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A deep dive on the applications of IoT in the Insurance Industry

How to turn sensor readings data into meaningful insights, increase customer experience and develop new services to outcome the competitors.


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coverage. But how is the price of the insurance premium actually calculated? Traditionally, domain experts (the Underwriters) would use historical data of similar customers and their policies to define a price for the potential risks. With the rise of Data Science, the insurance risk is now calculated using Machine Learning Pricing models which support Underwriters' decisions by detecting complex patterns in historical customer data.

The underwriter's contribution is crucial. They bring knowledge and understanding of the customer but things are starting to change. Insurers are rethinking how to improve: the customer relationship and the risk assessment of each customer.

Why now?

IoT collects readings from small sensors. This obviously produces tons of raw data that needs to be processed, aggregated, etc. These operations are usually very computationally expensive and it has been one of the biggest challenges so far. However, with the recent technological boom, some key aspects are now no longer a barrier.

One such development is the growth of big data tools and cloud computing. These tools allow businesses to process huge amounts of data collected from IoT sensors in real-time. Also, because of the high demand for sensors and microcontrollers, as we can observe in the below graph, the cost of IoT ownership has decreased and the processing power has increased and so it is no longer the bottleneck of IoT solutions.

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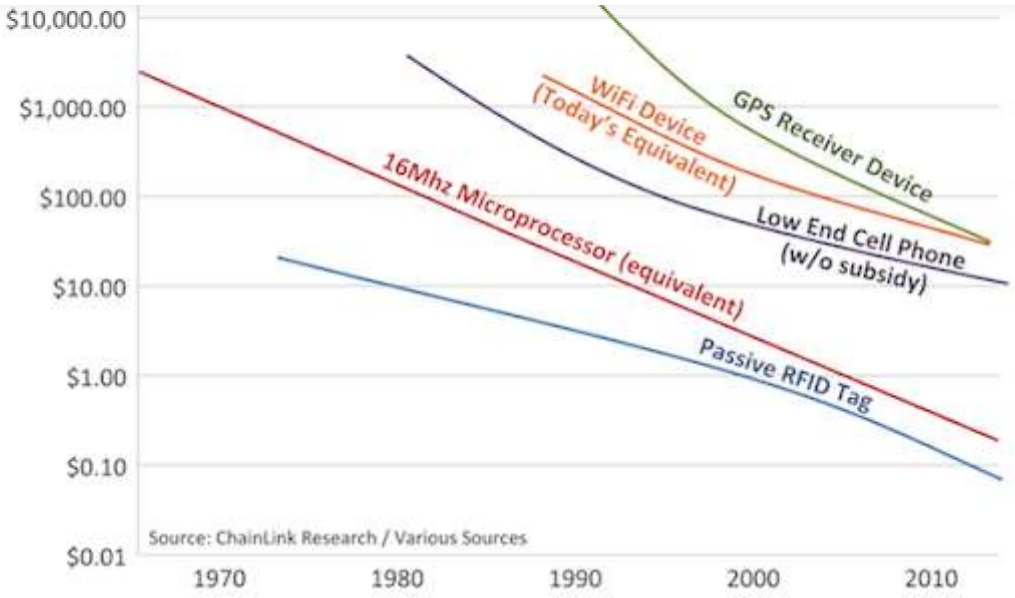

Source: ChainLink Research

We can see in the market cheap microcontrollers with enough power to efficiently perform edge computing and run inference for Machine Learning algorithms.

Advantages

Now let's head into the important part: **how exactly Insurance companies can benefit from adopting IoT solutions?**

New revenue sources

Insurance companies get their revenue by charging their customers premiums in exchange for insurance coverage. With this in mind, **new services and products can be developed** — by analyzing customer data we can get insights on what could be a new product that would have a high demand on the market, provide additional services like predictive maintenance and recommendation of services.

IoT could also help insurance companies cross-sell to customers. With more data about customers and their behaviors, there may be scope to suggest new customized products, make recommendations for each customer and create a network of partners such as car repair centers or MoT specialists, where repeat businesses and commission opportunities may well be explored.


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allow Insurance companies to save billions each year by easily detecting fraudulent claims by analyzing sensor data.

Also, a more accurate risk assessment is possible since underwriters will have much more data from each individual customer to make a custom risk analysis. Dynamic Insurance policies will not only protect the Insurance companies by adding penalties for customers' bad behavior but will also encourage them to be more careful by rewarding the good behavior.

