Intelligent Video Analysis and Investigation System

Overview

Intelligent Video Analysis and Investigation System is a web application that leverages AI-powered face recognition and people attribute detection algorithms to automatically analyze video recordings. By integrating with Network Optix and other devices, the system ensures seamless data retrieval and management. Users can initiate investigations, search for specific individuals, and collaborate with team members, enhancing the overall efficiency and effectiveness of security and monitoring operations.

The system includes features:

- Automated Video Retrieval
- Manual Video Upload
- User-Generated Notes
- Collaborative Investigation
- Comprehensive Reporting

The system can be applied to various use cases:

- **Law Enforcement:** Facilitating criminal investigations by identifying suspects and tracking their movements.
- **Security:** Enhancing security measures in public spaces, airports, and critical infrastructure by monitoring and identifying suspicious individuals.
- **Corporate Security:** Protecting assets and personnel by monitoring premises and identifying unauthorized individuals.
- **Search and Rescue:** Aiding search and rescue operations by identifying missing persons in recorded video footage.

Setup Guide

The following setup is performed on a single computer with Windows 11 and the recommended GPU, NVIDIA RTX 3050.

1. Install PostgreSQL and pgAdmin4, and set:

   Port : 5432

   User Id : postgres

   Password : Admin123

   Create a database named “ignis”, then restore the database using the provided SQL file (back-end → ignis.sql).

2. Install RavenDB version 5.4.111.
3. Install Cyberlink FaceMe Security with the People Tracker Add-On (version 7.13.1), and set:

   Database Account : faceme_dba

   Database Password : Admin123

   Account : AdMin

   Password : Admin123

   Add 4 cameras through the FaceMe dashboard (http://localhost:8080):

   1. Camera 1:

      Name : video/live/channel1

      Location : -

      RTSP URL : rtsp://127.0.0.1:11554/video/live/channel1

   2. Camera 2:

      Name : video/live/channel2

      Location : -

      RTSP URL : rtsp://127.0.0.1:11554/video/live/channel2

   3. Camera 3:

      Name : video/live/channel3

      Location : -

      RTSP URL : rtsp://127.0.0.1:11554/video/live/channel3

   4. Camera 4:

      Name : video/live/channel4

      Location : -

      RTSP URL : rtsp://127.0.0.1:11554/video/live/channel4

4. Install FFmpeg.
5. Install Nx Meta Server & Client, and set:

   Port : 7011

   Administrator Password : Admin123

6. Run the back end by opening it in Visual Studio (click on the file back-end → ignis → ignis.sln). Start ignis.API and access the endpoint http://localhost:5000/api/configuration/ravendb (method GET).
7. Set up the front end by running the command “npm install” in the working directory of the front-end folder (to install the node modules).
8. To run this web application:
   - Run ignis.API, ignis.NxService, and ignis.Service simultaneously in Visual Studio.
   - Run the front end by executing the command “npm run dev” in the working directory of the front-end folder. The web application link will appear.

User Manual

Users need an account to log in to the system. If a user does not have an account yet, they must register a new account first.

Creating a New Account:

1. Click “Sign Up” button on the bottom of login page.
2. Fill in all the fields: first name, last name, email, and password. The email and password will be used to log in after creating the new account.
3. After filling in all the fields, click the "Sign Up" button.
4. The user will be redirected to the login page after successfully creating the account. Use the registered email and password to log in.

