

What is computer vision :

Computer vision is a study that studies how to extract meaningful information from still images or moving images using computers.

Research purpose :

Strong precipitation radar echo detection and tracking

Used program / library :

Python / OpenCV, numpy, scipy

What is Object Detection?

Detect specific elements in an image

What is Instance tracking?

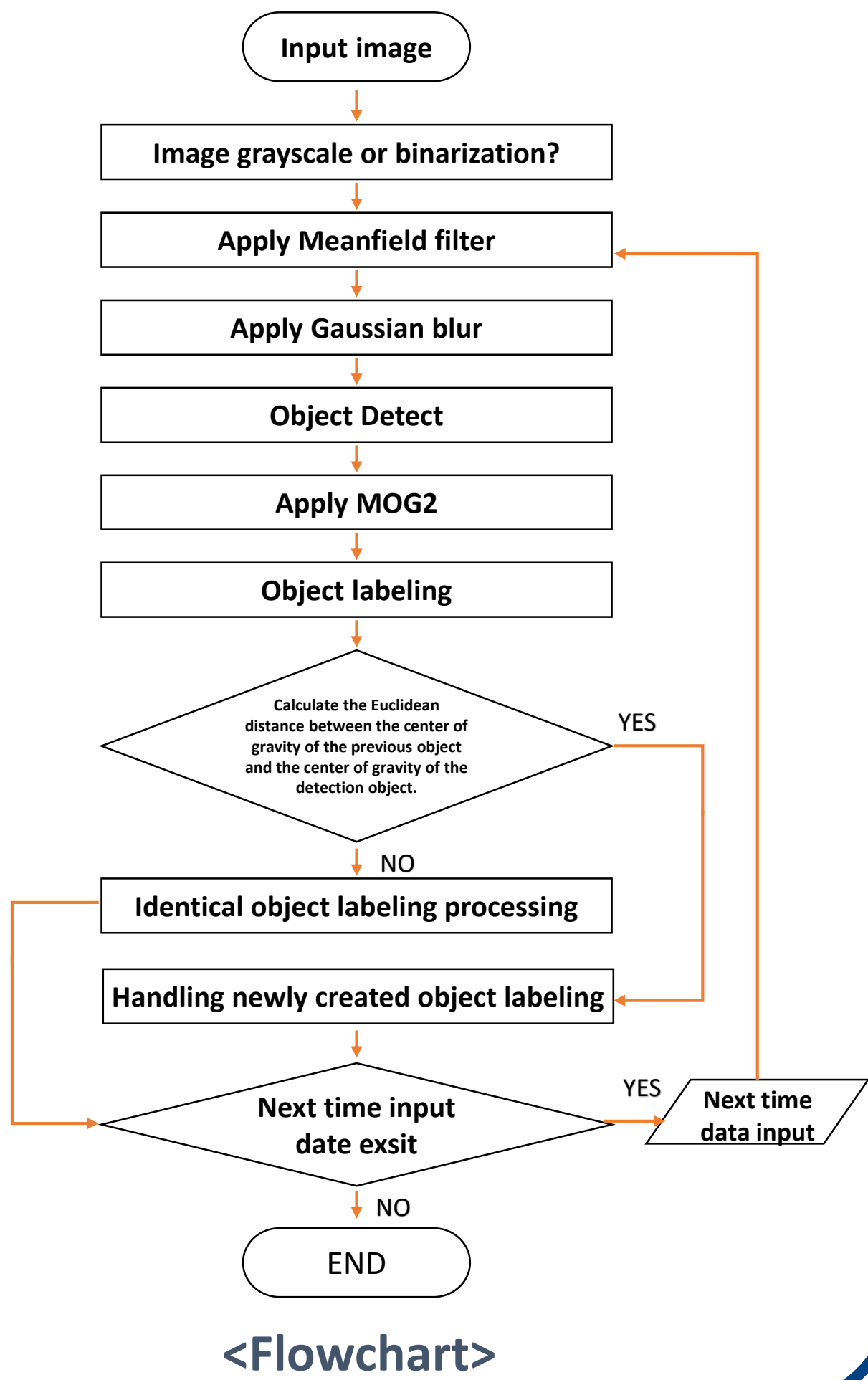
Processing a frame by isolating individual frames and deducing them from the image of the previous frame

What is MOG?

