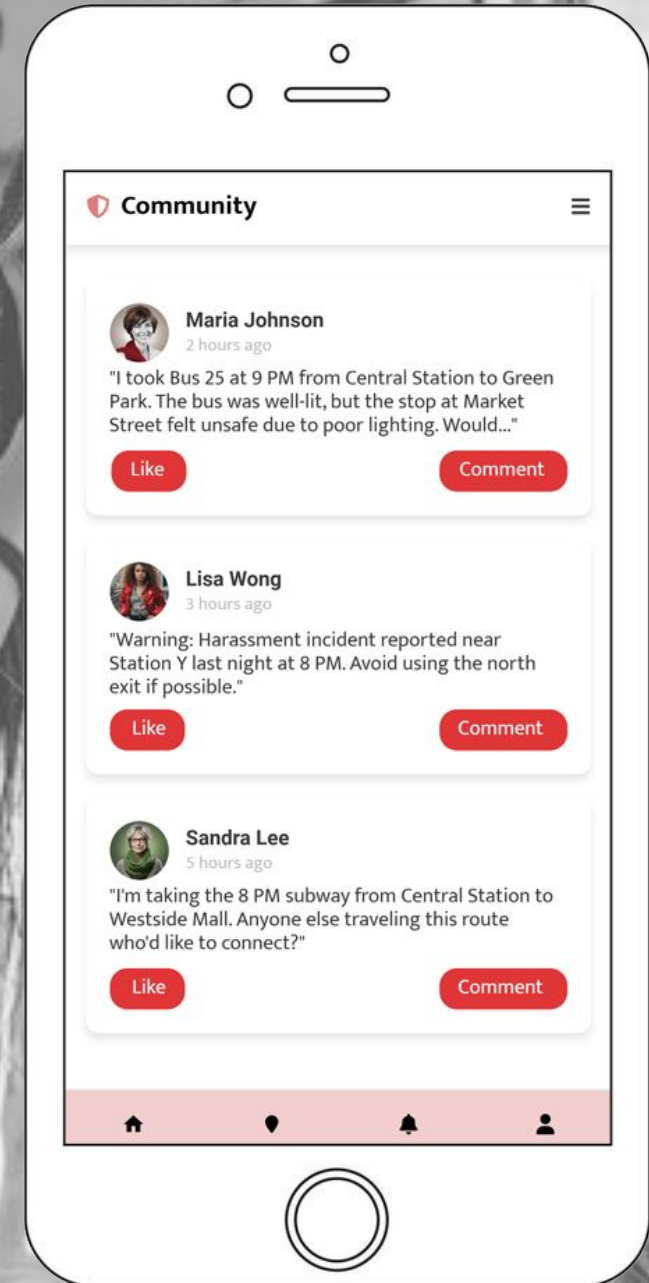
Safety before the trip

Choose a Safe Route : Safety recommendation
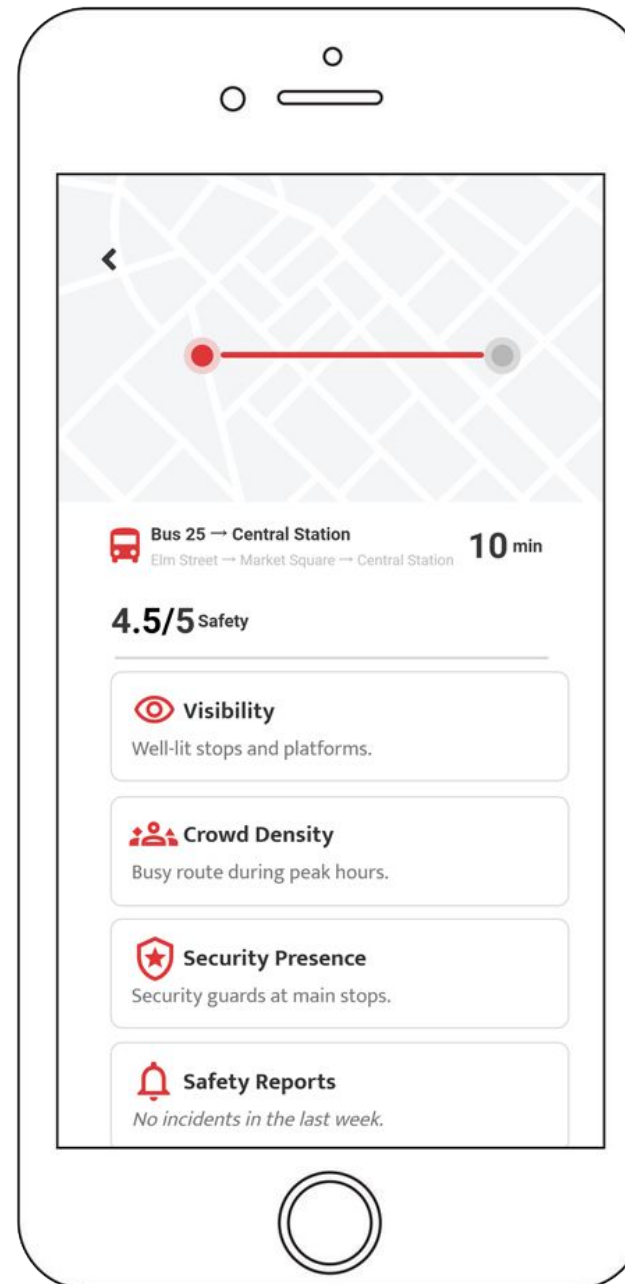
Data from woman community

