Whitepaper - YOUCALL-IT

NOLEAK AGATHA

Analysis of visual anomalies from security cameras using NOLEAK solutions

NoLeak

23/04/2021

INTERNAL USE

Date	Version	Person	Comments
02/04/2021	1.0.0	Paulo Sonego	Initial Version
23/04/2021	1.0.1	Rafael Libardi	Revised Version

SUMÁRIO

WHITEPAPER - YOUCALL-IT VERSION

1. ABOUT THE COMPANY

Noleak Defense Technologies Inc is a Canadian company with a presence in North America, Europe and Latin America. Created in 2018, it is a reference in the application of artificial intelligence for security and defence, being recognized and awarded internationally for its innovation.

Lasting YOUCALL-ITship

Noleak Defense Technologies Inc is part of the BRINKS Group specializing in the Transportation of Values and security of valuable cargo and the Canadian Group DATA-H Artificial Intelligence, specializing in artificial intelligence. Within this context, we value long-term YOUCALL-ITships to solve customer needs through applied artificial intelligence.

Within the domain skills of the DATA-H group are the following areas:

- Autonomous vehicles;
- Natural language processing (text interpretation with AI, chatbots, call center automation, among others);
- Defense Security;
- Automation and optimization of processes with artificial intelligence;
- Image processing;
- Computer vision;
- Analysis of medical images;

2. SOLUTION DESCRIPTION – NOLEAK AGATHA (SCALE – HYBRID EDITION)

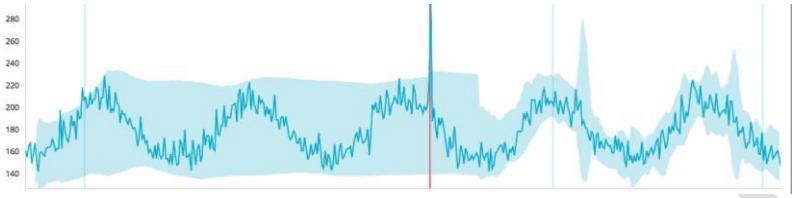
2.1. Benefits

The NOLEAK AGATHA is a rapid implementation solution that **increases operational efficiency and reduces the costs** of real-time monitoring of cameras and security devices. It enables the security company to **migrate from reactive actions to effective and preventive reactions before an incident occurs**.

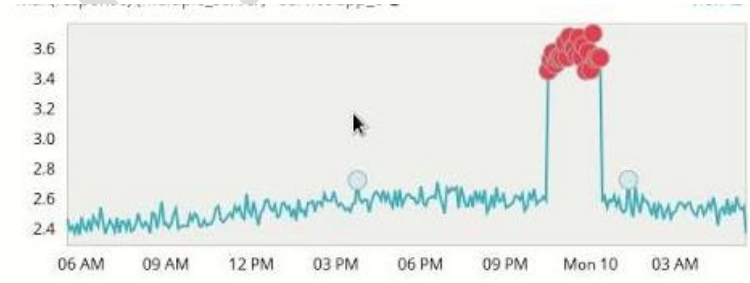
AGATHA works by monitoring thousands of existing cameras in real-time in an autonomous and 100% intelligent way, reducing the number of alerts, increasing the assertiveness of incident and anomaly detections and reducing incident response time.

As a result, it is possible to **multiply up to 80 times the number of cameras monitored by each operator**, reducing labour costs and offering the end customer a much more intelligent solution than traditional rules-based cameras and DVRs.

As AGATHA learns what happens in the environment on her own, in practice, it is as if the company had an operator looking at a camera 24 hours a day and learning the standards of that environment, such as the dates of fairs, times of entry of cars, times when it is normal to have crowds, times when it is normal to have objects standing in the scene. In these places, it is normal to have people/cars, among other things, that the solution learns autonomously. All of these features are not possible to monitor with traditional alarm-based systems and camera analytics.



In the figure above, the system does not identify anything out of the expected behaviour, so it does not generate alerts; in the case of the figure below, the system identifies an unusual situation for what is expected in that environment:



Reducing the number of false positives of traditional alarm systems, AGATHA offers a competitive advantage by bringing Security 5.0, with 100% intelligent and autonomous learning to your business. In general, the solution pays for itself in the first months of implementation.