A technique for separating foreground and background by extracting a moving object as a Gaussian mixture

Benefit of MOG2 ?

Conventional MOG takes a Gaussian distribution value of 3 or 5, but MOG2 sets it in pixel units, so the foreground and background can be clearly separated even if the surrounding conditions change.



DATA preprocess

Pre-processing required

Conventional pretreatment is done by erosion and dilation.

<This Images from OpenCV web>



<Original image>

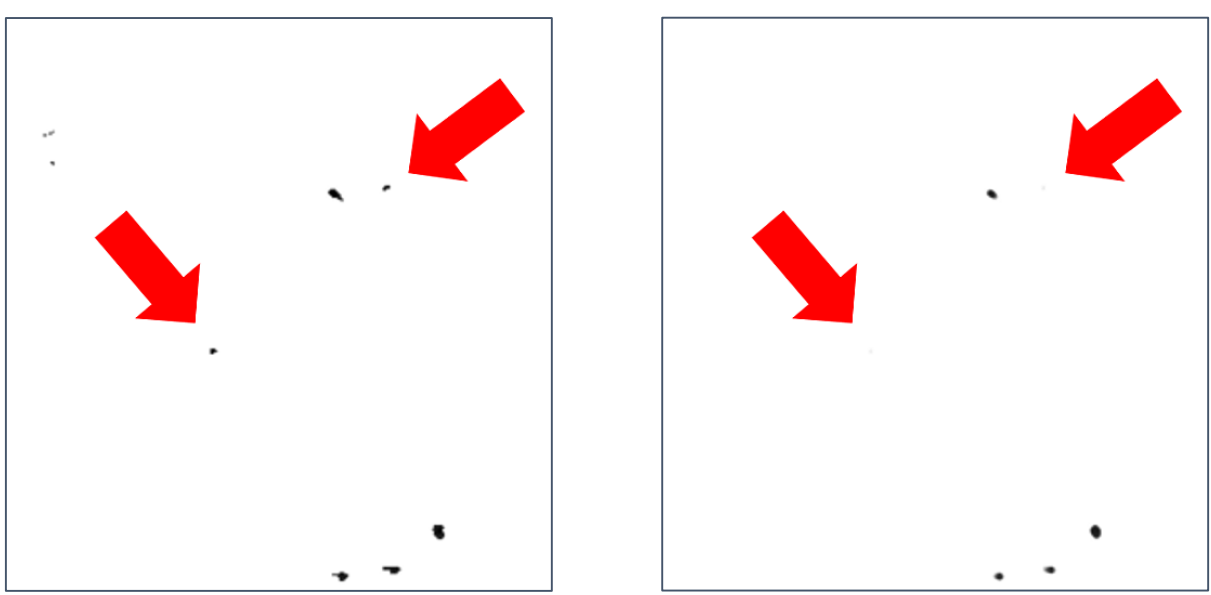


