IRT Conference

IRT e-Coaching

An Evaluation of the Potential of e-Coaching for Riders

Senior Researcher
Pekka Ranta
Tampere University of Technology
Hypermedia Laboratory

TUT – Tampere University of Technology

- Established in 1965
- The second largest university of technology in Finland
- 12,400 students & 2000 employees
- Leading edge fields of research
  - Signal processing related technologies
  - Nanophotonics
  - Biotechnology
  - Intelligent mobile machines

Hypermedia Laboratory
Research and development interests

- Simulator-based training
- Adaptive hypermedia, structured documents and semantic web
- Technical development of web-based learning environments and e-Learning
- Use of collaborative tools and social network
- Knowledge modeling
- Evaluating quality and usefulness of web-based services
- Performance and competency profiling based on process data

Simulator-based training examples

Drilling rig simulator training

with Sandvik Mining and Construction and Creanex

Forest machine simulator training

Bus simulator development

with STC Simulator Training and TUT/IHA

Structure of the Presentation

1. Goals of the Evaluation
2. Study Process and Methods
3. Requirements for the Simulation
4. Basic Functionality
5. Possible Implementation Technologies
6. Modular Architectural Design
7. Recommended Implementation Technologies
8. Project Planning

1. Goals of the Evaluation

- Offer a method for the trainees to experience hazardous riding scenarios, which they are likely to face in real traffic, in a no-risk context and receive advice and feedback on their performance.
- Enable learning of hazard preventing behaviour and attitude through understanding the consequences of incorrect actions,
- Enable an easy transference of the learned abilities to real-life situations.
- Be a self-learning process, rather than a replacement for the traditional instructor-based training.

1. Goals of the Evaluation

- Be an affordable solution even for the young initial rider trainees, i.e. work on a regular PC or video game console that the trainees are likely to have available already.
- To reach especially the young initial riders, but also the other riders who for one reason or another will not receive hazard perception training from other sources.
- Appeal to the gaming generation while remaining accessible to the older, non-gaming generation.

What is the appropriate way to achieve all this?

2. Study Process and Methods

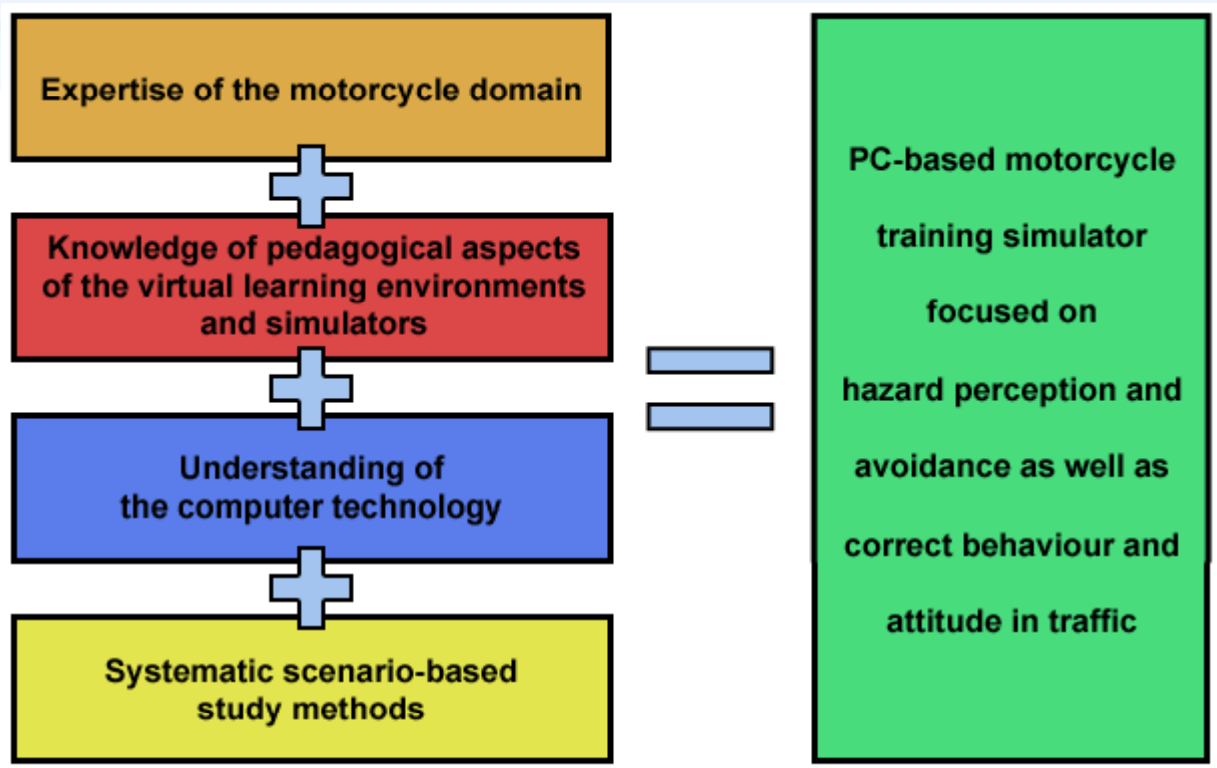
- Theory: Litterature survey
  - Psychological theories
  - eLearning
  - Simulator-based training
  - Digital game-based learning
  - Perspectives of Rider Training
- => Appropriate multidisciplinary framework

- Practice: Scenario-based discussions with experienced riders and instructors

- Implementation: Requirement definition for the technological application development based on the experiences of TUT/Hypermedia Laboratory

2. Study Process and Methods

Interactive and iterative process composed of cycles of research, design and discussions.