Predictive Maintenance and Warning Services will cause billions of dollars of savings every year because changing a potential cause of an accident (for instance a leaking pipe) is much cheaper than repairing all the damages caused by that accident which would eventually turn into a much bigger claim.

Improve customer experience and relationship

here are only two points of contact between the insurer and the customer; first when the terms are agreed, and second during the renewal or cancellation process — unless there is a claim. Insurers have little contact with people they serve and these are often done by automatic emails or phone calls. Limited exposure to the customer over time makes it difficult for insurance companies to build positive relationships and engage customers.

The fact that we can have real-time information about the client, **allows us to often communicate with the customers** by providing new services like warnings, recommendations, creating loyalty programs, and an award system for good behavior. This brings a whole new level of customer experience that will likely **reduce the churning rates** and allow to be more competitive not only by reducing the premiums price.

Challenges

IoT devices represent opportunities but also challenges. One major challenge is to convince customers to give away their personal data. According to a survey by Deloitte,


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Legacy IT systems may also present a problem. Data management and warehouse platforms may need to be redesigned to harness the full potential of the IoT real-time data. Many insurance companies may be apprehensive about introducing new technologies which are to some degree untested as of yet.

People in the industry may also present a challenge. There has also been some industry debate as to whether the use of IoT may reduce the need for the specialist skills of some staff in the insurance sector. As such, some teams may seek to challenge and question the benefits and the introduction of the technology.

Privacy and security issues are also major concerns. IoT technology deals with highly sensitive and very personal information about customers, where they go, when, and how. This type of detail about an individual comes with an unrivaled level of personal sensitivity about what a business could do with it and shows no signs of abating.

Lastly, if these systems show good results in preventing claims situations, the exposure to risk would be minimal and so the policy price would have to drop dramatically, eventually harming the Insurance business.

Application Areas

There are dozens of application fields in the insurance industry and many more are yet to come. A few examples of these fields and how IoT technology can make a difference.

Auto

Using telematics to track driver behavior, with a simple mobile device (or even a mobile phone app) insurance companies can monitor in real-time the driver routes, speed, acceleration, steering wheel rotation, among others. The more recent vehicles already have embedded a lot of sensors; getting access in real-time to these values we would be able to also track engine temperature and pressure, oil level, brakes, seat belts detection, human presence detection, temperature, and humidity inside the car

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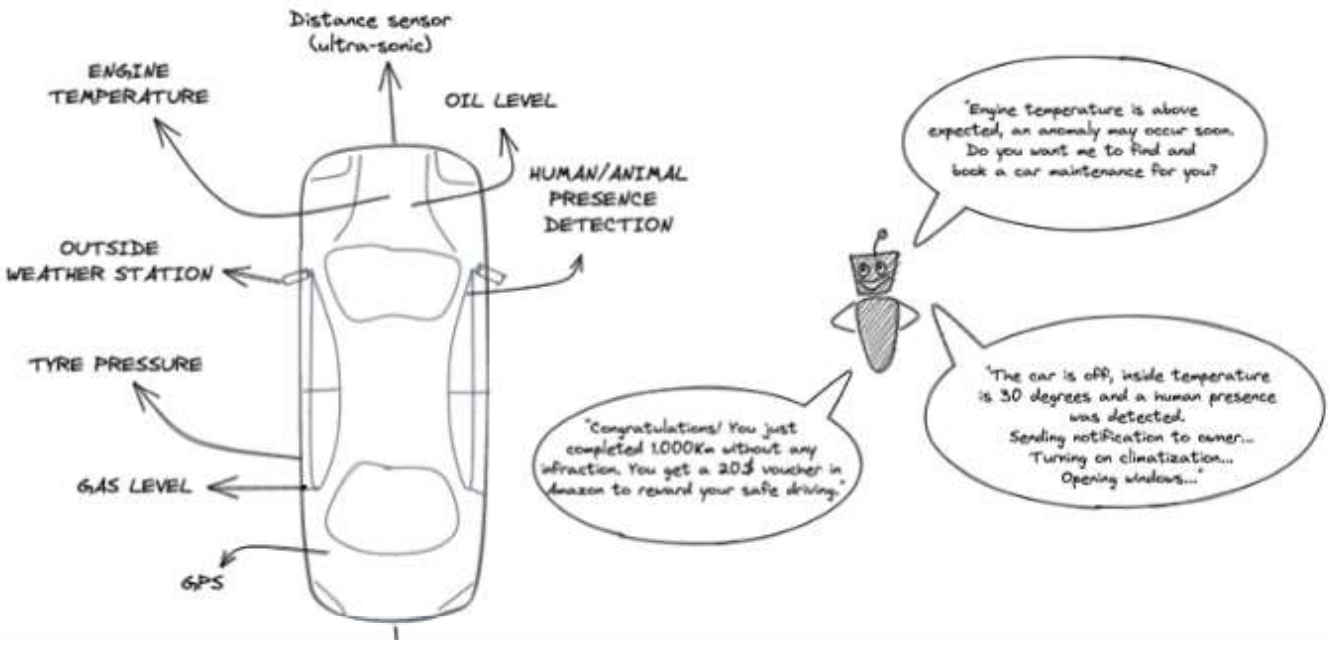
policies to **reward good behavior** and add penalties in case of an infraction or risky behavior.

