



BOSCH

IVA Pro Appearance with FW 9.40 Whitepaper



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1 Introduction

Do you need to find a specific person in your surveillance system? Intelligent Video Analytics (IVA) Pro Appearance, a software solution based on AI capabilities of our cameras, analyzes the appearance of people for later forensic search in video management systems like BVMS. Instead of manually searching through a multitude of cameras and times, IVA Pro Appearance allows you to automatically highlight persons based on gender, color, and length of clothes and hair, as well as wearing hats, glasses, bags, or backpacks.

In addition, IVA Pro Appearance can fulfill basic surveillance and counting tasks as it comes with a robust detection and separation of upright people and vehicles.

2 Features

IVA Pro Appearance detects and separates upright persons and vehicles, and extracts the appearance of persons for use in later forensic search. The following person attributes are available:

- ▶ Gender: male, female
- ▶ Top color: black, grey, white, brown, beige, green, red, blue, yellow, orange, pink, purple
- ▶ Top length: short, long
- ▶ Bottom color: black, grey, white, brown, beige, green, red, blue, yellow, orange, pink, purple
- ▶ Bottom length: short, long
- ▶ Hair color: black, grey, brown, blond, red
- ▶ Hair length: short, long
- ▶ Hat / no hat
- ▶ Glasses / no glasses
- ▶ Bag / no bag
- ▶ Backpack / no backpack

IVA Pro Appearance is based on IVA Pro Buildings and comes with its full functionality. In addition, a new task “Appearance search” is available, which checks for the person attributes. This can be used for forensic search, for example in the Bosch video management system (BVMS).

View the appearance attributes of a selected person via metadata inspection.

IVA Pro Appearance is a licensed option.

3 Limitations

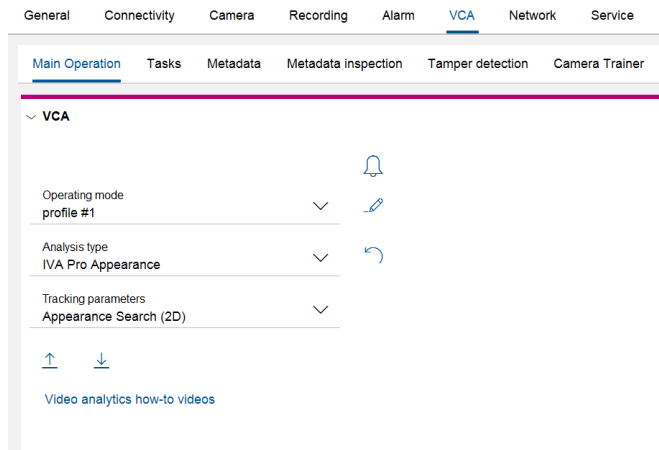
- ▶ Available on CPP14 cameras w/o 3000, multi or panoramic cameras.
- ▶ Object detection and tracking is running with 7.5 fps instead of the usual 15 fps. Appearance attribute extraction is running roughly once every three seconds for each person.
- ▶ In the used video analytics resolution of 1280x720 or 1024x576 (8MP cameras), the person must have a height of at least the following pixels to properly detect the respective attributes:
 - Gender: male, female: 64 pixel person height
 - Top color: 64 pixel person height
 - Top length: 64 pixel person height
 - Bottom color: 64 pixel person height
 - Bottom length: 64 pixel person height
 - Hair color: 96 pixel person height
 - Hair length: 96 pixel person height
 - Hat / no hat: 96 pixel person height
 - Glasses / no glasses: 256 pixel person height
 - Bag / no bag: 96 pixel person height
 - Backpack / no backpack: 96 pixel person height
- ▶ The persons should be upright and either standing or walking.
- ▶ The persons should be clearly visible and not occluded by other persons or items for more than 50%.
- ▶ Ensure that a minimal illumination of at least 200 lx is given in the scene.
- ▶ Attributes need to be visible to be detected correctly
- ▶ Glasses without a rim may not be detected properly.
- ▶ Hats includes helmets.

4 Configuration

Configuration of IVA Pro Appearance requires the Bosch Configuration Manager 7.74 or higher.