3. Requirements for the Simulation

To meet the goals, requirements for the simulation were set:

- Accessible to the wide audience.
- Self-learning process.
- Exercises created by competent instructors.
- The trainee can control the parameters of the environment.
- Evaluating the performance of the trainee.
- Giving feedback based on the performance.
- User interface, graphics and sounds.
- Communal collaboration.

What kind of functionality fulfils these requirements?

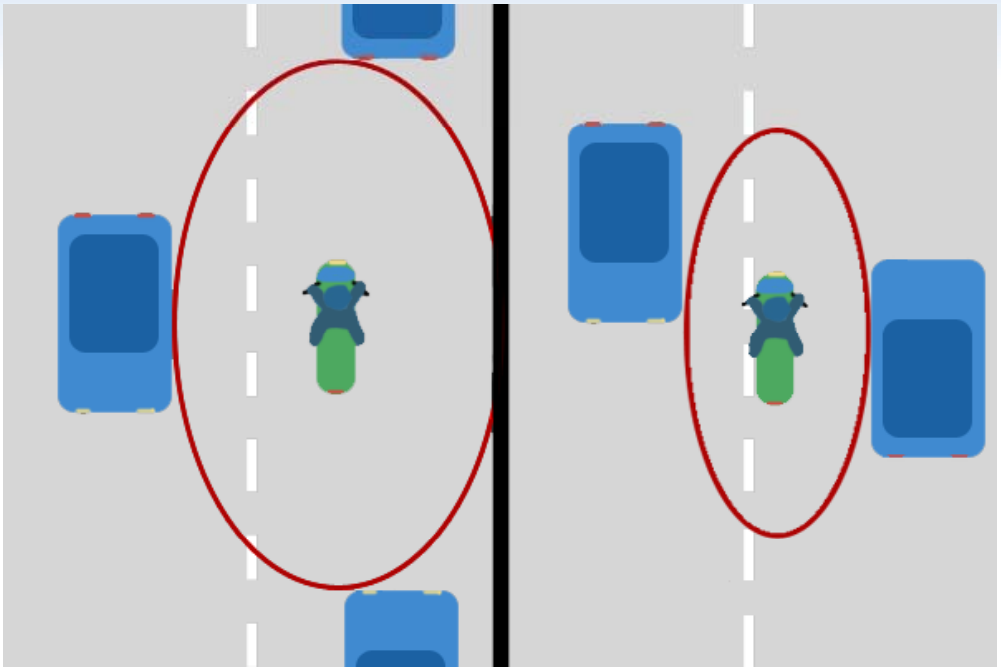
4. Basic Functionality

To meet the requirements, the following basic functionality was planned:

- The simulator is launched from a website.
- Two modes:
  - Level-based mode: practice random events with increasing difficulty
  - Exercise-based mode: practice specific manuscripted exercise
- Realistically behaving traffic
- Authentic riding environments.

4. Basic Functionality

- Riding and feedback evaluated based on the concept of the safety bubble.
- Avoiding ”crash game” behaviour.
- Simple controls suited for keyboards or joysticks



4. Basic Functionality

- Mentor offers help and tips.
- Minimal briefing and debriefing.
- Emphasize the consequences of the accidents: injuries and repair costs.
- Cartoon-like graphics with stripped-down user interface.

What is the best way to implement this functionality?

5. Possible Implementation Technologies

PC:

Pros:

- Vast numbers of PCs at homes, schools, libraries…
- People are used to computers
- Easy to connect to the Internet
- Easily updated content

Cons:

- Clumsy controls
- Varying hardware & software configurations

5. Possible Implementation Technologies

Video Game Consoles:

Pros:

- Unified device base: impressive graphics etc.
- Versatile controllers
- Development toolkits might cut down the production time

Cons:

- Different consoles require different game versions
- Inferior numbers sold (when compared to PCs)
- Royalties
- Ties to project to console vendors

5. Possible Implementation Technologies

Internet-based approach:

Pros:

- Easy and economical distribution
- User data stored on server: practice anywhere you want
- Communal collaboration and social aspects
- Web standards: guaranteed interoperability in the future

Cons:

