



Our onboard technologies bring easier mobility and better safety to everyone



# Real time App for onboard driving risk assessment **SafetyNex** used by Insurance Companies *(onboard telematics with smartphone for car insurance)* Evaluation of return on investment (ROI)

by NEXYAD  
Nov 2016

## **INTRODUCTION**

European and American car Insurance Companies are all currently testing onboard telematics systems (on professional electronics devices or on Smartphones), in order to study new opportunities provided by digital technologies in the evolution of their business and business models [1].

We also can see now some experiments in Asia. Indeed, digitization of the economy has an impact on insurance industry too, as new competitors such as GAFAMs (Google, Amazon, Facebook, Apple, Microsoft) come to their car insurance market with new approaches, always ready to capture value.

The main idea behind testing telematics is that it would be nice to adjust at best pricing of insurance depending on the driver. Onboard telematics is expected to « measure » usage (kind of road, day/night, number of km, etc.) and to estimate risk taken by the driver.

Reminder: we have already clearly shown (see chapter REFERENCES) in previous publications that among all these experiments we can tell:

### . FAILURE OF THE SEVERE BRAKING HYPOTHESIS

Those systems that only measure driver's behaviour (accelerations, etc.) without contextualization (they know HOW the driver drives, but it is unclear WHERE the driver is) are trivial solutions unusable in practice by car insurers, particularly by actuaries who are responsible for pricing. We do know that some solutions developed by insurers themselves (and big ones) are based on this hypothesis of « detecting severe braking » and other behaviour criteria.

We can't blame them as we made the same hypothesis when we started our research **in 2001!** But believe us, it doesn't work at all! And because accident is very rare, it will take 5 to 7 years to actuaries to detect that they lose money with such telematics solutions! To be convinced of such a prediction, just ask yourself: consider a brutal driving behaviour (harsh acceleration, severe braking, huge lateral acceleration, etc.).

Will it lead to the same driving risk when the driver drives on a disused airport, in a narrow street in front of a school, approaching a crossing road? ... Of course not. And you don't need to be an expert to notice that, this is common sense.

On the other hand, if a driver is very smooth BUT ... crosses stop signs without stopping the car, crosses roads without slowing down ... then this driver is VERY dangerous. Although this is not a brutal driver with severe braking! And you don't need to be an expert to understand that ... again, it is common sense.

So please never stop using common sense! The geographic contextualization of the driving style is absolutely necessary. [2]

As a practical demonstration, we used our risk assessment tool **SafetyNex** and we also used (real experiments with a pilot in a car on open roads) an eco-driving measurement system (EcoGyzer, by the company NOMADIC Solutions) and we compared results: EcoGyzer is very sensitive to driving behaviour. Indeed, when you do severe braking, then you always need to accelerate after, so your driving behaviour is NOT eco (as you see telematics systems that use severe braking detection for risk assessment don't measure a risk ... but a kind of Eco driving) . We could see that correlation between EcoGyzer and **SafetyNex** is ZERO [3]. So, first, common sense tells you that those solutions cannot work, and second, experiments with tools that are already available for sale shows you that it DOES NOT work, definitely.

#### . FAILURE OF THE GEOGRAPHICALLY CONTEXTUALIZED CLOUD COMPUTING WAY

Those systems offering a contextualization (recording speed and / or acceleration AND geolocation) with the promise of scoring risk in the cloud as a back office service are prohibited by the French Penal Code (Art 226-29) because from geolocation and speed (or acceleration that allows reconstruct the velocity with simple maths computing), one can go read the points of interest on a digital map (ie. Here, Google, Tom Tom), and read offenses to driving code (infringements such as speed limit crossing, taking a one way the wrong way, etc.) [4]. In France, it is prohibited to record (directly or indirectly) infringements to the law or to regulation codes on computers (except if you are an Administration that is supposed to do that : Police, ...). So if you are not based in France you may say this is not a problem. Just be aware of some key points:

- European Union is about to launch a regulation pack with the same point of view (more than 20 countries)
- France is a 40 Million car drivers country. So if you develop a solution that cannot apply in France, that is too bad, in a market point of view (USA has only 130 Million cars ... so you see Europe and even France alone is a big market).
- 

We fully described the **SafetyNex** solution [5], which took advantage of 15 years of collaborative research with researchers and Road Safety experts, and that now offers a solution proven and unique that:

- . estimates both usages (time slot, global location by big areas, km/miles, kind of road infrastructure – urban, countryside, highways - , ...) , risk profiles, and risk classes. ALL computation is made INSIDE the smartphone (no indiscreet data is recorded on a distant computer, estimated risk is the « real risk taken by the drive », proven and validated on 50 million km by researchers on road safety community).
- . uses the cloud only for storing statistics then it is compatible with French law AND with respect for driver's privacy anyway.
- . warns the driver in real time before entering a risky area (then the driver has time to slow down), which affects the risk and loss experience: **SafetyNex** reduces accident rate by 20% (and there is NO other car telematics system that can promise that) [6].

