
STandUP for ENERGY

# Electric Vehicle User Interfaces: Cars, Buses, Robotaxis, On-Demand

Cristian Bogdan

# (Graphical) User Interaction with energy systems

### Electric vehicles

- Car dashboard
- Car controls (e.g. regen braking)
- Charger UI
- E-car Fleet management
- ...
- Bus dashboard, other bus use cases
- …
- ETCS (european train control, standard UI for locomotive drivers, braking curves != Swedish ATC)

### Buildings (housing cooperative, brf)

- Ventilation system UI
- Heat pump UI…
- Comparison with neighbours
- Hemnet “energy widget”
- Decision support system to decide on heat pump acquisition/tender, installation

Computer **engineer** doing **Interaction Design**
User **conceptual model** of the energy system.
**Interaction**: explore, control

# User understanding of energy systems: buildings / Brf


**Figure 4. Overview of the housing cooperatives' energy use (from [32], used with permission).**

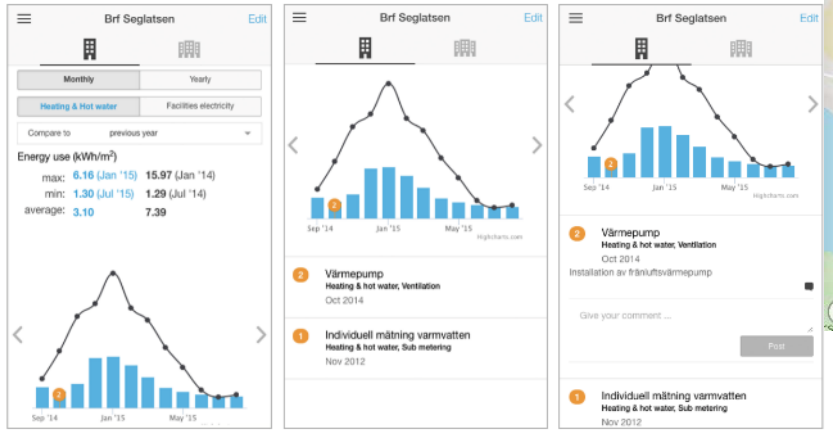
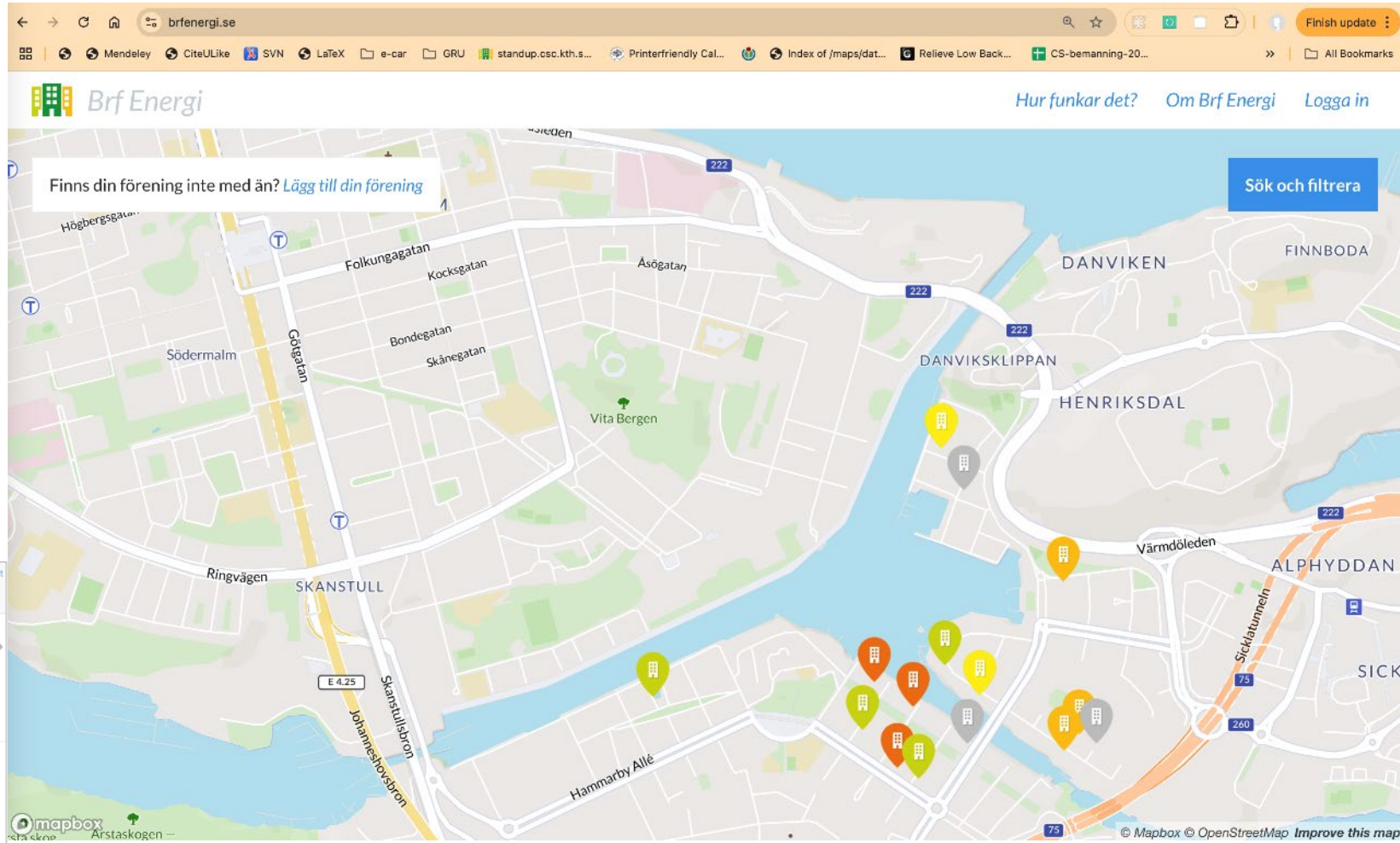
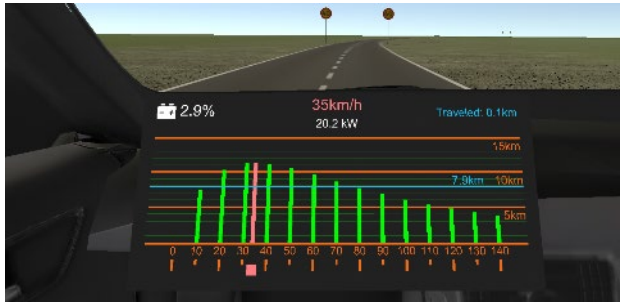