- Slow connections may cause problems
- Requires servers

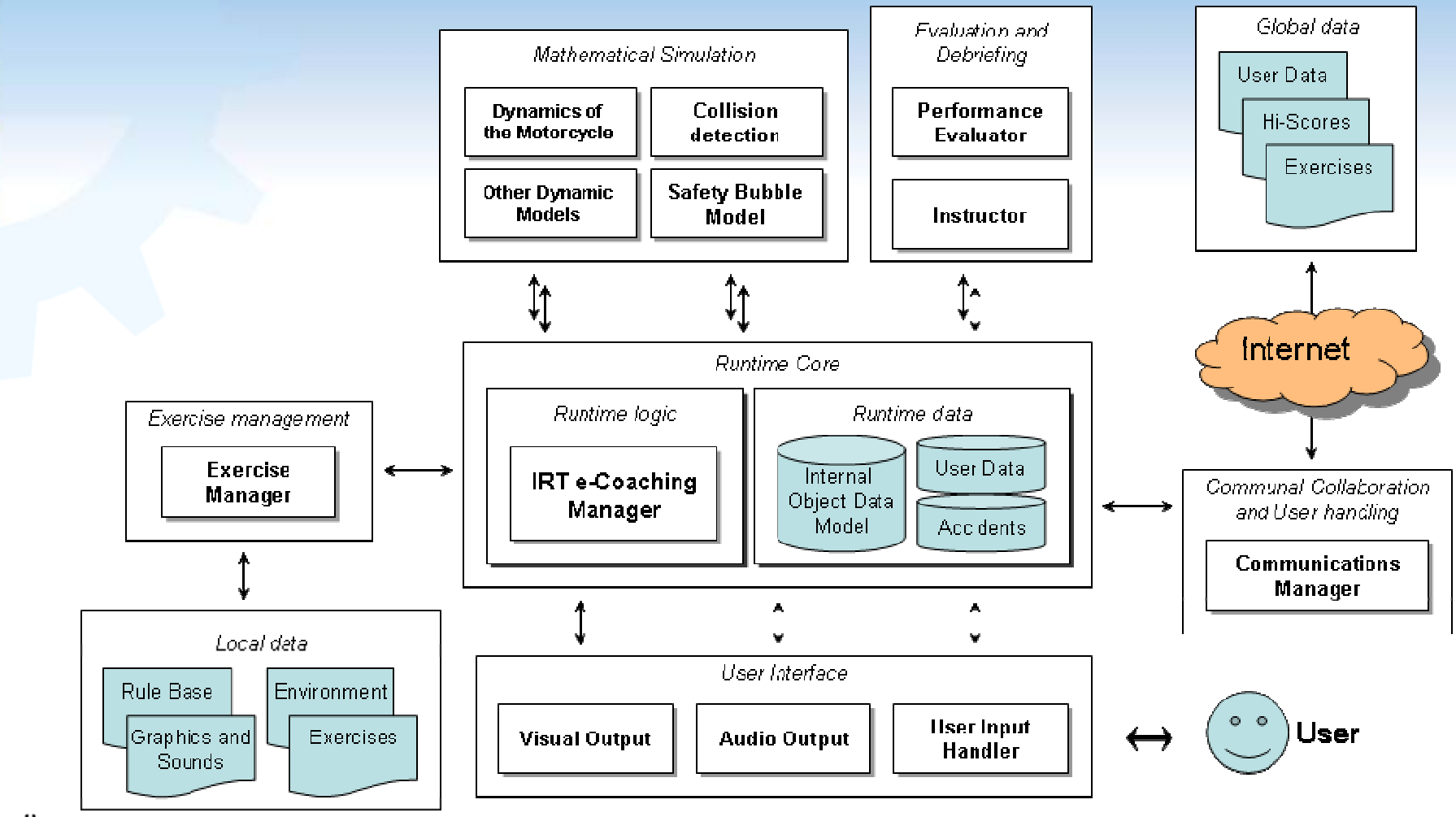
5. Possible Implementation Technologies

Recommendation:

- To easily reach the young initial rider trainees around Europe
- To fully utilise the Internet and communal collaboration
- To easily update the simulation and exercises in the future
- To be independent of any single vendor and their decisions
- No costs for trainees

Internet-based PC solution.

6. Updated modular Architectural Design



8. Project Planning

- Challenging project.
- Implementation requires an interdisciplinary workgourp.
  - Defining the exercises, curriculum and other education aspects
  - Modeling traffic events, vehicles etc.
  - Technical know-how
  - Visualisation competence
  - Graphic design
  - Intelligent preformance evaluation system
  - Game design

8. Project Planning

Cost estimate

- The expences are extremely difficult to estimate on the early stages of a software project
- 21 man-years
- Around 2,3 million euros

Schedule

- Large scale project – more planning required
- The project will last three years

Thank you very much of attention! Questions or comments?

Senior Researcher
Pekka Ranta

TUT/Hypermedia Laboratory
PL 553
33101 Tampere
Finland

phone +358 3 3115 5606
mobile 040-849 0173
email pekka.a.ranta@tut.fi