

Platoi's Global Leak Detection, and Infrastructure Remote Monitoring System - GENWS

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Summary

Platoi Industries Inc.^[1] is a Cleantech start-up serving the energy & utility industries. We are the first to provide the Oil & Gas industry with advanced remote-sensing threat intelligence continuous monitoring SaaS platform that can

1. detect where and when oil and gas leak & spill incidents will happen so that our customers can act in a timely way to prevent and mitigate the damages resulting from these incidents.
2. predict incidents that are environmental and natural in origin, which in turn threaten upstream, midstream (pipeline, stations, etc.) and downstream (storage, etc.) sectors.

There is very limited knowledge known to the industry on when and where the next incident will strike. We solve the problem with continuous satellite spectral data & proprietary spatiotemporal deep learning analysis only! No hardware and no sensors!

Theory / Method / Workflow

To address the pain-point of “Untimely, Inaccurate and Unscalable Detection of Release of Liquids and Gases,” Platoi innovated solution - GENWS Detector™, which solely uses satellite measurements to continuously, accurately, and timely detect Oil & Gas released into the air and the environment that are caused by any given reason. Solely based on the satellite measurements, the team are innovating the AI algorithms that can distinguish the spatial-temporal pattern of Gas/Liquid Leak/Spill from normal situation - no leak.

Figure 1 depicts the inputs, outputs and dataflow for the GENWS - Detector:

1. The clients/customers will only need to provide the coordinates for the areas/infrastructure to be monitored;
2. Scripts built in the GENWS Detector will automatically and continuously collect the associated satellite monitoring for the target areas;
3. Platoi's innovated deep learning engine will analyze the collected satellite measurements from both spatial and temporal perspectives, and detect whether there is any release of gas/hazardous liquids for the target areas.

To address the pain-point of “No Existing Solutions of Predicting Incidents Caused by Natural Hazards,” Platoi innovated solution - GENWS Predictor™, which solely uses satellite measurements to predict incidents that are environmental and natural in origin. Solely based on the satellite measurements, the team are innovating the AI algorithms that can identify the spatial-temporal pattern of natural hazard and then predict the potential occurrence of the incidents.

Figure 2 depicts the inputs, outputs, and dataflow for the GENWS - Predictor.