Data from institutions

Visibility
crowd density
local crime reports
…

User information and experience

recommendations exclusively for a user
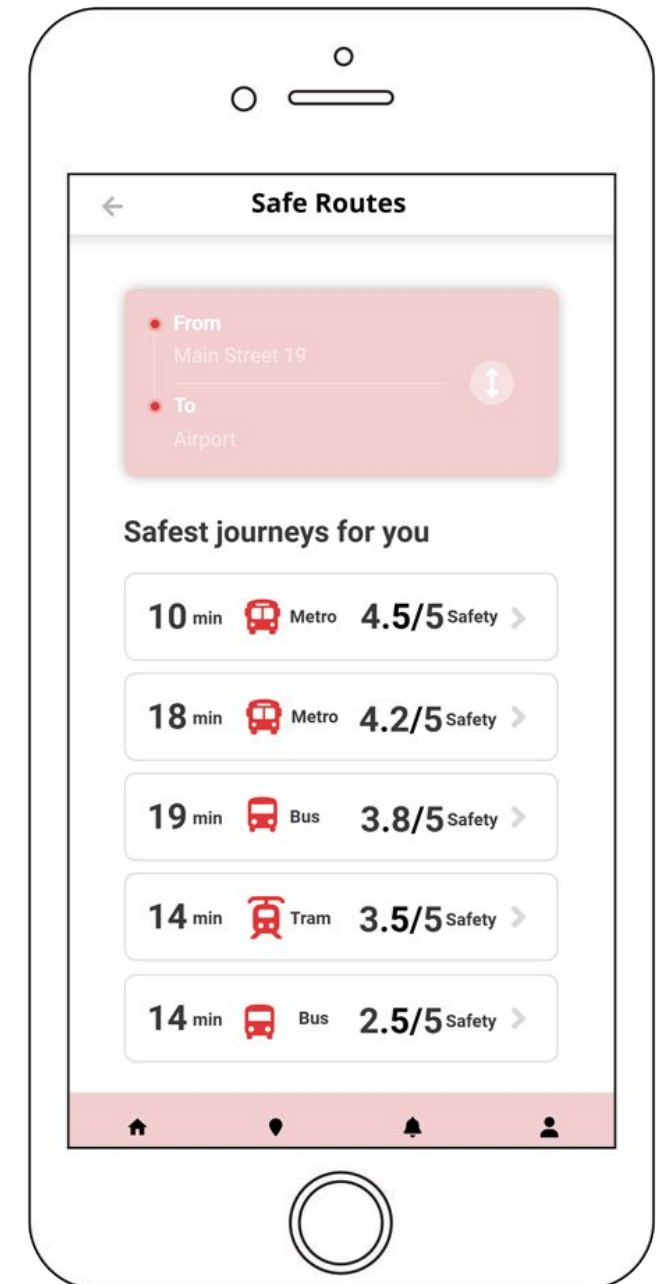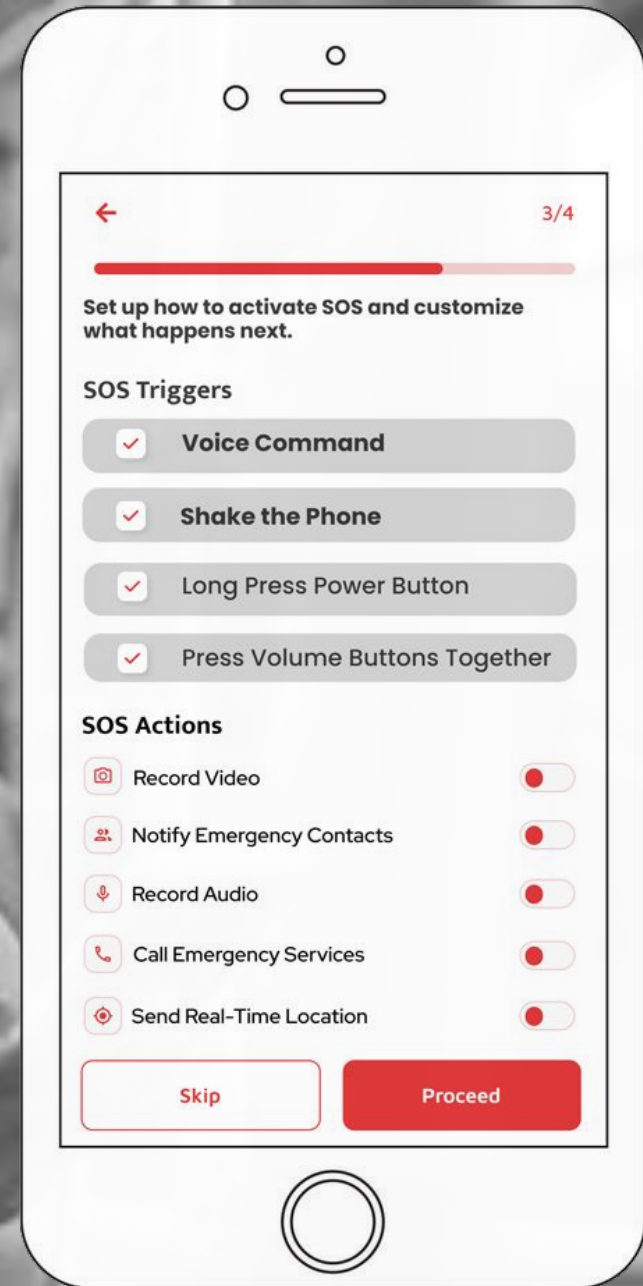
How to trigger:
User Actions