Now, this paper provides an assessment of the return on investment (**ROI**) for car insurers after massive deployment of **SafetyNex**.

## **SAFETYNEX APPLICATIONS FOR CAR INSURERS**

As explained in the previous paragraph, **SafetyNex** can reduce by 20% number of road accidents [6]. The 20% rate is calculated simply and formally, using the State of The Art on Road Safety Research: studies in accident analysis and road safety research show, after years of observation, that the reduction of 1mph on vehicle speed reduces accident rate by 5%.

Since **SafetyNex** warns the driver BEFORE a danger, then the driver can slow down and thus reduce speed, thus avoiding accidents. A simple propagation of the published paper (5% for 1 Mile per hour speed reduction) leads to an efficiency estimation of **SafetyNex**: 20% of accident rate reduction. We can say that 20% is demonstrated in a formal way (ask yourself how many car telematics system scan give you the same formal demonstration, based on research results, with references that you can read yourself).

Given this 20% accident rate reduction, given functionalities of **SafetyNex** (recording usage, risk profile, risk category), then it is possible to imagine several applications of **SafetyNex** by car insurance companies:

### . Pay as you drive:

**SafetyNex** saves usage (km city / highway / motorway, dayparts, etc.) for a usage-based pricing.

### . Pay how you drive:

**SafetyNex** records risk profiles and risk classes (Validation of the risk meaning was made on 50 million km under French collaborative research programs « PREDIT » on Road Safety) for a driving behaviour based-pricing.

### . Prevention:

Insurer can clusters profiles and risk classes, and then offer training courses adapted to people who take the same kinds of driving risk, to modify (and not only measure) the risk taken by those drivers.

### . Training of young drivers:

Young drivers use to start their driving experience with their parents coaching them, and before they can buy their own car, they use to drive their parents car. **SafetyNex** helps young drivers to progress, as it will alert every time that the young driver will drive too fast for the danger ahead. In some countries (where cultural uses allow it, i.e. USA), you may imagine that parents read the **SafetyNex** score of their young driver and then decide if the son/daughter will be allowed to take the parents car next time he/she will ask.

### . Silver coaching:

If ever the driving risk of a driver suddenly increases, then insurer detects it as soon as it happens, and may offer appropriate support (pay for new glasses for instance, as it is very important for insurer to keep the driver driving and with a low risk).

### . Insurance for new collaborative usage of car (car sharing, private taxi, Uber, Blablacar, etc.):

The rating of drivers is a confidence indicator. Very important for companies and startups that develop new ways of car usage as services, because car insurers always need this kind of information. Indeed, insurers do not like disruption in usage, as it may change completely risk profiles.

### . Communication:

Communication between the auto insurer and the driver is mainly made through two channels: direct debit on bank account, and the declaration of loss / accident. This is not very positive. Nowadays, insurers need to gather their customers like social networks do, if they want to offer new services, communicate with viral messages, etc. Offering **SafetyNex** to their customer, showing that it may

save the driver's life, is a more positive way for communication. In such a case, the real question: what is the cost for deployment? What is the expected Return On Investment (ROI)?

## **ASSESSMENT OF ROI FOR SAFETY NEX DEPLOYMENT**

To perform this assessment, we start from the published statistics on French car insurance market. Of course, we do not have the exact data but only the published ones that may be a little different from those that you have on your insurance database. In such a case, or if you are not based in France, then you will be able to adjust by yourself our assessment.

The idea is that our work is auditable and thus easily modifiable if necessary by your experts.

Major researches on Road Safety those last years all agree to publish that a vehicle speed reduction of 1 mile per hour can reduce accident rate by 5% [6].

Published data for France market are:

- . fleet size in France: 40 Million drivers
- . number of road accidents: 7564000
- . Total amount repaid by auto insurers in France: **10 billion euro** (to convert in US \$, go to <http://fx-rate.net/EUR/USD/> )

These assumptions allow us to simply calculate the following statistics:

- . average cost of an accident: 1,322 €
- . accident rate per vehicle: 0.1891
- . average annual cost of a vehicle to the insurer: 250 €

Considering an average premium to € 400 (that is very low compared to other countries, so reshape your own estimation using the same method than us), this gives an average margin per vehicle than 150 €.

