Use of Information Technology for Developing Sustainable Public Transport
-- Status at present and prospects for future --

Hirokazu AKAHANE
Chiba Institute of Technology
Japan
Cyber-Rail intends to completely change car-users to railway-users???

- **Keeps** the present railway-users.
- **Let the present car-users use railways sometimes.**
- I may not know which is better, taking a train or driving my car when I go somewhere for the first time.
- I may not know the best schedule by train.
Transferring-Guidance on the Internet
by JORUDAN

2004年03月版（空路有効期間2004年02月01日～2004年05月31日）

乗換案内 山手（神奈川）～新宿（2004年3月24日9時40分着）

<table>
<thead>
<tr>
<th>経路</th>
<th>早業</th>
<th>高業</th>
<th>安業</th>
</tr>
</thead>
<tbody>
<tr>
<td>乗車時間</td>
<td>49分</td>
<td>総額</td>
<td>620円</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>路線</th>
<th>時間</th>
<th>距離</th>
<th>運賃</th>
<th>指定席</th>
<th>料金</th>
</tr>
</thead>
<tbody>
<tr>
<td>山手（神奈川）</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JR根岸線（大宮行）</td>
<td>2004/03/24</td>
<td>08:40～08:49 [9分]</td>
<td>5.0km</td>
<td>620円</td>
<td></td>
</tr>
<tr>
<td>横浜</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JR東海道本線（東日本）（東京行）</td>
<td>08:54～09:12 [18分]</td>
<td>22.0km</td>
<td>↓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>品川</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JR山手線渋谷方面行</td>
<td>09:16～09:38 [22分]</td>
<td>10.6km</td>
<td>↓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Access here
Access here from underground stations

Sorry! No maps for guests from abroad on the website.
More people will be induced to use trains just by railway-navigation better than the present?!

- **Trips that complete just by railways are very seldom.**
- **Guidance of routes to and/or from railway stations**
  - Walk : Route for walk?
  - Bicycle : Where to park my bicycle?
  - Taxi : Where to take? How much?
  - Bus : Route? Timetable? Where is a bus-stop?
- **It is quite difficult to go somewhere strange by train.**
Even car-parks can be reserved now.
Even travel times by car are predicted in consideration of traffic congestion now.

ex. Tokyo Metropolitan Expressway

“Inter-modal scheduling services” come true!
What is optimal?

- Are travel times or costs always criteria of optimization?
- Other criteria for choosing travel modes/routes
  - Avoidance of congestion
  - Possibility of seating
  - Transportability of luggage
  - Transferring/waiting times
  - Landscapes
  - Transferring conditions (No. of steps, Guidance, etc.)
The aged after a decade will not be the same as the present ones.

- Targets for promoting off-peak use!
- Experiences of them in using cars will not be in the same class as the present aged have.
  - The motorization in Japan commenced in 1966 (about 40 years before)
  - The people of 65 years old now were 25 years old then.
  - The people who will become 65 years old after a decade were 15 years old then.
- They will be able to more freely choose transport modes than the present aged can do.
The ultimate targets of ITS

• **Optimization of transport and freight by inter-modality**
  
  – There are some criteria of optimization other than travel time.
  
  – Comfortableness, safety, etc.
  
  – Criteria of optimization changes according to situations.
  
  – People who have their own criteria should not be treated all alike as “passengers” or “transport demand”.

• **Modes of transport or freight are literary just means.**
Ex. Pedestrian navigation service “EZ Navi-Walk” by au
(http://k-tai.impress.co.jp/)
Pedestrian Navigation

- Inter-modal navigation!
- Already serviced by mobile-phone and GPS.
- There are some difficulties in receiving GPS signals during traveling by train?
  - Let’s do “multi-mode positioning”!
  - Cyber-Rail + GPS +,,
  - Trips by train can not be fully covered from their origins to destinations even just by the Cyber-Rail.
  - End-users evaluate not technologies but services.
A log of a handy GPS receiver

A trip by train

A log of a mobile phone with a GPS receiver
### Discrimination of transport modes by GPS data

*(Acquisition intervals: 20-30 sec.)*

For navigation services by transport modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Walk</th>
<th>Train</th>
<th>Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hit ratio [%]</td>
<td>64</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>Delay in discrimination [sec.]</td>
<td>76-431</td>
<td>91-168</td>
<td>20-238</td>
</tr>
</tbody>
</table>

Due to poor reception during
transferring at stations

Due to poor reception during
in trains
Why do you make trips?

Just go for a walk, a drive, to do activities, such as

• meetings,
• shopping,
• eating,
• watching movies at destinations.
Olive Oil & Transport Information

• Olive Oil
  – is indispensable to the Italian cuisine.
  – But, I believe, very few people drink up one bottle of it at a stretch.

• Transport Information
  – is not necessarily attractive just by itself.
  – becomes indispensable & more valuable when it is combined with information about activities at destinations of trips.
Ex.) A combination of traffic and activity information

Really recommendable Chinese restaurant in Yokohama, Japan.

Various cards are available.

If you input the nearest station to you,
### Railway routes are informed.

<table>
<thead>
<tr>
<th>Time</th>
<th>Fare</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:40-19:42</td>
<td>470円</td>
<td>三田 [出口案内] [地図]</td>
</tr>
<tr>
<td>19:48-20:11</td>
<td>228,810円</td>
<td>228,810円 [出口案内] [地図]</td>
</tr>
<tr>
<td>20:15-20:22</td>
<td>150円</td>
<td>石川町 [出口案内] [地囧]</td>
</tr>
</tbody>
</table>

---

### Nearest to you

- **Time:** 42 分 (乗車32分 他10分)
- **Fare:** 620円
- **Distance:** 28.9km
- **Transfers:** 2

### Nearest to the restaurant

- **Time:** 48 分 (乗車38分 徒歩5分 他5分)
- **Fare:** 620円
- **Distance:** 28.6km
- **Transfers:** 1
Connection between cyber- and real-space

- Miss-matches between transport systems and demand for them are increasing due to drastic diffusion of communication means in the general public.
- Information exchanges in cyber space come to nothing if they do not result in physical changes in real space.
- The revision of the Road Traffic Act in 2001
  - Commercial companies have been able to join the market of road traffic information due to the deregulation of it.
- The connection of the Internet with ITS will bring the end of the era of the closed-door policy on ITS.
Open networks of transport information

• **Needs**
  – Fusion of activity and transport information
  – From “B to C” to “B to B”
  – A variety of evaluation criteria
  – Feedback of prediction of transport demand to service management
  – Seamless multimodality (routes + payments)

• **Problems to be solved**
  – Motivation to disclosing transport information and promoting common system for payments
  – Promoting so-called “third parties”
Railway operators are motivated for inter-modality?

- Even the present level of services is accepted by a sufficient number of passengers!
- Cyber-Rail should be used to enclose passengers!?
- Can not take care of services outside of railways!?

- At least, I wish transport information was open to the third parties.
- Costs are recovered by payments for it?
Thank you for your attention!