Other direct benefits of the solution:

- ACTIVE DEFENSE to activate countermeasure devices on-site;
- REDUCTION OF RISKS compared to traditional systems;
- EFFECTIVE and ANTICIPATED actions to the occurrences;
- REDUCED cost with operators;
- INCREASED operational efficiency;
- REDUCTION in incident response time;

2.2. Features

The main functionality of the solution is based on our autonomous and 100% intelligent learning technology. With this, a series of relevant and anomalous events can be identified by the solution after learning autonomously.

Continuous and 100% autonomous learning: This feature allows the solution to learn the patterns of a specific environment and identify only what is not normal. This feature increases the alerts' assertiveness in your environment, generating only alerts relevant to the operator and that do not conform to an environmental standard.

Shared learning: This functionality allows the solution to learn from each NOLEAK customer and share this knowledge with everyone in our client base. Therefore, the system can learn to detect a new incident from another company, but this knowledge is shared with all NOLEAK customers, further improving detection and offering a relevant competitive advantage.

Simple to configure: The solution does not need complex rules configurations because it learns autonomously. The only parameter necessary to configure is the sensitivity of the intelligence—the more sensitive, the greater the number of alerts generated.

Environment and alert risk score: When correlating multiple alerts from different sensors in the exact location, it is possible to infer each environment's behavioural risk (NOLEAK BEHAVIOR RISK SCORE). This score enables the operator to prioritize alerts that are more critical in relation to others.

Active defence: It is possible to carry out autonomous interventions in the environment according to the local risk SCORE, such as triggering a fog generator, ringing alarms on cameras, among other options to deter the criminal.

Self-adapt to changes in the environment's behaviour: The system can learn the changes in the environment patterns, such as the variation in people's behaviour in periods with lockdown and without, autonomously adjusting the intelligence.

Web management interface: The solution's entire configuration is through a web interface to access from any operating system and device, including remote locations.

Batch device configuration: There is no need to configure each device manually; the settings can be batch imported into the system.

Among the incidents detected by the solution, we can highlight the following:

ABNORMAL GROUP OF PEOPLE

E.g. 5 people standing in front of an entrance can be expected on a weekday at 11:00 am, but it is not expected at 3:30 am. Concurrent systems warn in both cases, AGATHA is wise to learn that one is normal and the other is not.

SUSPECTED AND ABNORMAL ATTITUDES

Ex. A car invading the sidewalk, people jumping over the wall, pedestrians breaking into garages, criminals closing roads, among others.

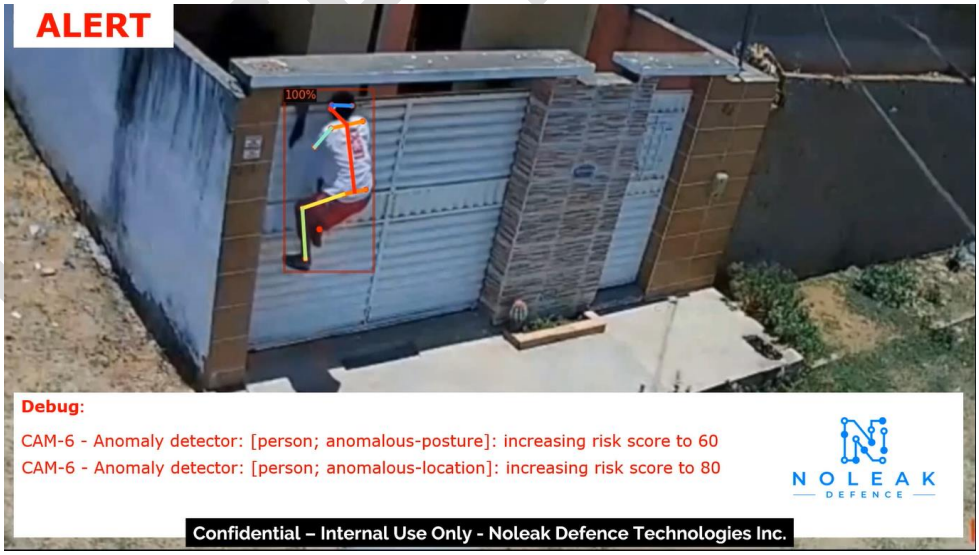


Figure 3 -Example of a residential intrusion detected by Noleak Agatha

PERSON STOPPED FOR TIME ABOVE NORMAL (LOADING - AUTOMATIC)