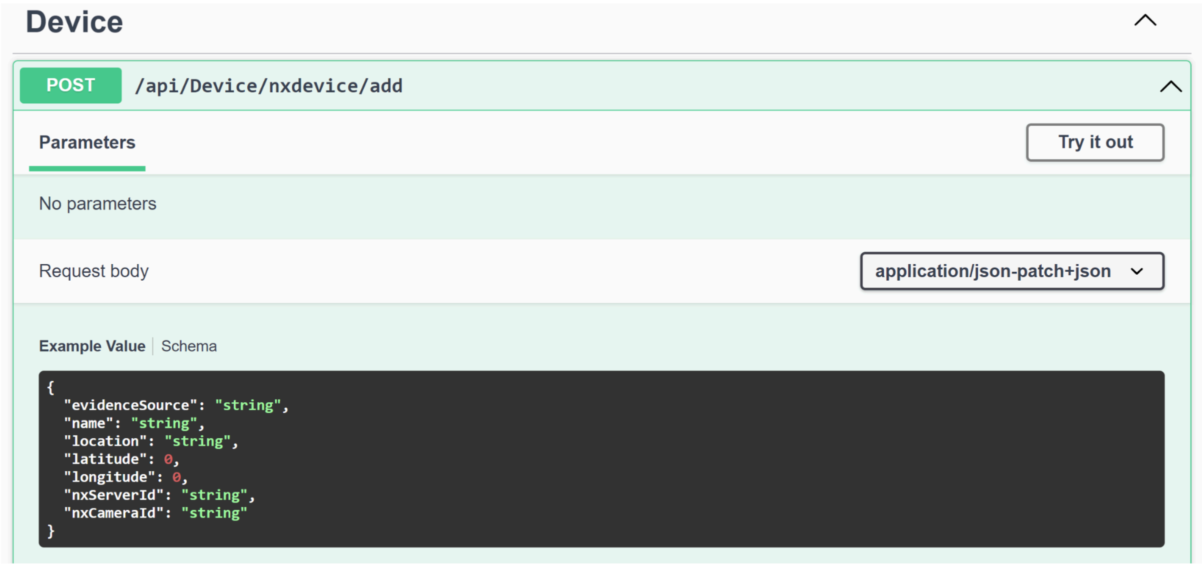
If a user already has an account, they can log in with their email and password immediately.

Logging in to an Existing Account:

1. Fill in the email and password.
2. Click the "Login" button.
3. The user will be redirected to the dashboard page.
4. The user cannot log in if they enter the wrong email or password.

Adding a Device (for automatic recording retrieval):

1. First, add the device stream link through the Nx Meta Client. Ensure recording is enabled.
2. Access the endpoint http://localhost:5000/api/device/nxdevice/add (Method POST).



For the evidenceSource parameter, choose from: “Body Worn Camera”, “CCTV”, “Drone”, or “Others”.

At the Dashboard, there are Two Menus in the Sidebar:

A. Case

The Case menu contains a table of cases with a search field to filter displayed cases based on inputted keywords.

a. Adding a New Case:

1. Click the "Add Case" button, which is on the right side of the search field.
2. Fill in all the fields, which include Case Title, Case Objective, and select Collaborators for this case. The Case Title must be filled in to continue to the next step.
3. Click "Next" to continue. The submitted data will be saved as a draft.
4. The user will be redirected to the Select Filter page to select the desired filter for this case. In the person filter, there is also an option to add the person's faces.
5. After filling in all the necessary filters, click "Save as Draft" to save all data as a draft, which can be modified later, or click "Done" to complete the process of adding a new case. By selecting "Done", the user cannot modify the initial filter data.
6. If the user clicks "Done", they will be redirected to the Analyze Case page.

b. Opening an Existing Case:

1. Find the desired case in the case table. Use the search field to search for the case with keywords.
2. Click the "View" button of the desired case.
3. The user will be redirected to the Analyze Case page.

c. Analyzing a Case:

This page contains case data and the necessary tools to help analyze the case. At the top of the page, there are the case title, created date, case tags, and other buttons. There are also tabs that provide information about the case.

a. Updating Case Information:

1. Click the “Summary” tab.
2. Click “Edit” button
3. A pop-up modal will appear with case information. The left part contains information about filters that were defined when adding the new case, and the right part contains fields for Case Title, Objective, Executive Summary, and Conclusion that can be edited during case analysis.
4. Edit the necessary information in the fields.
5. Click the "Update" button to save the changes.

b. Updating Case Tags:

1. If the case has tags, they will be displayed under the case title.
2. Each case tag has a cross icon to remove the tag.
3. Click "Add Tag" to add a new tag.
4. A text field, "Add" button, and "Cancel" button will appear.
5. Enter the tag name in the text field.
6. Click the "Add" button to add the tag or click "Cancel" to cancel adding the new tag.
7. The new tag will appear below the case status.

