Telematics
MyDrive 2012
Richard Jelbert
What does MyDrive Solutions do?

To enable the insurer to assess the actual risk presented by an individual driver, based on driving behaviour and driving patterns within the road context; and price that risk accordingly
What makes MyDrive different?

We understand and make simple the complex science of driver behaviour

- Driving capability is a complex mix of cognitive and individual personality elements as well as skill and competence
- MyDrive combines the expertise from three different disciplines and organisations resulting in the development of our profiling engine
- MyDrive delivers calibrated, contextualised outputs which add real value
What is Black-Box technology?

• Also known as telematics and telemetrics
• Phrase comes from aircraft data recorder and shares similar technology
• Not always considered as a positive in the consumer context
• Installed in road vehicles for fleet management for over 20 years
• Costs are coming down so new markets are opening
• The box simply captures location, speed data and the acceleration forces on the vehicle.
• Some solutions simply record the data in the car, some send the data to a service provider for analysis.
• There are many different types of telematics unit, each with advantages...
  – Professionally installed
  – Windscreen mounted with camera – self-install
  – OBDII “dongle” connected into the vehicle diagnostic port – self install
  – Smartphone app...
What is telematics used for?

• In the fleet management markets:
  – Tracking of assets
  – Routing efficiency
  – Vehicle idling times
  – Basic driver behavior
  – Stolen vehicle
  – Driver / loan worker safety
  – Fuel efficiency management

• In the consumer markets:
  – Stolen vehicle
  – Assistance services
  – Local search

• Insurance is a new market for telematics...
  – Crash notification (FNOL)
  – Crash data analysis
  – Driver behavior profiling
  – Anti fraud
  – Driver feedback to help encourage safer driving
Telematics Crash Data Analysis

Scenario - How did Robert Smith age 19 crash? Robert blames mechanical failure. His three young passengers survive!

Where and when?


How fast? – speed time plot

Key:
Red – Left / Right (LR)
Blue – Front / Back (FB)
Green - Up / Down (UD)

CONTEXT
21:08:09 Car is travelling at 110mph

21:08:10 – Car starts to spin horizontally because FB and LR accelerometer axis swap.

21:08:13 – Car is now travelling backward as a result of spin

21:08:15 – A complete rotation of the car and then first significant impact peaking at 8g on FB axis. Probably hitting central reservation

21:08:18 – Vehicle inverts as seen by UD axis (green) inverting

21:08:25 – Vehicle at rest after 7 seconds of sliding on its roof. Total event lasted 15 seconds.
Data replay...
Crash and bump - automated classification

Using 3 axis accelerometer, record 30s rolling buffer, identify important events, compress data, upload, then classify event on server. Archive for claims management. Link to MyDrive replay.

Normal driving

Pothole strike
In the future, camera based solutions will include lane departure and headway measurements.
What are the components of accident risk?

- **Driving Style**
  Combination of personality traits and skill (situational awareness, ability to manage space, visual acuity, experience, Journey mission, attention & distractions, familiarity)

- **Road Context**
  Road types – generic road types and specific cases
  Hazards - bends, junctions, road controls (signs etc)

- **Conditions and Environment**
  Darkness, congestion, weather, setting, time, season
Driver profiling – what is safe driving?

1 Second speeds + location = geocoded manoeuvres

Context:
Sub-urban minor road, RoW, time of day

Manoeuvre: Steady Speed of 40 mph

Context:
Sub-urban minor road, bend, time of day

Manoeuvre: Braking from 40 mph to 20 mph in 3 seconds

Context:
Sub-urban major road, GW, junction

Manoeuvre: Braking from 30 mph to 10 mph

Context:
Sub-urban "B" road, RoW, junction

Manoeuvre: Braking from 30 mph to 10 mph

Context:
Sub-urban minor road, GW, junction

Manoeuvre: Acceleration from 10 mph to 30 mph

Context:
Sub-urban minor road, RoW, time of day

Speed preference markers (Pace, Aggression)

Road planning markers (Aggression, Anticipation)

Road planning markers (Aggression, Anticipation)

Anticipation marker

Aggression marker

1 Second speeds + location = geocoded manoeuvres

30 second speed data (no exceptions)

Key:  
- 0-20 mph
- 20-30 mph
- 30-40 mph
- 40-50 mph
- 50-60 mph
- 60-70 mph
- 70+ mph
Speed Acceleration analysis

Graph showing acceleration and braking loops (from last 3600 seconds)

- Acceleration from stop (Aggression marker)
- Overtaking marker
- Cruise preference
- Braking while moving (Anticipation marker)
- Braking to stop (Planning marker)
**Driver A** – Is happy to drive well above the national speed limit. Mostly in free-flow conditions because of relative low time spent at very low speeds. Does not stick to speed limits because of wide distribution of speeds particularly at high speeds.