Propagation of the 20% accident rate reduction:

For a 20% accident rate reduction, it modifies previous values as following:

- . number of road accidents: 6051200 (decreased)
- . average cost of an accident: 1,322 € (unchanged)
- . total amount refunded by insurers: **8 billion euro ( 2 billion euro saved !)**

Then you save 2 billion euro every 40 Million customers, or 50 000 000 € saved for every million customers.

Which leads to:

- . accident rate per vehicle: 0.15128 (decreased)
- . average annual cost of a vehicle to the insurer: 200 € (decreased)

By integrating a cost of **SafetyNex** of about 20 € per driver per year, this leads to:

- . average margin per vehicle: 180 €, an increase of 20% margin.

But that is not all. Reducing speed in dangerous areas (those that produce accident) reduces by 20% accident rate, but it also reduces accident loss as every non avoided accident happens with a lower speed. We do not have published statistics on it, but NEXYAD has been working for years for car manufacturers as a outsourced maths service and we made a lot of studies to predict the influence of Emergency Braking Systems on accident and number of death reduction (working with accident data base of French police such as M.A.I.S. and others).

Using that knowledge of accident, we make the assumption (it is an assumption because we could not find it in any official publication), that **SafetyNex** reduces accident loss cost by 5%. Again, do your own hypothesis and recalculate the profit.

This assumption leads to:

- . number of road accidents: 6051200 (unchanged compared to the first impact of **SafetyNex**)
- . average cost of an accident: 1 256 € (5% decreased)
- . total amount refunded by insurers: **7.6 Billion euro** ( **2.4 billion euro saved** !)

And then:

- . accident rate per vehicle: 0.15128
  - . average annual cost of a vehicle to the insurer: 190 € (decreased)
  - . average margin (same premium and even cost **SafetyNex**): 190 €
- A margin increased by 27%.

## **CONCLUSION**

Depending on business strategy, with **SafetyNex**, it is possible to modulate insurance pricing (UBI) or to keep them unchanged. **SafetyNex** is the only onboard telematics App that really makes sense for car insurance: without telematics, good drivers pay for bad drivers. It is interesting to modulate (using telematics) the repartition of prices (a little more expensive for bad driver, giving back money to good drivers). But if good drivers are more numerous than bad drivers, the effect will be very small, and if the insurance company gives back more money, margin is reduced.

With **SafetyNex**, first, you know that you INCREASE your margin, and second, you ask yourself how you may give back money to drivers ... **It is a completely different approach!**

## **REFERENCES**

- [1] [https://nexyad.net/Automotive-Transportation/Papers/03\\_Deep\\_changes\\_in\\_the\\_business\\_of\\_car\\_insurance.pdf](https://nexyad.net/Automotive-Transportation/Papers/03_Deep_changes_in_the_business_of_car_insurance.pdf)
- [2] [https://nexyad.net/Automotive-Transportation/Papers/01\\_THE\\_ULTIMATE\\_SOLUTION\\_FOR\\_INSURANCE\\_COMPANIES\\_THAT\\_NEED\\_ONBOARD\\_RISK\\_ASSESSMENT.pdf](https://nexyad.net/Automotive-Transportation/Papers/01_THE_ULTIMATE_SOLUTION_FOR_INSURANCE_COMPANIES_THAT_NEED_ONBOARD_RISK_ASSESSMENT.pdf)
- [3] *"**SafetyNex** & **EcoGyzer** applied together on open road driving in order to measure Driver's Behaviour Signature : case of the « Quiet-Dangerous Driver"*
- [4] [https://nexyad.net/Automotive-Transportation/Papers/02\\_Onboard\\_measurement\\_of\\_risk\\_of\\_accident\\_with\\_SafetyNex.pdf](https://nexyad.net/Automotive-Transportation/Papers/02_Onboard_measurement_of_risk_of_accident_with_SafetyNex.pdf)
- [5] *« **SafetyNex**, a SmartPhone App that revolutionizes the automotive world : smart vehicle, car insurance, fleet management, digital App for retail Nudge »*
- [6] [https://nexyad.net/Automotive-Transportation/Papers/04\\_Smartphone\\_App\\_SafetyNex\\_reduce\\_accident.pdf](https://nexyad.net/Automotive-Transportation/Papers/04_Smartphone_App_SafetyNex_reduce_accident.pdf)

**Note** : those references are written by NEXYAD and they use themselves REFERENCES written by NEXYAD but also **by the international road safety community** then you have access to every published researches results and data that we used. Enjoy.