**Figure 5. The housing cooperative energy app. Left: Visualisation of monthly energy use compared to previous year. Middle: The energy actions are listed below the graph. Action number 2 is an installation of a heat pump. Right: Each action can be commented on, for example to ask for more details on the action.**

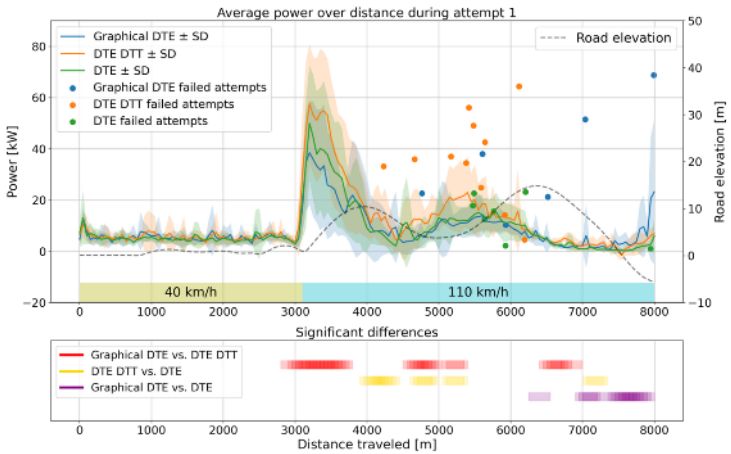


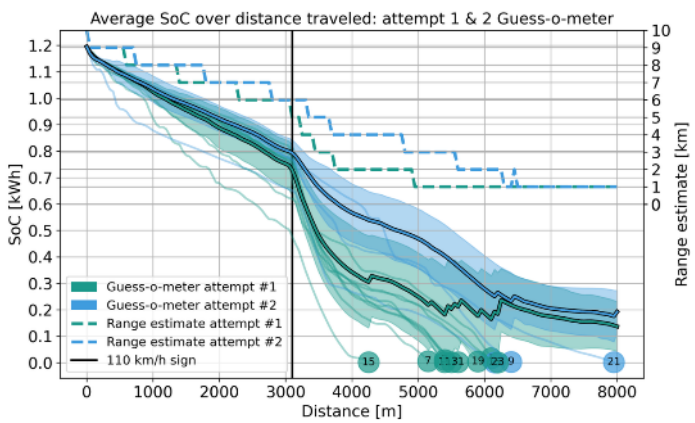

STandUp, EU and STEM funding

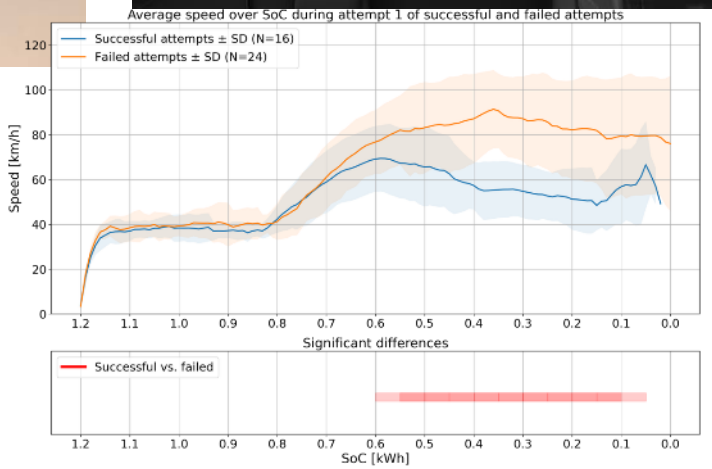
# User understanding of energy systems: EV range