<Erosion image>

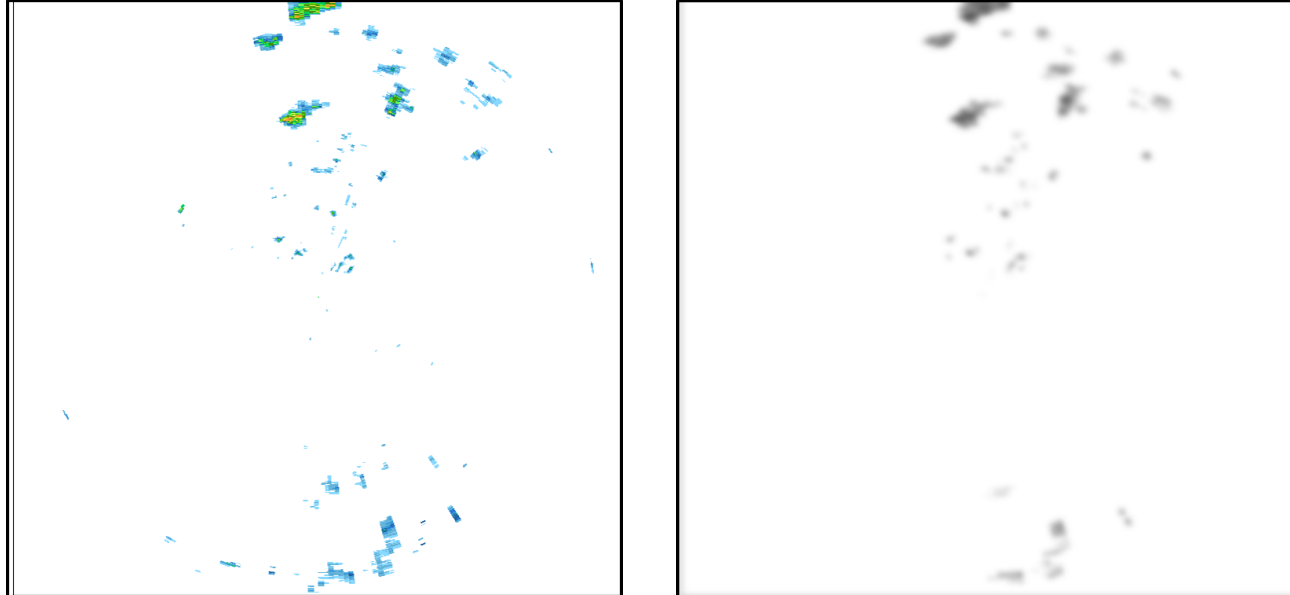


<Dilation image>

Erosion is performed with a mean-field filter without using the built-in function of OPENCV, and the image is dilation by configuring the Gaussian blur to be the same as the mean-field filter kernel size.



<Mean field filter example>



<Gaussian blur example>

What is Labeling?

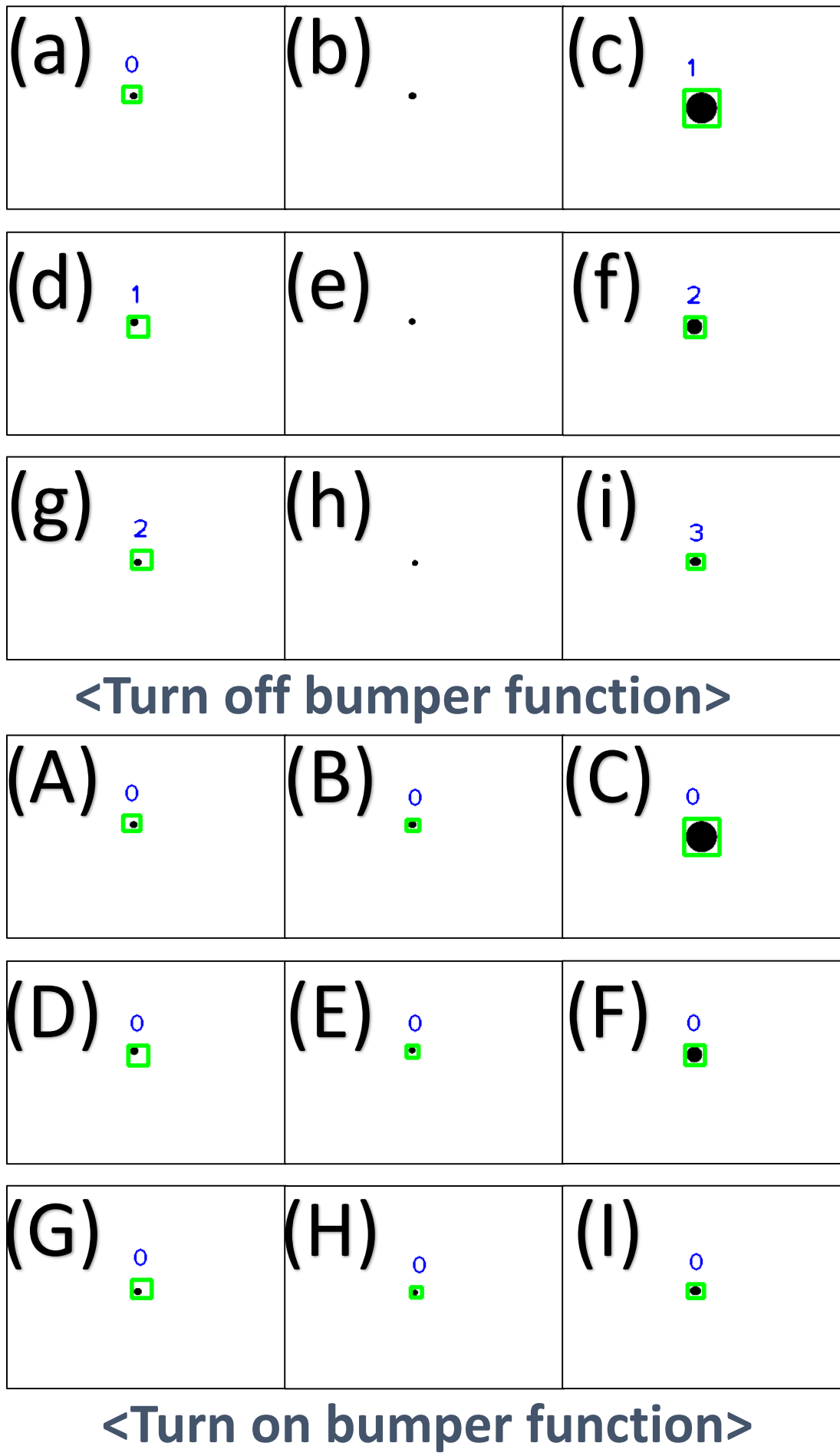
Detected objects are labeled based on the center of gravity of the detected object's set of pixels.