**Driver B** – Drives at a constant and moderate high speed (peak on right). They also drive at close to the speed limit because of the peaks at various speed limits. Driver is more deliberate and consistent. They also don’t habitually travel at over the speed national limit.
### Speed Acceleration analysis comparison

**Driver A** can be seen accelerating hard from low and high speeds. High speed harsh accelerations indicate overtaking manoeuvres.

**Driver B** is very moderate when accelerating at high speeds. The large lower braking loop is probably an emergency stop.
Driver performance matrix comparisons

The plots above show part of the MyDrive driver profile as a series of colour markers. The results are broken down by road type and road setting and in each cell there are six colour icons representing the results of six key manoeuvre tests. An all-blue profile means the driver is excellent in all respects.

**Colour key:**
- Grey – no data
- Blue – ideal result
- Green – average
- Red – extreme
- Yellow – below ideal

**Icon key:**
- Sp - Appropriate speed
- Bc - Braking when cornering
- Aj - Acceleration at junctions
- Ar - Acceleration on roads
- Bj - Braking to junctions
- Br - Braking on roads

Driver A

Driver B
Driver score

These spider charts show the final driver skills score for the two example drivers. Higher scores are better.

**Primary Driver Scores:**
Expert driver score – how closely the driver is behaving compared to professionally trained drivers.

**Secondary Driver Behaviour Scores:**
- Pace score – use of appropriate speed
- Calmness – (opposite to aggression)
- Anticipation – how well the driver is anticipating road hazards
- Smoothness – based on the frequency and magnitude of braking and acceleration events.

**Driver A**
- Expert Driver Score: 19

**Driver B**
- Expert Driver Score: 89
Calibrated scores for Consistency, Pace, Smoothness, Calmness & Anticipation
Driver classification

- **“Plodder”**
  - Average score
  - Lower risk driving style
  - 60% lower accident rate

- **“Plonker”**
  - More progressive driving style

- **“Pusher”**
  - 8 times accident rate

- **“Planner”**
  - Increasing risk

Skill (Anticipation) vs. Aggression
## Example MyDrive Driver profiles

| Profile 653 | Score | Driver Score: 55  
| Complete: 96%  
| Miles in Profile: 11115 miles  
| Estimated Mileage: 51454 miles/year  
| Familiarity: 19% |
| Profile 669 | Score | Driver Score: 16  
| Complete: 93%  
| Miles in Profile: 16211 miles  
| Estimated Mileage: 75038 miles/year  
| Familiarity: 27% |
| Profile 676 | Score | Driver Score: 69  
| Complete: 62%  
| Miles in Profile: 795 miles  
| Estimated Mileage: 7137 miles/year  
| Familiarity: 25% |
| Profile 682 | Score | Driver Score: 77  
| Complete: 81%  
| Miles in Profile: 1313 miles  
| Estimated Mileage: 10614 miles/year  
| Familiarity: 16% |
| Profile 695 | Score | Driver Score: 82  
| Complete: 45%  
| Miles in Profile: 638 miles  
| Estimated Mileage: 5003 miles/year  
| Familiarity: 29% |
| Profile 70 | Score | Driver Score: 37  
| Complete: 83%  
| Miles in Profile: 3222 miles  
| Estimated Mileage: 17337 miles/year  
| Familiarity: 21% |
| Profile 726 | Score | Driver Score: 55  
| Complete: 83%  
| Miles in Profile: 1109 miles  
| Estimated Mileage: 7204 miles/year  
| Familiarity: 22% |
Driver Feedback – consumer portal

Welcome back, Paul
Your Safe Driver Score is average. To improve, leave more space between you and the car in front. More distance gives clearer views and more time to react to road conditions and hazards as they arise.