- **Predictive Maintenance** using anomaly detection machine learning models to easily detect a need for maintenance in the brakes, engine, oil, etc… before something crashes and turns into a much higher claim for repairing the damages.
- **Reduce fraudulent claims** by analyzing the collected data in the event time frame to understand if the driver was negligent, it was caused on purpose if the impact measured by the sensors and the driver behavior matches the report description.
- Warn in case it **detects the presence of a human being or animal forgotten inside the car** and activates an emergency plan with a warning to the customer, opening windows, turning on air conditioning, etc..
- A camera to **detect driver facial expression and detect dizziness, somnolence, or alcohol** and throw a warning or automatically stop the journey safely
- **Gamification** of driving promoting defensive behavior, gas-saving, and a measure of how ‘green’ their driving is.

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And this is just a fraction of services that we could deliver to the customer to both increases their safety (and hence reducing risk) but also to provide a good service, avoid churning to our competitors.

Home

Smart Homes are one of the areas with the most potential. Smart doorbells, smoke alarms, vigilance systems are things that are present nowadays in a lot of homes. By having access to these device's data, insurance companies would be able to deliver services to avoid accidents and provide a better service to the customer. Here are a few:

- Moisture sensors or thermal cameras could **detect mold in a wall and warn for a possibility of water pipe leakage before the damages get too deep** and turn a small maintenance work into a high claim to repair the damage, host customers during maintenance time, and pay for damaged goods.
- People pay a lot for vigilance services every month. Smart bells, window/door sensors, human detection cameras could easily **detect a robbery and automatically call the police**, lock doors, turn off lights, record the several divisions of the house.
- Smart smoke and fire alarms could **detect a fire caused by a short circuit while no one is home and automatically call the firefighters.** This would save a lot of money in the high claims for the damages and goods lost usually presented in this type of incident.

Health

Smart Health devices could really improve reducing risk in the health and life insurances. There are bracelets that cost less than $30 that are able to measure in real-time our heart rate and sleep quality, devices to measure the sugar in the blood, among others. Having our customers using these, the following examples could be easily achieved:

- Elder people seek smart devices that provide them independence. U**sing these**


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discounts, prizes for goals achieved, loyalty plans, etc.

- Socks or shoes that can **alert diabetics on potential ulcers** and others that can prevent future high hospital claims, medical surgeries, disability claims, etc.

Again there are a ton of other products and services that could be provided that would benefit both the insurance company as well as the customer.

Industry

The industry is a whole world for insurance products so each sector has its own possibilities. Some examples that are more general across all the industries are the following:

- Embedded sensors in commercial infrastructure to monitor environmental conditions and quickly **detect smoke, co2, mold, and other measures and automatically adjust the environmental** conditions to prevent potential harmful events.

- Wearables on workers to track location and warn if they get close to a dangerous place. Also, this would **prevent fraudulent claims of workplace accidents**.

Real-Life Use Cases

Progressive

The Progressive car insurance company has installed a smart device to monitor telematics and is able to rate, using Machine Learning Techniques, how well the driver performed in each journey. This way, they say “they are able to price more accurately each customer individually based on his behavior rather than the living location or hobbies also promoting safe and environmentally-friendly driving. Progressive partnered up with Zubie, the maker of a device that tracks this telematics and allows customers to see their data and how much and why they are being charged for the insurance.