# From EV to autonomous EV, from car to “system”

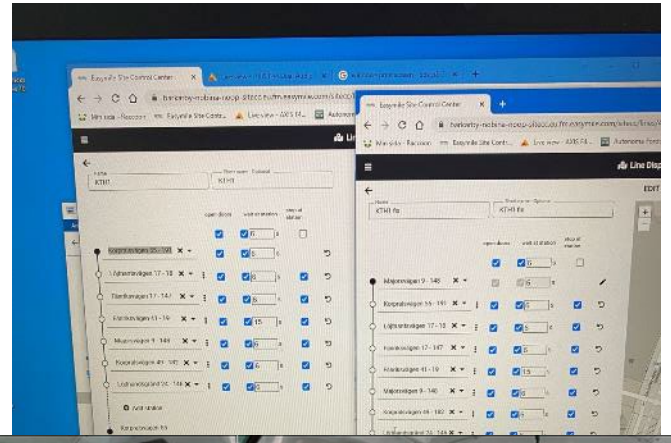
- Our discipline, Human-Computer Interaction is introduced **in contrast** with AI
  - Townsen et al. 2024 “ChatGPT is bullshit”
  - Lately: **Human-AI interaction**, e.g. bias, explainability

- Many **kinds of “user” and “use”**:
- Passenger, in-vehicle UI
- Pedestrian, Cyclist (external HMI)
- Driver in the same traffic (external HMI)
- Fleet manager
- Supervisor/maintainer in the garrage (self-washing, self-charging)
- Charging management (autonomous cars can charge when it’s better for the grid)

# User understanding of energy systems: autonomous EV



Axelsson et al.  ACM Transactions on Human-Robot Interaction



# Looks like 1957…

The Economist

Sub

Weekly edition | The world in brief | War in the Middle East | War in Ukraine | United States | The world economy | Business | Artificial intelligence

Europe | Charlemagne

## Robotaxis will be the Sputnik Moment for a declining Europe

A slow-motion car crash on Europe's roads

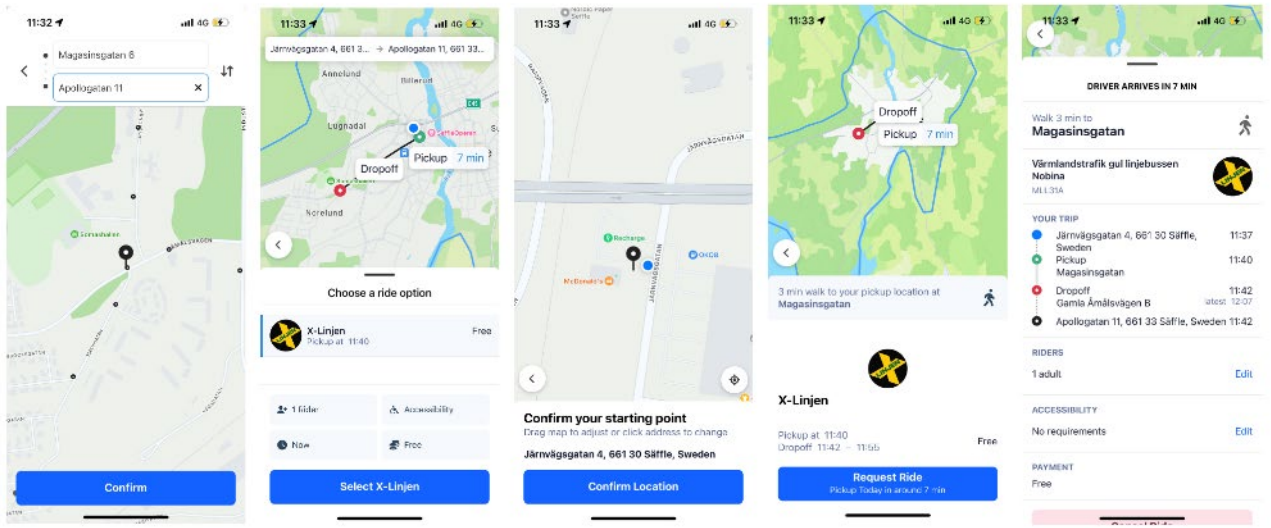
Share


ILLUSTRATION: PETER SCHRANK

# From fixed-line Public Transport to On-Demand

- Maybe robotaxi will take a different form in the Swedish “glesbygd”?
- “Dynamic” public transportation
- Again many types **of user interaction**:

- Booking UI  (phone for some passengers!)
- Payment UI
- In-vehicle UI
- Fleed management, maintenance
- Charging management



# Inclusive On-Demand transportation (VINNOVA)

- KTH (STandUP seed), RISE, Nobina, Värmlandstrafik



→ → autonomous? Charging infrastructure/management?

# PhD student(s) in Human-AI interaction for Autonomous Vehicles

- STandUP
- KTH transportation lab (ITRL)
- In discussions with Scania

- Recently closed … 440 applicants