👆 SOS Button？

"These applications require one click to perform this task. But when a girl is in trouble, there can be times when the girl can't take the phone and press a button."

🔊 Voice

e.g. Activate Vanguard

🕴 Gestures

e.g. Shake the phone three times consecutively "SOS will activate in 5 seconds" with the option to cancel.

Danger Happens: Emergency Response

📞 **Calling or Texting**

- emergency contact (preset)
- local authorities (high-risk event): Sends real-time location, video and risk assessment.

📍 **Live location sharing**

🎤 **Audio recording**

Privacy?
Preset, optional

How to trigger: User Safety Check

☑ **Regular check** (optional)

sends a safety confirmation notification every 10 minutes

☑ **Arrival Check** (optional)

- tracks progress using GPS

- If user does not confirm arrival within 5 minutes of the expected time, system triggers:
  - **Step 1**: Sends a reminder to confirm safety.
  - **Step 2**: If unresponsive, Emergency Response with the last known location
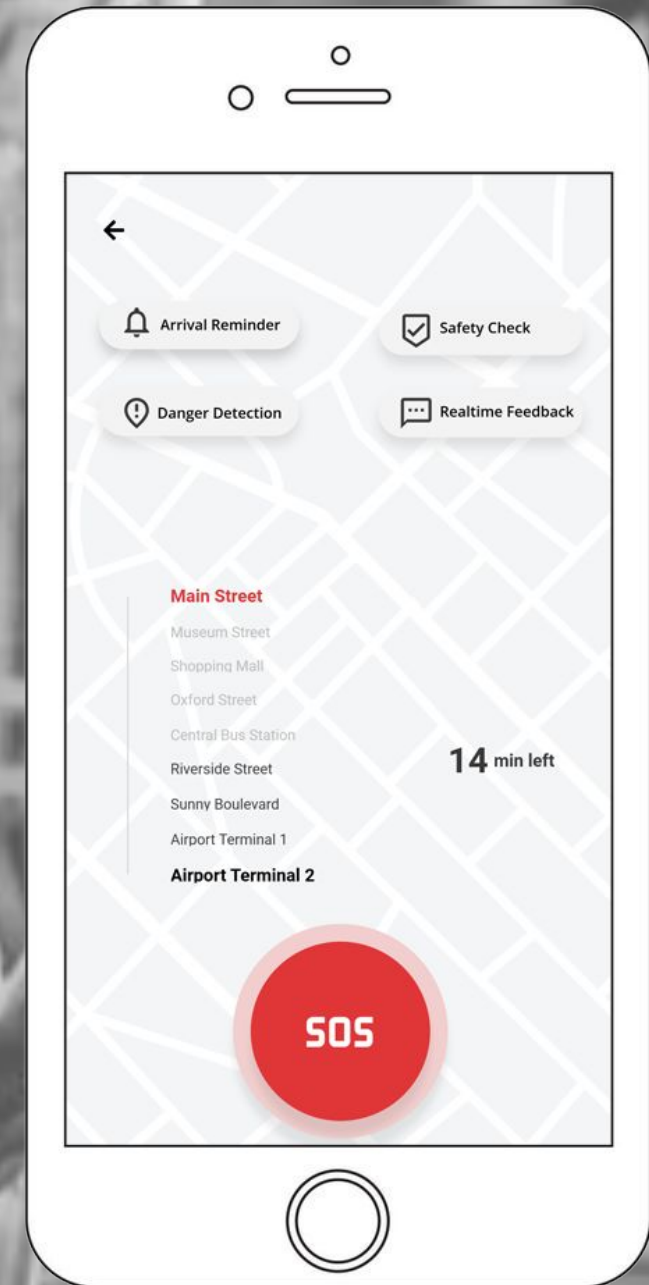
Safety before the trip
Travel Feedback

🏢 **Promote safety improvements**

- The app can work with governments (public transportation departments and urban planning departments) to feedback the actual needs of female users.
- E.g. insufficient lighting in a bus.

Environmental

Greater proportion of public transport usage – **7 passengers per shuttle, leading to a reduction in emissions.**

Business