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the insurance premium in exchange. This way, Liberty can detect a possible fire situation and call the emergency number automatically, preventing higher damages. The customer gets not only a 5% discount but also a Google Nest device for free.

John Hancock

The health insurance company partnered up with Vitality and offers a Fitbit to each customer to monitor their health and lifestyle. This opens a communication channel to engage with customers, monitor possible issues, and also promote a healthy lifestyle by rewarding good behaviors, gamification, partners discounts offers, etc.

Beam Digital

Dental Insurance is one of the most expensive in the health sector. Beam Digital provides a free smart toothbrush connected to an app that allows monitoring of oral health and uses that information to support the pricing of the insurance. Beam encourages good brushing habits and notifies if the customer is not brushing as often as he should. These good habits are rewarded in premium discounts, offers, services, etc. The company offers this toothbrush and hopes to reduce premiums on an average of 25%.

American Family Insurance

Smart Doorbells are one of the most used smart home devices. AFI in partnership with Ring is offering a 30$ discount to customers that purchase this device to reduce the risk of home robbery and help prevent fraudulent claims.

Oscar

Another health insurance startup, with Google as one of the major investors, has partnered with Misfit to give 1 Misfit Flash bracelet to monitor customers' lifestyles. Each customer that uses this wearable gets the chance to win up to 20$ in Amazon credit if they fulfill their health goals. The Oscar app also has a lot of other features like exercise tracking, doctor finder, and health historical data.

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businesses and in particular, insurance companies build better insights about their customers to potentially create better services. But it takes time and effort to weigh up all the factors and get started.

As with many data-centered services, the difficulty of entering the market grows exponentially since more data makes a better service, better services bring more customers and more customers generate more data.

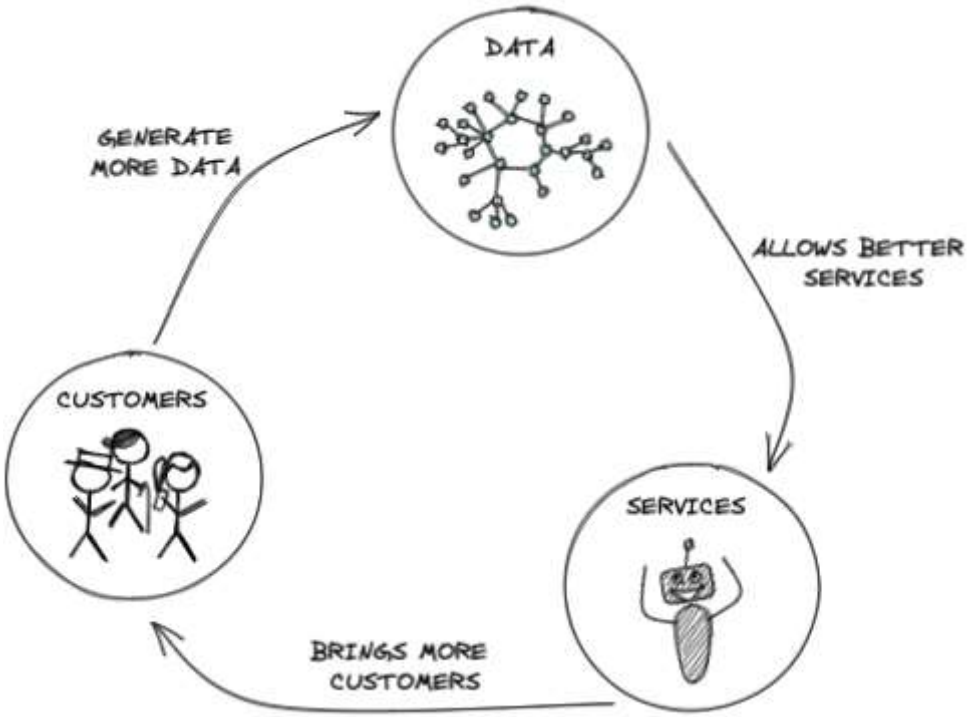

Image by the author

One important note to mention is that in order to start working with IoT-generated data it doesn't require a full team of hardware engineers, electronics experts, development of the devices, and maintenance. These services can be easily found in the market by several companies that have their own devices and they simply expose the collected data to the Insurance company through an API. All you need is to select the best partner for smart devices, redesign, and start making use of the collected data.


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