Ex. It is normal at a condominium entrance to have a service provider waiting during business hours, but it is not normal to have a person stopped for a long time at dawn. For the same situation in both cases, Agatha is the only system that learns this and

alerts only in the case that occurred during the night. Traditional systems require a maximum stay time to be set and alert if this time is longer than the preconfigured value, Agatha on the other hand, learns for each date/time/location what is the regular duration that a person waits in a given location and alert only in case of anomalies.

VEHICLE STOPPED FOR TIME ABOVE NORMAL (AUTOMATIC)

Ex. In the case of a parked car interrupting the entry/exit of a garage, the identifies that a car has been stopped for a longer time than usual in the gate area and alerts the operator to take immediate action.

VEHICLE TRAVELING IN CONTRA-HAND

Ex. Agatha learns the street directions automatically and can identify a car moving opposite to the road direction.

HIGH-SPEED VEHICLES

Ex. Agatha learns the average speed for vehicles and can identify vehicles with speeds above normal. This feature is handy for scenarios in which the criminals arrive in high-speed cars to the crime location.

PERSON RUNNING AT AN UNUSUAL TIME/PLACE

Ex. Agatha learns the average speed of people for different times and places, and with that, Agatha can alert in cases of abnormalities, like a criminal running during the night.

STOP/PARKING IN UNAUTHORIZED LOCATIONS

Ex. The system learns that it cannot have a car stopped in front of a garage for longer than the average time required to open the gate.

Figure 4 – Example of a car stopped on an abnormal location (over the walking path)

INVASION OF PEOPLE IN UNUSUAL PLACE / TIMES

Ex. A person appears on an internal camera when it is not normal to have people on this camera. The system automatically learns what times it is normal to have people on each camera and alerts you if it detects a person at a time when it is common not to have people on that camera.

Figure 5 – Invasion example on unusual hours

PERSON STANDING IN AN UNUSUAL PLACE FOR TIME ABOVE NORMAL

Ex. The system learns that it is not normal for a person to be standing next to a garage door for a long time, identifying, for example, a person preventing the gate from closing to make theft in the garage.

ABSENCE OF PEOPLE FROM A PLACE AT CERTAIN TIME

Ex. The system learns that it is normal to have people present (company employees) at a specific location/time, so it is possible to generate alerts if they are absent because the system considers this an anomaly.

AREA OF INTEREST IN THE SCENE

Ex. It is possible to define only the areas of interest for Agatha to monitor, focusing the system only on the areas relevant to each camera and eliminating areas that are not of interest.

OTHER SITUATIONS AND EVENT COMBINATIONS

Ex. As the system has autonomous learning, it is possible to automatically identify and learn other situations that were not previously foreseen. We also periodically update our intelligent cloud's intelligence (NOLEAK AGATHA BEHAVIOR CLOUD) with the most advanced research in anomaly detection and computer vision.

2.3. Solution Robustness and Performance

The basic architecture on which the Agatha solution was built is currently used by armed forces from different countries for critical defence systems.

It allows identifying incidents in seconds and is fault-tolerant if there are network failures, servers, disks, and video cards.

These requirements and the SLA for each of them will be defined within the project/design stage.

2.4. Solution Architecture

The NOLEAK AGATHA (Scale - Hybrid Edition) product has an architecture focused on scalability, fault tolerance, cost optimization and performance. Thus, the architecture is hybrid (part within the client and part in the cloud). NOLEAK provides this entire infrastructure on lending.

This architecture makes it possible to minimize network bandwidth usage and the amount of hardware within the client's architecture, dramatically reducing the TCO (Total Cost of Ownership) of the solution and enabling deployments in environments with tens of thousands of devices in real-time.

