Evaluation of Driving Assistance Systems Exemplified by the Austrian Project RONCALL_I2

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28th October 2005
ICTCT, Workshop Helsinki
Outline

• Why?
• How?
  – Technical Basis
  – Market Place
  – Services
  – Evaluation
• Whereto?
Well known problems

- Road related information is highly dynamic!
- ... traffic signs are not!
- Can we capture these highly dynamic data?
- How can we deliver information to the road user?
Driving Assistance System
RONCALLI & RONCALLI_I2

• Position dependent and dynamic real time road (safety) information
  – where it is exactly needed
  – only if it is relevant
  – with precise content and only content, that really matters
  – in a way which does not distract
• Market place for transport telematic information
• Several services for demonstration
• Evaluation
RONCALLI – System Architecture

Algorithm

Extract relevant information

PDA (in Real-Time)

• (d)GPS-Position
• Time
• Speed
• Sensors
• Database
• etc.

giving Information in a suitable way
RONCALLI_I2 – Market Place

- a common, electronic market place for supply and demand of transport telematic information
  - RONCALLI clearing interface: central infrastructure for the exchange of transport telematic content and standardisation of data exchange based on xml-technology
  - RONCALLI reference system: transport telematic content based on a standardised geographical reference system
  - RONCALLI clearing house: central infrastructure for billing and financial clearing for the transport telematic sector
RONCALL_I2 – The Services I

Road Safety Services

- ISA (Intelligent Speed Adaptation)
  > Display of current speed limit
  > Speed limit exceedance: icon begins to blink, changes colour, sound signals
- Warnings of Accident Black Spots or Dangerous Road Sections
  > Depending on circumstances (e.g. weather, day time, …)
  > Increase driver’s attention to specific sections
- Priority Information
  > For selected crossings
  > Behaviour recommendations based on current priority situation
RONCALL_I2 – The Services II

ECO-Driving

- Economical driving behaviour: reducing fuel consumption & CO² production
- Assessment of eco-driving solely via GPS data
- Relevant values: acceleration, deceleration & look ahead ➔ the lower, the more economic

xFCD – Extended Floating Car Data

- Generating additional data through driver’s interaction (e.g. congestion warnings)

ECO-Driving Results

<table>
<thead>
<tr>
<th>Last Drive</th>
<th>Look ahead</th>
<th>Accelerate</th>
<th>Braking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>5 out of 6</td>
<td>2.53</td>
<td>88.26</td>
</tr>
</tbody>
</table>

History:

0.43  1.79  0.43  1.79  2.53
RONCALL_I2 – The Evaluation of the Services

• Survey in driving school
  – Learners: one- or two-staged pre- and post-survey
  – Driving instructors’ protocols on learners’ reactions
  – Moderated group discussion with instructors

• Market Survey
Service Evaluation by Learners

- Duration: 3 month
- Sample: 37 learners (60 % women, 85 % ≤ 19 years old)
Evaluation of instructors’ protocols

- Percentage of learners, influenced by services:

  - **Display of maximum speed**
    - Total: 88.0%
    - 1st lesson: 96.0%
    - 2nd lesson: 80.0%
    - 3rd lesson: 86.0%

  - **Warning of dangerous road sections**
    - Total: 50.0%
    - 1st lesson: 46.0%
    - 2nd lesson: 48.0%
    - 3rd lesson: 55.0%

  - **Display of priority situation**
    - Total: 47.0%
    - 1st lesson: 35.0%
    - 2nd lesson: 42.0%
    - 3rd lesson: 59.0%
Group Discussion with driving instructors

- Services ISA & priority information very useful
- Especially ISA is contributing to road safety
- Warnings of dangerous road sections & accident black spots not so important
- Non-distractive service display
- Pilot trail restrictions (not area-wide, reliability not 100 %, …)
- No information better than wrong information
Market Survey

- Analysing customer’s view of services’ market acceptance

  - Two-staged market survey:
    - Via Telephone: 1,345 people → objective personal features?
    - Interactive stated-response interviews:
      200 people (possessing driving licence & using car regularly)
Market Survey: RONCALLI services

Extended Floating Car Data: 82%
dangerous road sections and accident black spots: 73%
display of speed limit ISA: 65%
park&ride, connection to public transport: 64%
priority information: 56%
eco-driving: 51%

Proportion of Agreement in %

n = 200

Difference in Service Value
€ 45.89/month
Market Survey: Types of Settlement

- Fixed, monthly flat rate (preferred by 28%)
- Daily rate, when the services are used (preferred by 25%)
- Rate per kilometre, when the services are used (preferred by 47%)

Daily:
- 17 days (≈ 21 days/month)
- 31.3 km/day

Monthly:
- 525 km/month (≈ 1451 km/month)
RONCALLI & RONCALLI_I2
Driving Assistance Systems in Austria
A Big Step Forward …

• Prepare information for transport telematic services
• Deliver information to customer
• Competition-free trading space on market place
  → general framework is missing
• Services for system’s demonstration
  – ISA & xFCD most interesting
  – Eco-driving not interesting
• Pilot trial problems
  – Improvements are necessary
  – Establish preconditions
Thank you!

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