Exploiting Fitness Apps for Sustainable Mobility Challenges Deploying the GoEco! App

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How can we encourage people to engage in more sustainable mobility lifestyles, reducing use of the car?
Gamified App
- Feedback
- Social Interaction
- Challenges / Awards

Automatic Tracking
- GPS Trajectories
- Transport mode
GoEco! – A Community Based Eco-Feedback Approach To Promote Sustainable Personal Mobility Styles
Mobility Tracking for Sustainability
Mobility Tracking for Sustainability

How?
Key Considerations

- Accuracy of GPS
- Automatically Start Recording
- Organize Data (Routes / Activities)
- Identify Transport Modes
- Battery Consumption
- Near Real-Time
System Architecture

- **Moves App**
  - Moves Connector
  - GoEco Datastore
  - GoEco Tracker Algorithm

- **GoEco Tracker App**
  - User validation
  - Learning loop
  - Routes with **confirmed** means of transport
  - Routes with **proposed** means of transport

- Raw routes
**System Architecture**

- Third-party server storage
- Introduces delays
- Make user interaction easy
- Be aware of device diversity
- Inaccuracies in tracking

**Moves App**
- Routes with confirmed means of transport
- Moves Connector
- GoEco Datastore

**GoEco Tracker App**
- Routes with proposed means of transport
- Learning loop
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**GoEco Tracker Algorithm**
- Raw routes
Transport Mode Identification
Transport Mode Identification

\[ P(c_j|\vec{f}) = \frac{P(f_1|c_j)P(f_2|c_j) \ldots P(f_m|c_j)P(c_j)}{p(\vec{f})} \]

Bayes Classifier, using average speed, total distance, distance between track-points, heading change, matching with public transport schedules
Transport Mode Identification

![Graph showing classification accuracy over number of activities collected for different transport modes]
461 registered users
359 contributed more than one route
41,199 routes tracked
Willingness to Participate

**Reasons for Leaving**

- **653** (100%) Sign ups for the study
- **461** (70.6%) Registrations in the app
- **292** (44.7%) Participants started tracking within the first five days
- **199** (30.5%) Participants provided tracks on 21 or more days
- **142** (21.7%) Participants actively interacted with the app on 21 or more days
Data Quality

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities recorded</td>
<td>41'199</td>
<td>100%</td>
</tr>
<tr>
<td>Actively validated by user</td>
<td>31'782</td>
<td>77.1%</td>
</tr>
<tr>
<td>«Walking»</td>
<td>15'820</td>
<td>38.4%</td>
</tr>
<tr>
<td>«Unknown» (by Moves®)</td>
<td>9'434</td>
<td>22.9%</td>
</tr>
</tbody>
</table>
Data Analysis

![Data Analysis Chart]

- **activity**: plane, tram, train, skate, ship, scooter, motorbike, ecar, ebicycle, bus, bicycle, car, unknown

**Number of Activities**

- **Date**: 07 Mar Monday, 14 Mar Monday, 21 Mar Monday, 28 Mar Monday, 04 Apr Monday
Data Analysis

Distance covered

Date

07. Mar Monday
14. Mar Monday
21. Mar Monday
28. Mar Monday
04. Apr Monday
Data Analysis

![Bar Graph: Average kilometers travelled daily by mode of transport used.](image)

- **Mode of Transport used**: car, train, tram, walking, bicycle, motorbike
- **Average kilometers travelled daily**
- **variable**: avg vs. census
Key Motivators

1. Users learn something about themselves
2. Study participants contribute towards research and development of new concepts in the mobility domain
3. Becoming part of a community of people interested in their personal usage mobility
4. Personal relationship to study participants
5. Monetary incentives (win vouchers)