Reporting Tuner
[Incident Reporting Tool]

ProtectRail
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May, 2014
Optimal decision making requires full knowledge of (all the) facts about a situation or an environment.

Knowledge (information) is captured by sensors.

Ideally the sensors’ network should:

✓ Provide information about the environment variables;

✓ Cover every relevant location;

✓ Monitor every relevant variable (temperature, counting, density, disturbances, people grouping, etc.);

✓ Require low CAPEX;

✓ Have low complexity and installation cost;
In a real environment and project, some of the relevant variables are difficult to monitor;

To stay within a reasonable budget, the range and number of sensors that may be deployed is usually much lower than the adequate/ideal.
An ideal sensor should:

- Be capable of capturing different environment variables;
- Be able to cover different locations (mobility);
- Have high processing capacity (capable of analysing and evaluating events);
- Be present almost everywhere (ubiquitous);
- Be able to send the monitoring results to a CC;
- Large autonomy;
- Easily rechargeable;
The Human (sensor):

- Is capable of capturing different environment variables (vision, sound, smell, movement, ...);
- Is movable, roaming through different locations throughout the day;
- Has high processing capacity (analyses the information it collects);
- Is present almost everywhere (of interest);
- Has sophisticated communication skills;
- Is autonomous for large periods of time;
- Is easily rechargeable (a sandwich and a glass of water);
In conclusion, Humans are sensors that “comply” with most of the ideal requirements for a sensor;

But have some weaknesses:

- Different sensors may understand the same event differently (age, education, perception, etc.);
- The sensors may be directly affected by the event (e.g. burglary);
- In some cases the sensors make deductions that have no concrete support (intuition);
- Their communication skills are variable and there is no standard communications protocol to overcome this issue;
- Under stress, the sensors are prone to errors or bias;
How to use humans and their abilities to credibly report events?

Include “control” mechanisms to identify, reduce or mitigate their weaknesses

- Perception homogenization;
- Control involuntary error reporting;
- Control voluntary error reporting;
- In general evaluate error input;
Add a continuous evaluation of the report reliability and criticality

- Identification of the source of the report (staff, type of staff, passenger, type of passenger, type of usage, ...);
- Evaluate content consistency;
- Identify event location and time of report;
- Identify and evaluate similarity with other events at the same time period and location;
- Identify and evaluate similarity with past events;

Have a continuous update of the environment “characterization” based on the reports received and their evaluation and follow-up.
The reporting process

User login

Step 1

Start report

Specify event

Refine event

Step 2

Step 3

Report status

Evaluate criticality

Refine location

Close report

Step 4

Step 5

Step 6

Step 7
Network and parameter setup; Report evaluation
Event management; Post-processing analysis and reports

Operators/Managers

Transportation Authority

Metro Operator

Rail Operator A

Security Authority
(Police, emergency services ...)

New network setup; Report evaluation Event management; Post-processing analysis and reports

Authorities

User1

User2

User3

UserN-1

UserN

Interface development

App Developpers

GUI format design/development

Users

App Developpers

GUI format design/development

Users

App Developpers

GUI format design/development

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GUI format design/development

Users

Supplied by Various Authors
Main features

- Reporting media
  - Smartphone App
  - Web Browser (No application needed)
  - Use of standard hardware (smartphones, tablets, laptops, ...)
  - Usable in open (public) or private networks

- Reporting process
  - Structured reporting
  - Dynamic GUI
  - Very limited number of reporting steps
  - No partial message loss
  - Continuous evaluation
  - Registered users may receive information

- Data collection and analytics
  - Report and data analysis
  - History analysis
  - Reporting pattern characterization

- Reporting modes
  - Critical events
  - Operational events
  - General information

- Report evaluation
  - “User reliability”
  - Message criticality
  - Message consistency
Applications

- **Locations / situations**
  - Transportation Networks
  - Shopping Malls
  - Sports events
  - Airports
  - Large scale events (music festivals)
  - ...
  - Virtually any location or situation where sensing or reporting may be relevant

- **Type of reports**
  - Security events
  - Assistance / information request
  - Traffic update
  - Disturbance report
  - Critical events (terrorism, vandalism, ...)
  - ...
  - Virtually any report
Trespassing/restricted area encroachment

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