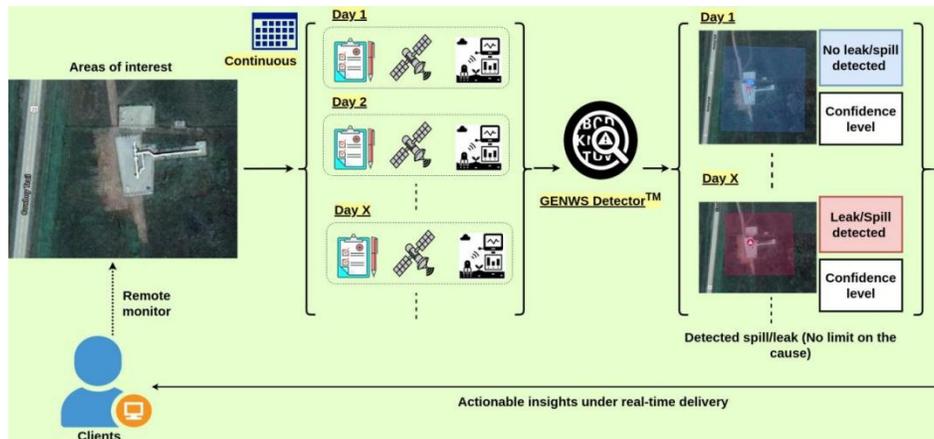


Figure 1. High-level workflow for the GENWS - Detector

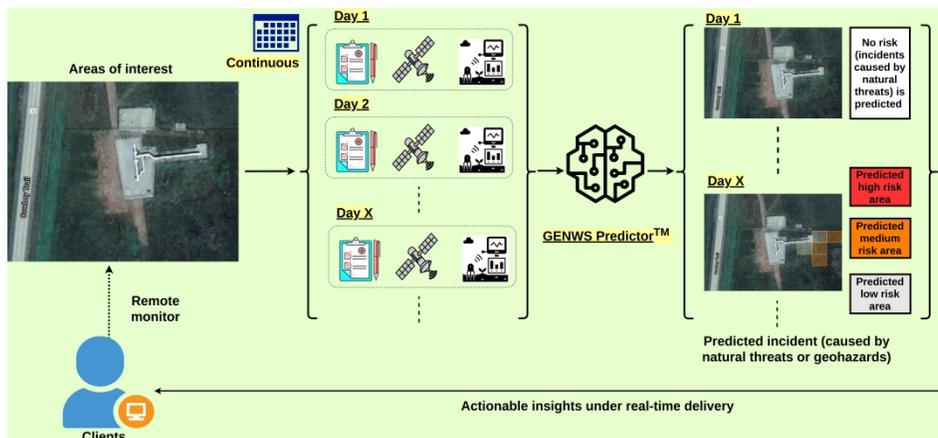


Figure 2. High-level workflow for the GENWS - Predictor

Results, Observations, Conclusions

GENWS Detector™ was tested 2016 - 2020 using USA-DOT-PHMSA^[2] significant oil/gas leak records from 1181 public incident records^[3]:

- 353 Gas leak (Distribution) caused a total loss of (US\$) 464,151,230; GENWS detected 91.5% gas leak cases and could have helped save up to \$454,453,279.
- 462 Gas leak (Transmission and Gathering) caused a total loss of \$330,902,925; GENWS detected 85.28% of liquid spill cases and could have helped save up to \$302,700,394.
- 366 Oil & Oil products spill incidents have caused a total loss of \$466,560,110; GENWS detected 88.25% of liquid spill cases and could have helped save up to (US\$) 376,472,252.

The GENWS Predictor™ has been validated on geohazards-causing incidents like the May 29, 2020, Norilsk fuel storage incident in Russia (caused loss of over \$2 billion), and June 13, 2020, Sumas Station incident in Langley B.C. GENWS Predictor™ successfully predicted both incidents at least two weeks in advance.

Novel/Additive Information

Reports from the Canada Energy Regulator^[4] have stated that over 71% of the pipeline incidents are found by employees, contractors, and the general public while only 7% of such incident are reported by the SCADA system. USA PHMSA has reported that 90% of leak and spill incidents are reported by third parties and only 10% are reported by current SCADA and pressure, flow, and acoustics monitoring systems. A calculated average time between the occurrence date of the incidents, and their reported date in Canada is 27-days and 9-hours.

There is very limited knowledge known to the industry on when and where the next incident will strike. We solve the problem with continuous satellite spectral data & proprietary spatiotemporal deep learning AI only! No hardware and no sensors! The GENWS Detector was validated with more than 1100 past incidents 2016-2020 covering a time spectrum of 57 months. We achieved more than 85% accuracy on land-based incidents and 75% accuracy on off-shore based incidents. Our technology also performed very well under complex weather conditions and various geographies covering 43 US states and the Gulf of Mexico. Our performance reports indicate that we could have saved the industry more than \$800 million of the total reported damage of \$1.1 Billion between 2016 and 2020.

References

Reference Style

- [1]. Platoi Industries Inc., <https://www.platoi.com>
- [2]. USA Department of Transportation, Pipeline and Hazardous Materials Safety Administration (USA-DOT-PHMSA), <https://www.phmsa.dot.gov/>
- [3]. PHMSA incident records, <https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-incident-and-incident-data>
- [4]. Incidents recorded by Canada Energy Regulator, <https://www.cer-rec.gc.ca/en/safety-environment/industry-performance/interactive-pipeline/incident-data.html>