c. Adding Collaborators:

1. Click the “Summary” tab
2. Click the plus button beside the text "Collaborator".
3. A pop-up modal will appear containing a list of collaborators added when the case was created, a select field to select a collaborator, and an "Add" button.
4. Select the desired collaborator in the select field.
5. Click the "Add" button to add this collaborator.

d. Filtering Metadata:

1. Click the "Filter" button.
2. A pop-up modal will appear containing filters such as Time Range, Tag, Person, and Attributes.
3. Select the necessary filters.
4. Click "Apply" to apply the filters or click "Reset" to reset all selected filters.

e. Closing a Case:

1. Click the "Close Case" button.
2. A pop-up modal will appear containing text fields to enter a reason to close the case.
3. Enter the reason to close the case.
4. Click the "Close Case" button.
5. The case status will be changed from ONGOING to CLOSED.

f. Viewing and Downloading the Report:

1. Click the "Report" button to view the case report.
2. The user will be redirected to a new page containing the case report.
3. Click "Save as PDF" to download the report as a PDF.

The Evidence List contains selected evidence based on filters selected when adding the case, and new evidence added after the case was created will appear at the top of the list labeled "NEW".

g. Linking and Unlinking Evidence to a Case:

1. Click the “Evidences” tab.
2. Click the plus button to link evidence to the case.
3. Click the trash can button to unlink evidence to the case.

h. Selecting Evidence to be Analyzed:

1. Each evidence item in the Evidence List has a play button.
2. Click the play button to select this evidence for analysis.
3. The shown video and all data linked to the evidence will change based on the selected evidence.

i. Updating Evidence Tags:

1. If the evidence has tags, they will be displayed under the evidence title.
2. Each evidence tag has a cross icon to remove the tag.
3. Click "Add Tag" to add a new tag.
4. A text field, "Add" button, and "Cancel" button will appear.
5. Enter the tag name in the text field.
6. Click the "Add" button to add the tag or click "Cancel" to cancel adding the new tag.
7. The new tag will appear below the evidence title.

People Metadata and Attribute Metadata will show all metadata based on the selected evidence and filter.

j. Seeking a Timestamp in People Metadata and Attribute Metadata:

1. Each data point in People Metadata and Attribute Metadata has a timestamp.
2. Click the timestamp.
3. The video and timeline will be set to the selected timestamp.
4. On the right side, there is a video player with a timeline that shows data recorded in a video. A blue circle represents data recorded at a specific time. These data include people and attribute metadata.

k. Adding Evidence Notes:

1. Click twice on the timeline.
2. A box will appear. Adjust the length by dragging its edge, and drag it to move. Its edges represent the start and end times, and its length represents the duration.
3. Right-click on the box. A pop-up modal will appear with people and attribute metadata that appears within the duration.
4. Enter the notes and level.
5. Click "Save Note" to save.
6. After saving, the box color will turn blue. The user can right-click again to view the note data.
7. All saved notes will appear in the notes section with a timestamp, which enables the user to seek a specific timestamp by clicking it.
8. All activities performed by users will be recorded in the activity log, such as creating a case, adding tags, adding notes, renaming the case title, etc.

B. Evidence

The Evidence menu contains a table of cases with a search field to filter displayed evidence based on inputted keywords.

a. Adding Evidence:

1. Click the "Add Evidence" button on the right side of the search field.
2. Fill in all the fields, which include Evidence Name, Location, File, Source, and Description. Users can use the map for a more precise location.
3. Click “Submit” to submit the evidence.
4. Evidence that has been submitted will take some time to be analyzed until completion.

b. Opening Existing Evidence:

1. Find the desired evidence in the evidence table. Use the search field to search for evidence with keywords.
2. Click the "View" button of the desired case.
3. A drawer will appear with all evidence data. Click the close icon on the top left to close the drawer.

c. Updating Evidence Tags:

1. After opening an evidence, click the “Add Tag” button.
2. Enter the tag.
3. Click “Add Tag” to add the tag.