Labeling tracking

Identifies identical objects by calculating the Euclidean distance between the labeling of the selected object in the previous image and the pixel center of gravity of the currently selected object.

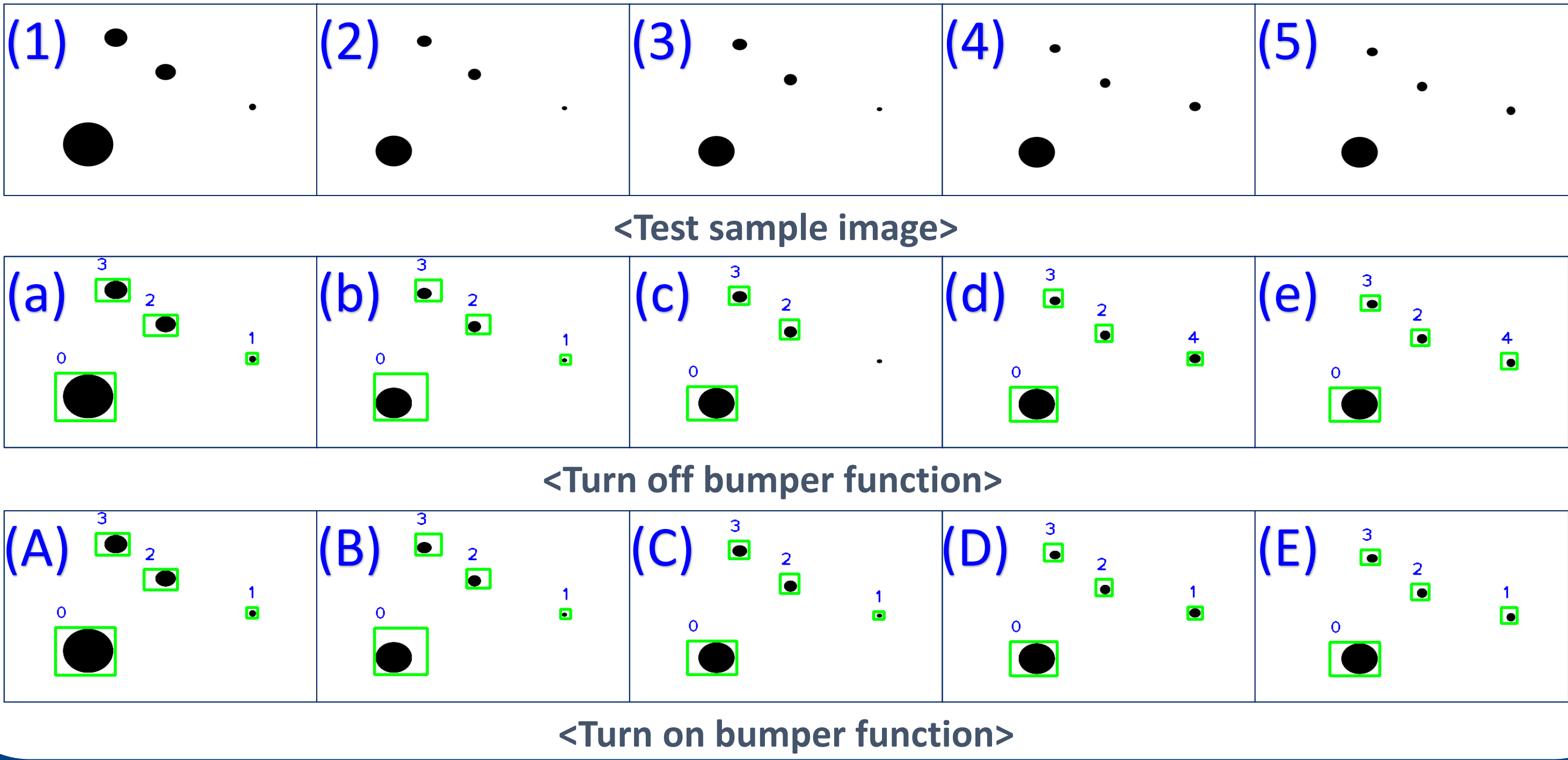
Labeling bumper area setting

If the number of pixel sets counted above the threshold remains above the lower bumper limit, the labeling object keeps track of the old labeling number.



