Integrating data sources to enhance the experience for passengers with special needs through privacy aware mobile applications

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Aim

- To analyse the disabled passenger journey
- To evaluate data requirements for user scenarios
- To investigate privacy issues
- To evaluate Wi-Fi localisation on trains
Approach from passenger perspective

- Desk research on previously reported problems for mobility/visually impaired passengers
- Interviews with 6 mobility impaired and 4 visually impaired passengers
  - Identified key value propositions
- Staff interviews with customer experience management staff and station staff to refine propositions
- Evaluation of propositions with interviewed passengers
Technical Approach

- **Review of**
  - Data feeds (Darwin, NRE Journey Planner)
  - Localisation (Wi-Fi scanning)
  - Privacy documents (Data Protection Act, EU General Data Protection Regulation, Information Commissioner’s Office Guides, BSI, NIST and ISO/IEC frameworks)

- **Prototype Evaluation**
  - Test Wi-Fi localisation on trains
  - Test the integration of the data feeds to address the key propositions

Chiltern Railways
Findings
Propositions for Mobility Impaired Passengers

- M1 Access to up-to-date information
- M2 Physical assist
- M3 Positioning on platform
- M4 Seat availability
- M5 Being prepared to leave the train

Stages:
- Pre-trip
- Start station
- On train
- Connections
- Off train
- End station
Propositions for Visually Impaired Passengers

- **Pre-trip**
  - V1 Preparing for a journey
  - V2 Buying a ticket for travel
  - V3 Station-based assistance

- **Start station**
  - V4 Carriage & seat finder

- **On train**
  - V5 Train-based assistance

- **Connections**
  - V6 Journey progress monitor

- **Off train**
  - V3 Station-based assistance

- **End station**
Propositions for Mobility and Visually Impaired passengers

M1 Access to up-to-date information
- M2 Physical assist
- M3 Positioning on platform
- M4 Seat availability
- M5 Being prepared to leave the train

Pre-trip
- V1 Preparing for a journey
- V2 Buying a ticket for travel
- V3 Station-based assistance

Start station
- V3 Station-based assistance

On train
- V4 Carriage & seat finder

Connections
- V4 Carriage & seat finder

Off train
- V6 Journey progress monitor

End station
Prototype Findings

Mobile app used by a passenger to:
- Review possible journeys
- Check assistance available
- Book a journey with assistance
- Cancel a journey
- Review disruption to a journey
- Contact station and train staff

Localisation used to:
- Inform the passenger of their location on a train or station
- Assist in navigating a passenger to a platform
- Inform staff of the passenger’s location
- Alert staff when a passenger is about to arrive at a station
Example Journey Search Results View and Data Source

- Shows journey options
  - Results from National Rail Enquires OJP

- Observations
  - Visual queues help review assistance
  - Current OJP makes assumptions about transfer times and requirements
  - For assistance, an automatic way of picking journeys with better transfer options and assistance is needed
V1: Preparing for a journey from home

- **Data required:**
  - Customer details
  - Journey
  - Credit card
  - Sensitive customer details

- **Security:**
  - Credit card information theft
  - Fingerprint details theft
  - Sensitive information disclosure

- **Privacy:**
  - Previous journeys might be considered private
Privacy and Data Findings

- Many standards and guidelines refer to what constitutes personally identifiable information (PII)
- Geolocation and MAC address data should be treated as PII and treated according to relevant data protection and privacy laws
- Minimise the amount of data to be collected and stored (“least privilege”)
- Delete the data once it is not required anymore
- Obtaining informed consent from the passengers is critical. Not acceptable to rely on privacy notices
- Provide an opt-in approach
Impact and benefits
Impact of Data Provision for Passengers

- Attitudes to sharing needs and capabilities, location, travel plans, photo and name, mostly positive but variable according to context
- Recommendation on provision of improved data for visually impaired users build a mental model of route prior to their journey
- Provision of up-to-date travel information tailored to customer’s journey, including information on train configurations/seat availability to allow passengers to position themselves in right place on platform
- Use of location-based services needed to help customers and station/train staff find each other more easily and alert staff ahead of time to the needs of a passenger
Impact on Apps for Improving Customer Experience

- Journey planning API does not account assistance requirements and longer transfer times
- Wi-Fi and other localisation infrastructure data should be made available to app providers
- Real-time train facility information should be made available
Security Recommendations for Rail Industry

- Applying industry privacy and security frameworks (ISO-IEC and NIST)
- Conducting a Privacy Impact Assessment to establish impact on passengers’ privacy of any new system, and application of ‘Privacy by Design’ principle as part of design of any new system
- Applying principle of requesting as little information as possible to provide a service (least privilege) when collecting personal data, and obtaining informed consent from users for how their personal data is used
- Anonymising or Pseudonymising, if possible, any Personally Identifiable Information to safeguard the privacy of customers
Next steps
New Research – Data for Improved Customer Experience

- ESPRC funded project September 2016 for 3 years
  - Develop a trust framework that integrates privacy and provenance considerations so that customers have more effective control over their data
  - Evaluate impact of trust framework on passenger experience
Commercial Feasibility and Demo/Pilots

- Pilots and trials of
  - Improved data feeds
  - Apps for passengers and staff
  - Ensuring security/privacy compliance
- Full-scale operational testing
- Working with ATOC on various project
- Working with Enable-ID to apply our ongoing research to inform future product development
Questions
Thank you