4.1 Activating IVA Pro Appearance

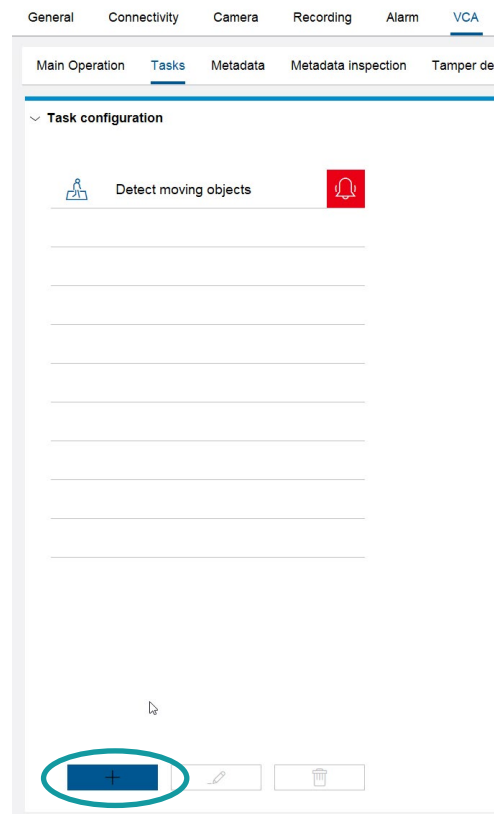
In the Configuration Manager, select the target camera, then go to **VCA -> Main Operation**. Set the **Analysis Type** to **IVA Pro Appearance**. The **Tracking parameters** will change automatically to **Appearance Search (2D)**.

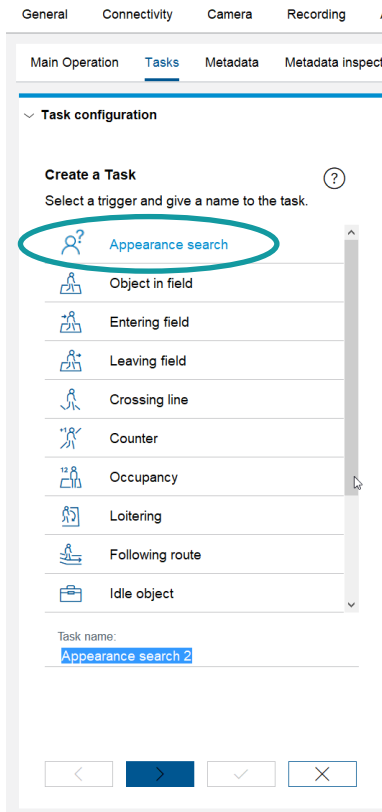


4.2 Appearance Search Task

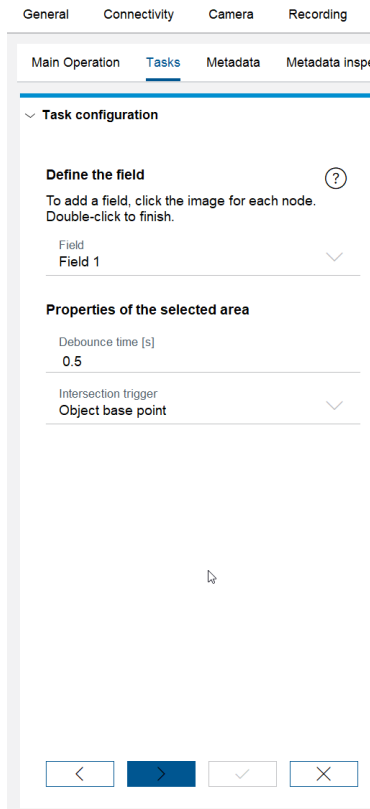
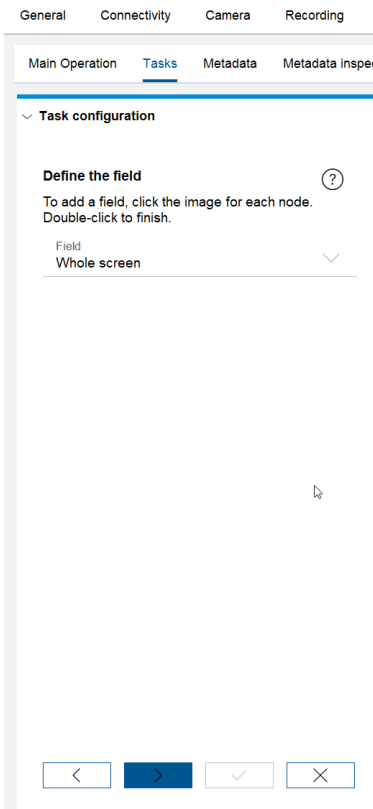
The goal of IVA Pro Appearance is to support forensic search of persons in addition to the normal surveillance and statistics tasks available in IVA Pro Buildings. Therefore, all the normal configuration and default task of IVA Pro Buildings is available. In addition, there is a new task Appearance Search dedicated towards analysing person appearance attributes.