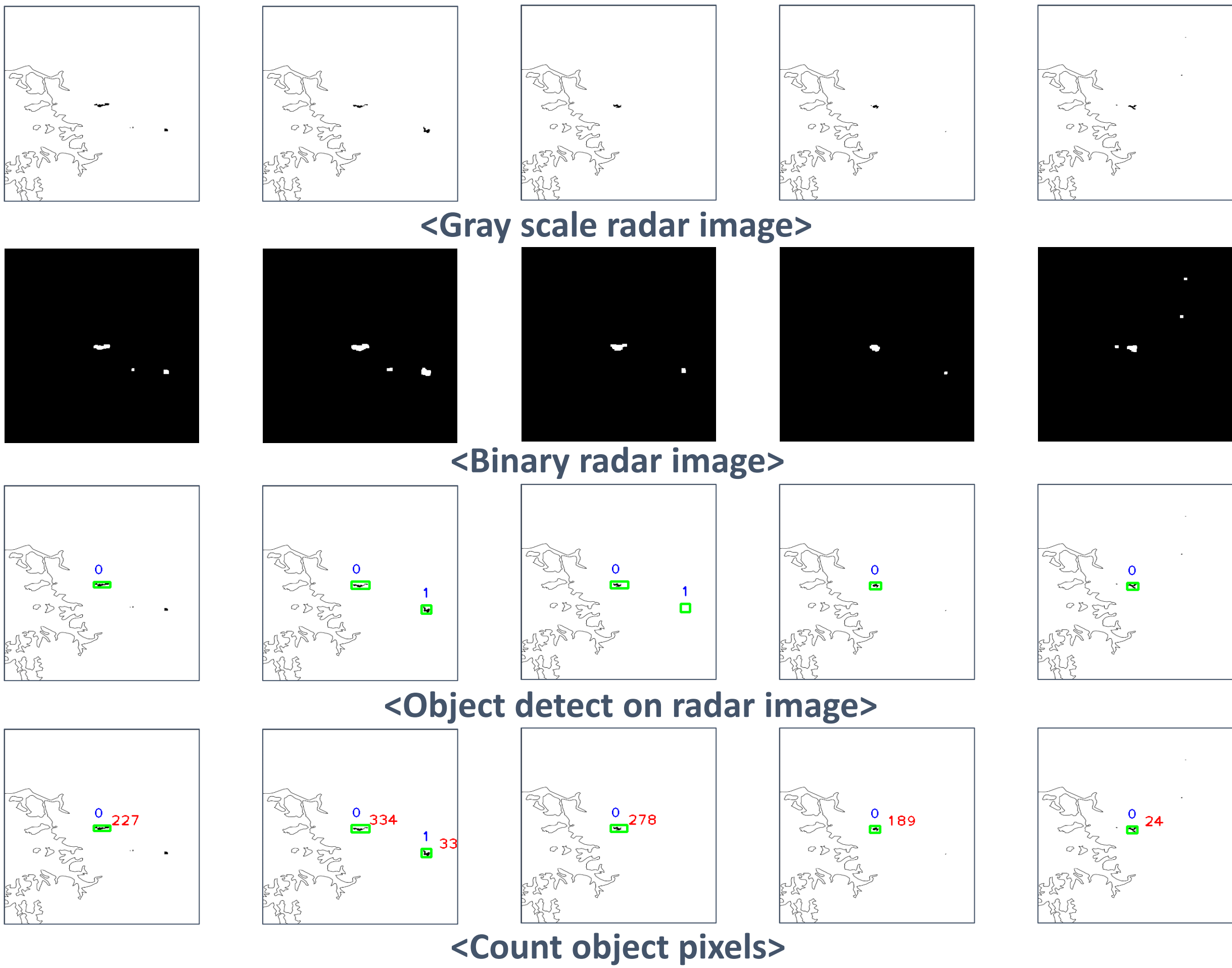
<Turn on bumper function>

Example of object labeling tracking bumper

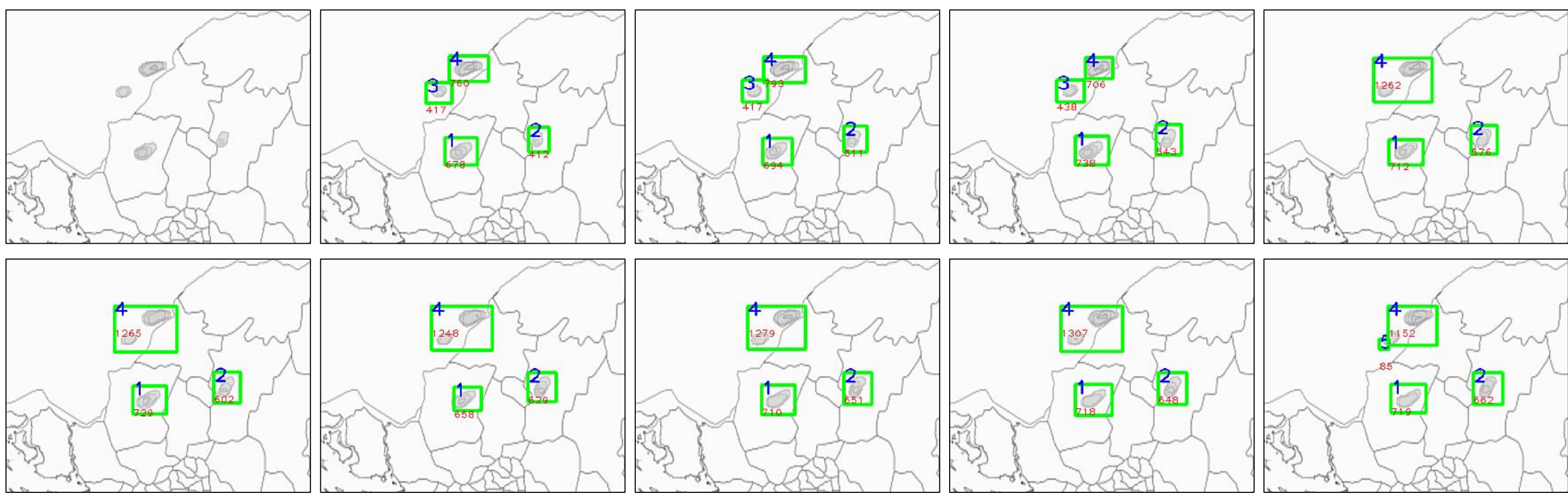


Example of object labeling tracking

July 22, 2022 from 15:25 to 15:45 in 5-minute intervals



