

## **Project: SAVE – Smart Alarms & Verified events**

### **MACHINE LERNING HELPS TO REDUCE FALSE ALARMS**

Big data scientists at ZHAW School of Engineering are developing a system being able to match then-thousands of alarms and false alarm records. Therewith false alarms should be identified before they cause cost.

Everyday hundreds of alarms are being sent to monitoring centers in Switzerland. The monitoring centers are then mobilizing the responsible public emergency services. Due to the fact that a considerable amount of incoming alarms being false alarms, police and fire brigades move out in vain – but not for free. Every alarm received by the monitoring center is being charged. On the one hand, alarm system owners therefore have an economical interest in keeping the amount of false alarms small. On the other, having fire brigade or police at the doorstep for no reason is an inconvenient situation.

In a research project funded by "Commission for Technology and Innovation" CTI, ZHAW School for Engineering, in collaboration with Sitasys, develops a solution to reduce the number of false alarms.

### **MANUAL ALARM VERIFICATION WITH TECHNOLOGICAL ASSISTANCE**

"We are working on a system which can tell a true alarm from a false alarm, with high probability" Kurt Stockinger from ZAHW Institute of applied information technology explains. But how can one technically tell a true alarm from a false alarm? He and his team relying on machine learning in doing so. For this matter the researchers are collecting data about alarms and false alarms - the so called training set. "The more data we have, the better we can train the automated error detection – specifically our project partner has provided us several hundred thousand records" says Kurt Stockinger. "Alarm as well as false alarms do have certain characteristics and patters which are to be identified". At it, point in time, place and duration until the alarm is reset are the corner stones. The system matches the current alarm with archived data and can therewith suggest whether it is a true alarm or a false alarm. Here, the customer is put into the loop to make a decision, based on the suggestions, whether the alarm should be send to the monitoring center or not. This allows him to suppress the false alarm before generating cost.

### **MATCHING AGAINTS 15'000 RECORDS PER SECOND**

However when the alarm represents a real emergency, every second counts. The target of the researches therefore is identifying the authenticity of the alarm in a minimum of time. "To process amount of data at this scale, we need sufficient bandwidth and computing power" says Kurt Stockinger. We can match an incoming alarm against 15'000 records per second." Therewith it can be told whether the alarm is true or false within a few seconds. "However achieving a suggestion which is 100% accurate can never be reached." says Kurt Stockinger. Further, many customer would not trust machine learning entirely. "Many still see this as a kind of black box." Along with the automated suggestion the system additionally gets the possibility to see a history of similar historic alarms. "Thereby one does not have to trust the system blindly, but can connect the dots independently and let empirical values slip in" Kurt Stockinger explains. The possibility to look into the past makes it easier for the customer to come to a decision. And the system learns with every alarm.

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Kurt Stockinger, Institute of applied information technology

## **UP TO DATE WITH SOCIAL MEDIA**

According to Kurt Stockinger the first test runs went well. "Our algorithms are showing a hit ratio of over 90 percent in the suggestion for alarms". In order to improve the ratio further, the researchers want to include activity in social media as an additional data source. With this, the system can be fed with additional information concerning current events: "With text recognition we want to collect additional evidence about possible false alarms" says Kurt Stockinger. "We look into the textual sources to filter for viable information like event, location and time. The researchers not solely want to use the information in combination with their algorithms but also visualize it on a map. This increases the probability for the suggestion and meanwhile the customer can use this map as a third decision aid for the verification of an alarm.

## **SAVE MONY WITH ALARM VERIFICATION**

The project partner Sitasys is a leading alarm transmission provider in Switzerland and plans to offer the system as-a-service in the future. "The cost for a false alarm are quickly amounted to CHF 1000-2000" explains Peter Monte, CEO of Sitasys. "With the verification help which ZAHW School of Engineering developed together with us, put into the loop, our customers will save real money." Further, the project partner publish a so called "Security Heat Map" listing true alarms statistically and using different shading to visualize it. The map thereby reveals, in a representative way, where events are to happen more likely and where less.

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