MARVin—Model for Assessing Risks of Road Infrastructure

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Idea of MARVin

Road conditions (RoadSTAR*)

Linked by the location of accident

Accident data

*Road Surface Tester of arsenal research

Portorož, Slovenia
Idea of MARVin

Combine detailed information on:

- Road Geometry (horizontal curvature, gradient and crossfall),
- Road Surface Condition (roughness, rut depth, texture depth and skid resistance)
- and Road Accidents.
RoadSTAR – Road Condition Monitoring

Pavement Management - Road Safety

- Skid resistance
- Texture (cracks)
- Transverse evenness (ruts)
- Roughness

- 250,000 measured values/km at 60 km/h
RoadSTAR – Registration of route/trace parameters

Inertial navigation gyre incl. dGPS-System

- Curve radius
- Transverse slope
- Longitudinal slope
- Actual longitudinal profile
- Registration of lane (Possibility of creating route graphs)
MARVin – Road Safety Analysis

- Visualisation and elaboration of road condition data with arSis (arsenal research road information system)
- Correlation with road safety data
- Prognosis of scenes of accident
- Accident prevention
- Reconstruction expertise, reconstruction plans
MARVin – Motorcycle Safety Analysis

Curve radii vs. Accident Types (sample: 1358 accidents)
MARVin – Current Results

Average crossfall (q-avg) + average gradient (s-avg) – 100m before the position of accident

(run-off accidents; sample: 5918 accidents)

... road condition: WET
MARVin – Current Results

3D-Histogram:
Average crossfall (q-avg) + average gradient (s-avg) + skid resistance (μ) - 100m before the position of accident

(accident type 011: run-off right on a straight lane, sample: 1951 accidents)

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MARVin – Current Results

“Similarity Search”

Finding similarities in road geometry

(simulation and search in the whole road network)

… for Road Safety Inspection

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MARVin – Current Results

“Similarity Search”

Finding similarities in road geometry

(simulation and search in the whole road network)

... for Road Safety Audit
MARVin – Current Results

Visualisation of results
(skid resistance, crossfall, gradient, accidents...)

Portorož, Slovenia
Our goals... our commitment

Our goals are:

- Explanation of so far unexplored accident causalities
- Demonstration of the connection of different parameters for accident sources using mathematical models
- Clarification of accident events on similar route sections
- Accident analysis and crash-causes-research specifically regarding powered two-wheelers
- Innovative accident prognoses and derived preventive measures
Our goals... our commitment

We reach these aims by:

- Linkage of the road conditions data with accident data based on the locality of the accident
- Development of suitable mathematical models for the verification of accident causalities
- Implementation of accident-cause-research within Road Safety Inspections and Road Safety Audits
- Identification of connections between data on road accidents and traffic infrastructure and development of specific preventive measures
- Specific measures to create awareness in combination with driving education, based on detailed accident statistics and conclusions of accident analyses of motorcycles
Our Motivation...
THANK YOU FOR YOUR ATTENTION!