Aug. 04, 2022 01:01 to 01:10 in 1-minute intervals & QR



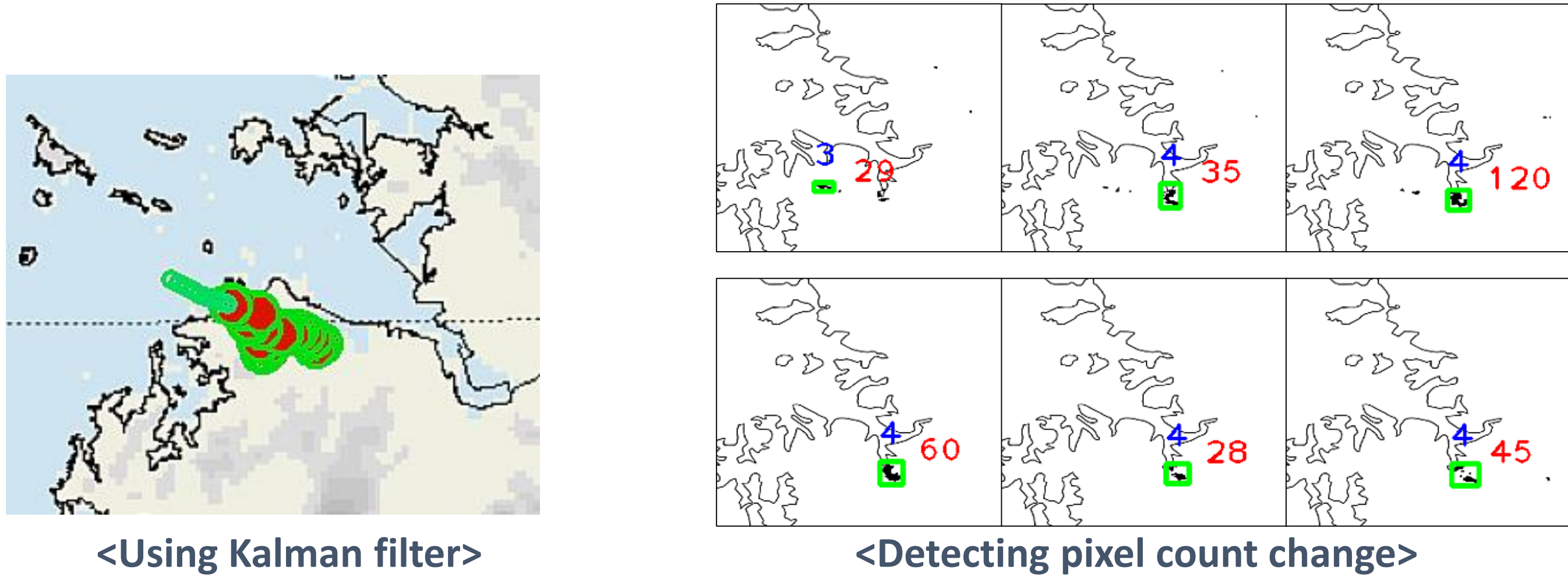
Using Kalman filter

Big red dot : Detect point

Big green dot : Prediction point based on detection object point

Small green dot : 1 hour prediction point based on final detection object using Kalman filter

Detecting pixel count change



<Using Kalman filter>

<Detecting pixel count change>

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