Latest Trip
Date | Distance | Score
---|---|---
20/06/2012 | 13.92 Miles | 4
19/06/2012 | 3.39 Miles | 4
18/06/2012 | 3.44 Miles | 4
16/06/2012 | 2.48 Miles | 3
17/06/2012 | 0.53 Miles | 3

Personal Benefits
- Reduce your fuel bills
  Save up to 15% on monthly fuel bills by following the driving hints on your Portal Dashboard. Safe driving is economical driving, and the advice we give you is tailored to your own driving style.

Event Log
- Event: braking alert | Time: 08:24
- Event: acceleration alert | Time: 08:47

Policy holder name: Paul Knight
Policy Start date: 20/11/2012
Total distance: 6317.72 Miles
Estimated Policy Distance: 1379.26 Miles
In partnership with RoSPA www.rospa.com
# Goals for Driver Education (enhanced GDE Matrix)

<table>
<thead>
<tr>
<th>GDE Matrix (Goals for Driver Education)</th>
<th>Competencies</th>
<th>Risk increasing factors</th>
<th>Self-evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IV. Personal characteristics, ambitions and competencies. (General Level)</strong></td>
<td>Knowledge and control of general ambition in life, values and norms and personal tendencies which affect driving behaviour • life style • peer group pressure • motives in life • self-control and other characteristics • personal values and norms</td>
<td>Risky tendencies • acceptance of risk • self-value through driving • adapting to social pressure • use of alcohol and drugs • attitude towards society</td>
<td>Self-awareness regarding: • impulse control • risky tendencies • Personal unsafe motives • personal risky characteristics</td>
</tr>
<tr>
<td><strong>III. Trip related context and considerations. (Strategic Level)</strong></td>
<td>• choice of route • estimated driving time • effects of social pressure from passengers • estimating urgency of the trip</td>
<td>Risk relating to: • physiological condition of driver • road environment (urban/ rural) • social context and company in vehicle • other motives like competition in traffic</td>
<td>Self-awareness relating to: • personal skill with regard to planning • Typically risky motives when driving</td>
</tr>
<tr>
<td><strong>II. Mastery of traffic situations. (Tactical Level)</strong></td>
<td>Knowledge and skill regarding: • traffic rules • observation and use of signals • anticipation • speed adaptation • communication • safety margins</td>
<td>Risk caused by: • poor decision- making • risky driving style (aggressive) • excessive speed • vulnerable road users • breaking traffic rules/ unpredictable behaviour • information overload • difficult road conditions (darkness, bad weather) • insufficient automatisation of basic skills</td>
<td>Self-awareness regarding: • strengths and weaknesses regarding driving skills in traffic • personal driving style • personal safety margins • strengths and weaknesses in dangerous situations • Realistic assessment of own skill</td>
</tr>
<tr>
<td><strong>I. Basic vehicle control. (Operational Level)</strong></td>
<td>Knowledge and skills regarding: • control of direction and position of car • surface grip, tyre pressure • dimensions of vehicle • technical aspects of vehicle</td>
<td>Risks related to: • insufficient automatisation of basic skills • difficult (road) conditions (darkness, bad weather) • improper use of seatbelts, headrest, sitting position.</td>
<td>Self-awareness concerning • strengths and weaknesses of basic vehicle control • strengths and weaknesses manoeuvring in dangerous situations • realistic assessment of own skill</td>
</tr>
</tbody>
</table>
What’s next in telematics and driver profiling?

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Openness
Conscientiousness
Extraversion
Agreeableness
Neuroticism
Locus of control
Experience
Coordination & Skill
Goals and values

“Why?”

Personality Traits & Competences
Personality, skills and goals determine Driving-style and Life-style aspects

Influence & control

Driving-style

Consistency
Discipline
Thrill-seeking
Aggressiveness
Confidence
Skill, Use of space
Roads and routes

“How?”

Life-style

Locations
Commute details
Car age, type & value
Times on road
Types of journeys
Credit status
Job / status, earnings
Social interactions

“What, Where & When?”
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Thank You

Any Questions?

Richard Jelbert
Email: richard.jelbert@mydrivesolutions.com