Infrastructure within the Client Monitoring Center: NOLEAK EYE servers for real-time image processing that connect to the cameras, process the images and send the metadata to the NOLEAK cloud, reducing the internet link required for processing. (SERVERS INSTALLED IN LODGE BY NOLEAK)

Cloud infrastructure NOLEAK: NOLEAK AGATHA BEHAVIOR CLOUD, responsible for the continuous and adaptive learning of the environments to be monitored and uses 100% proprietary solutions of artificial intelligence and autonomous behavioural learning generating alerts in cases of anomalies found. These alerts are sent to the customer's PSIM and incident management platform.

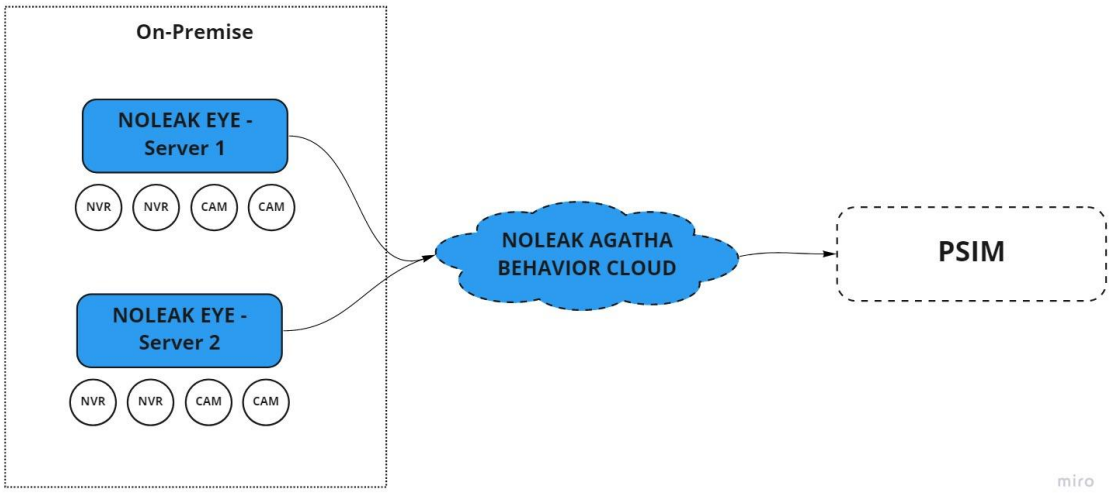


Figure 6 – Agatha architecture (Hybrid edition)

This architecture enables the real-time processing of thousands of cameras in real-time, enabling rapid response to incidents, increasing operational efficiency, and reducing the solution's total cost.

2.5. Solution Requirements and Features

For the solution to function properly, the following technical requirements are necessary in the local infrastructure.

- RTSP link of the cameras (H264, H265) stable and without interruptions (can be a direct link of the camera or the NVR);
    - Minimum bandwidth between the cameras and the NOLEAK EYE server: 0.15 Mb / s per camera;
- Recommended camera resolution of at least 1 MP (the higher the resolution, the better the assertiveness of the analytics, but the system works with any resolution);

- Stable internet link for uploading metadata to servers in the cloud;
    - Minimum bandwidth between NOLEAK EYE server and NOLEAK AGATHA BEHAVIOR CLOUD (internet): 0.01 Mb / s per camera;
- Network infrastructure for local Agatha servers;
- Network infrastructure compatible with image traffic internally between cameras;
- Physical infrastructure for the internal servers located inside the company.

Other characteristics, such as the storage time of images, alerts, integrations with additional systems, and fault tolerance, are flexible and will be defined during the project to implement the solution.

INTEGRATION WITH INCIDENT MANAGEMENT INTERFACE (PSIM)

It is strongly recommended that a specific incident management solution is connected to make the system's best use. In this sense, we recommend BCF Solutions' PSIM solution, which we already support by default and is used by major customers worldwide, including banks and security companies.

2.6. Data Security and Privacy

The Noleak Agatha solution complies with internationally established security standards and follows the international requirements of data protection laws (GDPR, LGPD, Uk Data Privacy Act, among others). The basic architecture on which the Agatha solution was built is currently used by armed forces from different countries for critical defence systems.