Greater female labour force participation

Social

Greater access to safer public transport to **51% of Berlin's population**

Spillover impact – safer transport for **children, minoritized genders the elderly and disabled people.**

Challenges & Mitigations -
1. Data protection and anonymization - Harmonizing data with the EU GDPR and mitigating vulnerabilities.
2. Collecting gender disaggregated data
3. Addressing structural gender inequality

Our vision for the Future
As an extension of our limitations, our vision is to facilitate the making of safer environments for everyone, starting with marginalized communities. In the end, if there is no need for our solution, then that is the best outcome - a structurally and systemically more equal society.

Our Team   BXA VanGuard™

Xinjie Jiang

- Research the challenges faced by women during travel and current safety measures
  - Develop the technical aspects of the solution
- Create flowcharts explain concepts

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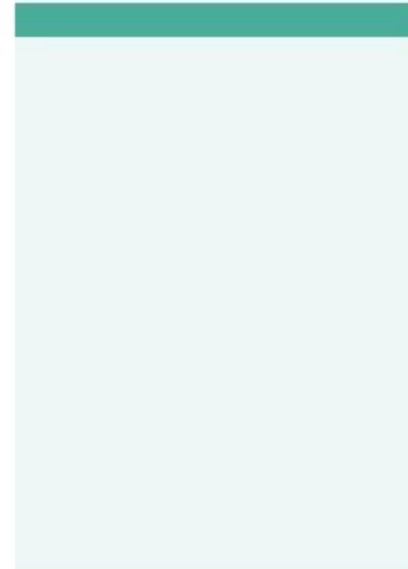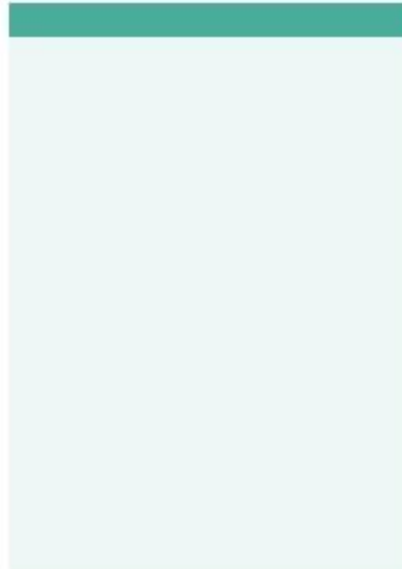Information technology for built environment | TUM

Amrutha Viswanath

- Researching case studies, literature
  - Creating a larger framework for the application
  - Conceptualising framework and general team management

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Bibliography

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