The task can be viewed under **VCA -> Tasks** when selecting a new task via the + button.



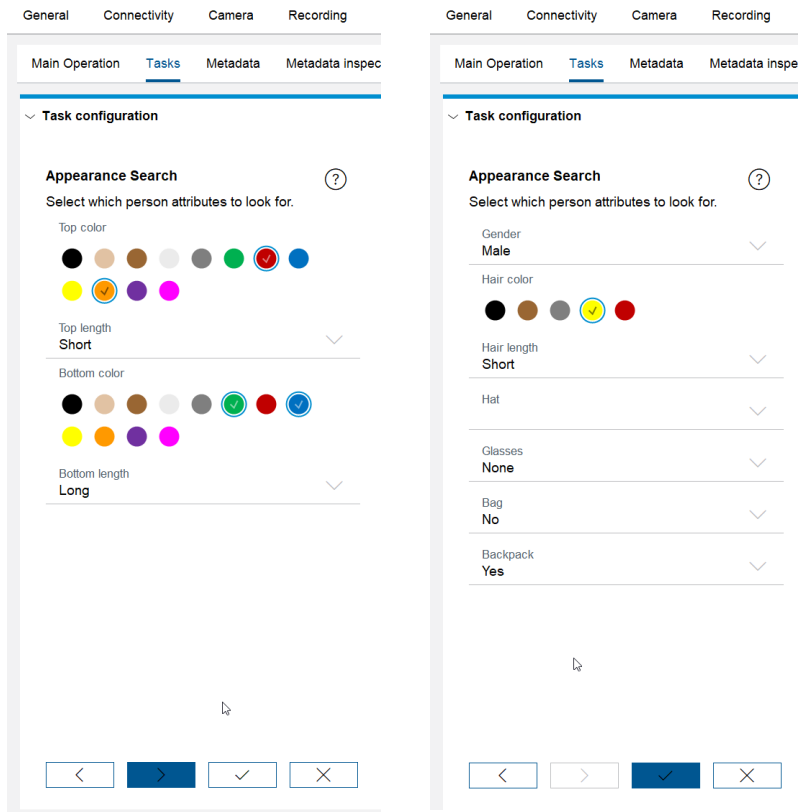


The Appearance Search can be restricted to a selected area in the image. To draw this area, simply click into the video image for each node of the field. Double click to end the drawing with the last node. You can move each node, each line and the show field by selecting it accordingly in the image. The corresponding element will be highlighted when hovering over it, then click with left mouse to select, move, and release the mouse button. Each field also has a debounce time denoting how long an object needs to be in the field before it is considered for Appearance Search, and an intersection trigger of object and field that selects which part of the object needs to be in the field.



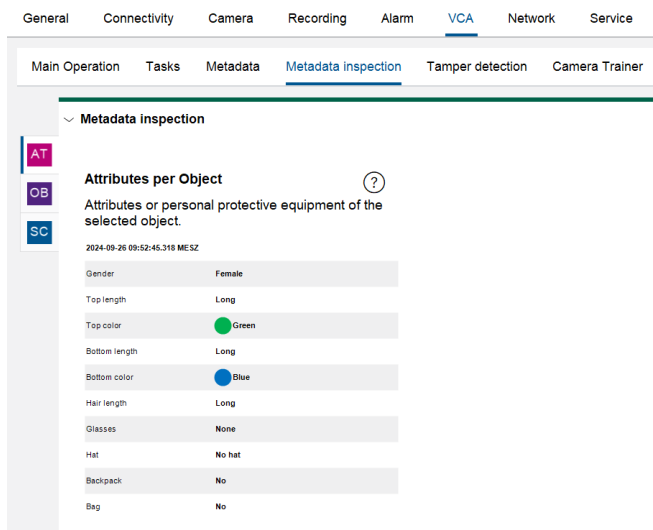
Next define which appearance attributes to look for. Fields can be left empty or set to none in order to not include them in the search. If more than one attributes is selected, then the object to be searched for needs to conform to all selected attributes. For colors, multi-selection is supported which allows to search for object that are e.g. red or orange. The first page has filter for cloth color and distinguishes between short and long sleeves and leg. The second page has more general filter like gender, hair color and length, and whether the person has a hat, glasses, bag or backpack.

The example below searches for a person that wears a top is red or orange and has short sleeves, and wears bottom clothes that are green or blue and fully cover the legs. The person also needs to be male, have short, blond hair and a backpack.



4.3 Visual Feedback

In order to see which appearance attributes IVA Pro Appearance detects on a person, go to **VCA -> Metadata Inspection** and select a person. It may take up to 3 seconds to display the results.



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