Among the main security requirements of the solution, we can highlight:

- **Data encryption:** We use the TLS encryption standard in data communication, ensuring that data will not travel without encryption at any time.
- **Token authentication of all modules:** We use authentication tokens in all internal communications of the system.
- **Servers configured in accordance with CIS controls:** All on-premises and cloud servers follow compliance with CIS controls (https://www.cisecurity.org/cis-hardened-images/) of good security practices for servers. This certifies the application of the solution in banks, military and defence environments.
- **Authentication and authorization:** The entire interface is protected by authentication and security controls, such as LDAP, Active Directory, Single-Sign-On and others.

2.7. Specialized Technical Support

All support related to local hardware is provided via local technical YOUCALL-ITs. The support related to the Software is offered through the Support Center that works from Monday to Friday from 09h-18h GMT -3 and emergencies through the emergency channel. This support is provided in the Brazilian Portuguese or English language via system tickets.

2.8. Training and Certification

Included in this commercial model are remote training for system operators and a certification test to operate the solution. This training lasts for 2 days, with the test taking place at the end of the second day.

3. COMMERCIAL CONDITIONS

The services and pricing models are described below. This version runs partly in the cloud and partly on the client. Noleak provides all necessary hardware on loan.

SOLUTION CLOUD PILOT

Description: Noleak cloud pilot of the Agatha solution with up to 5 cameras

Deadline: 6 weeks (3 weeks for autonomous intelligence learning and 3 weeks of tests with simulations)

Deployment: 100% in the cloud (private environment for the client due to data security/privacy issues)

Methodology: Measurement of the solution's assertiveness KPIs through simulations performed by the client.

Amounts: €7,000.00 paid upon signing the contract

INSTALLATION AND DIMENSIONING PROJECT OF THE NOLEAK AGATHA SOLUTION

Description: Development of project and dimensioning of the solution to meet the demands of the CONTRACTING PARTY.

Deadline: 30 working days after defining the main requirements

Deliverable: Technical report of installation design and dimensioning of servers according to customer requirements.

Investment: € 15,000.00, paid on delivery of the project

Deduction: The project's investment is deducted from the service's annual license according to the following rules:

Project with 1000+ cameras – € 15,000.00 deduction.

Project with 50-1000 cameras– € 7,500.00 deduction.

NOLEAK AGATHA SERVICE

Description: Anomaly detection system license (Noleak Agatha).

Deployment: Hybrid - part of the solution is installed on the client, and part is executed on the NOLEAK Cloud.

Integration with external applications: 1 integration included.

Payment terms:

- One installment of 25% for Set-Up, Installation and Training;
- 75% paid in monthly installments of equal value;

Loyalty: A minimum loyalty of 18 months is required. There is also additional discount for longer contracts and renewals up to 30%.

Investment:

Package	Channels (H265)	Monthly cost per camera (H265) Excluding VAT+ YOUCALL-IT margin
A-50	50	€ 185,00
A-250	250	€ 116,00
A-500	500	€ 104,00
A-1000	1000	€ 92,00
A-5000	5000	€ 67,00

ADDITIONAL - APPLICATIONS AND DEVICES INTEGRATION

Description: Development of integration modules with existing applications and devices on the client.

Values: Varied according to the complexity of the integration.

ADDITIONAL - OTHER REQUIREMENTS

Description: Other project requirements, such as link redundancy, equipment redundancy, storage time, SLA, among others.

Values: Varied according to the requirements defined in the project.

4. COMMISSION STRUCTURE AND SALES MARGIN

The standard commission margin is 10% over the license fee, paid monthly after receiving from the customer.

5. RESPONSIBILITY FOR ETHICAL AND LEGAL USE

The YOUCALL-IT company is responsible for the service's ethical and legal use, ensuring its use complies with existing laws and regulations. NOLEAK only offers the service and disclaims any responsibility for the incorrect or illegal use of the technology.

6. CONFIDENTIALITY AND REQUIREMENTS

This document's confidentiality is guaranteed by the confidentiality agreement signed between the parties and comprises the entire scope, and all information exchanged securely between the parties. This document is confidential and should not be disclosed to third parties without the knowledge of the parties involved.