

# Enhancing the Commuter Experience

An HSI study of the Trenord Application

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# Table of Contents

## Real-world HSI case

- Scenario
- User, needs, goals

## Human Factors

- Human factors implied

## Evaluation

- Tools used to evaluate human factors
- Possible setup and tasks to collect data

## Output

- Expected findings
- Practical implications



### Trenord Application

# The Problem



The retrieval of real-time information regarding delays or cancellations is often difficult because updates are not uploaded instantly; the app acts as a passive reporter of technical data rather than a proactive guide during disruptions.

# Users, Needs, and Goals

## Users

- Daily commuters
- Students
- Workers

## Needs

- Information Reliability
- Route Recovery

## Goals

- The system is expected to act as a **comprehensive information hub**,
- It should enable travelers to **maintain situational awareness**

## What can be enhanced to improve the HSI?

- **From Passive to Proactive:** transitioning the app from a passive data reporter to a proactive assistant.
- **Dynamic Guidance:** HSI should be enhanced to automatically suggest the fastest alternative route
- **UI Clarity:** Simplifying the presentation of technical data



# Human Factors

These factors play a critical role in determining the success of the interaction



**Attention**



**Mental demand**



**Temporal demand**



**Frustration**

# Evaluated aspects

In relation to the human factors

## Cognitive Workload:

- Mental Demand: Complexity of replanning based on delay data.
- Temporal Demand: Level of perceived user urgency.

## Attention:

- Visual search efficiency
- Distraction level

## Emotions:

- Effort
- Frustration

## Performance:

- Success Rate in finding the fastest route
- Frequency of Errors made while navigating under pressure.



# Evaluation

## NASA Task Load Index

Post-task mobile pop-up using a 'Very Low' to 'Very High' slider.

## PANAS

A self-report scale where users evaluate 20 adjectives

## Eye-tracking

- AOI: Attraction to specific elements.
- Dwell Time: Information processing duration.
- Fixation Sequences: Visual scanning order/path.

## Performance Metrics

Quantitative measures of task success and efficiency

## Visual Analogue Scale

A simple 0-100 rating line

# Expected findings

A discrepancy between the user's goal and the system's current interface

## Eye-tracking:

- **Long Dwell Times:** Fixation on technical delay details
- **Erratic Fixations:** Frantic search for a missing "solution" button.
- **Cold Heatmaps:** Navigation menus ignored due to cognitive distraction.

## NASA-TLX:

Scores for **Mental Demand** and **Frustration** are expected to be rated as "High" or "Very High,"

## PANAS and Heart Rate

- High Negative Affect.
- Heart rate spikes.

## Performance Metrics:

Low Success Rate in:

- finding the fastest alternative

High Error Rate in:

- proving the inefficiency of the current design.





# Broader impacts

of the evaluation

- ✓ **Operational Efficiency & Safety**
- ✓ **Social Impact**
- ✓ **Environmental Sustainability**

# Practical Implications

Benefits from the data collected

| Tool               | Problem                     | Solution             | Explanation   |
|--------------------|-----------------------------|----------------------|---|
| Eye-Tracking       | Missing Button              | Smart Action CTA     | Prominent, high-contrast button labeled "Find Alternative Route"  |
| NASA-TLX           | Offload the Cognitive load  | Automatic re-routing | The app should automatically generate the top 3 alternative itineraries   |
| PANAS              | Panic and anxiety           | "Calm Mode" UI       | Use softer, solution-oriented language like <i>"This train is delayed, but we have found a faster alternative for you."</i> |
| Performance metric | Unprecise real-time updates | Real-time filtering  | Trains not available anymore must be grayed out or removed  |

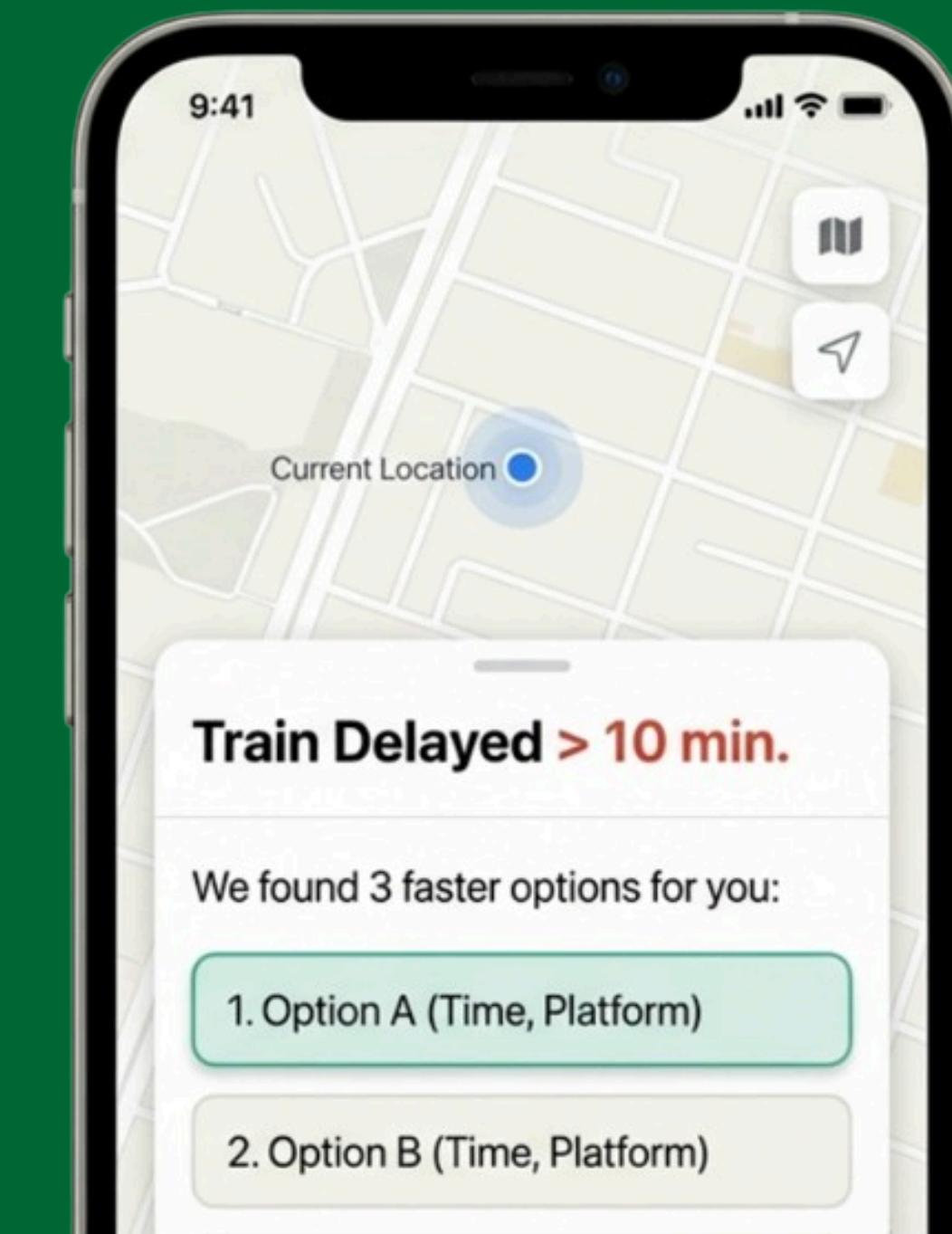


# Alternative Route



**Insight:** Offload the Cognitive Load.

**The Fix:** Automated Re-routing based on GPS.





Thank you for  
the attention

BSc Artificial Intelligence

Module 2 Project

Human-System Interaction