Beginner Level

Video Analytics

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Theory

Introduction to openCV

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Latar belakang Pendidikan Pengajar

- **S1: Teknik Informatika (1995)**
- **S2: Sistem Informasi (2001)**
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Riwayat Pekerjaan

- **IT Bank Swasta Terbesar di Indonesia (2001-sekarang)**
- **Audit Internal Bank Swasta Terbesar di Indonesia (1997-2001)**
- **Dosen Universitas Bina Nusantara (1995-sekarang), Ukrida, Universitas Mercu Buana, Untar, UPH, dan beberapa universitas lainnya**
- **Penulis buku di Elexmedia Computindo, Gramedia (2004-sekarang)**
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What is Computer Vision?

What is Computer Vision?

Computer vision is a field of machine learning who's goal is to help computers 'see'. It's end goal is to make intelligent systems which can understand digital images

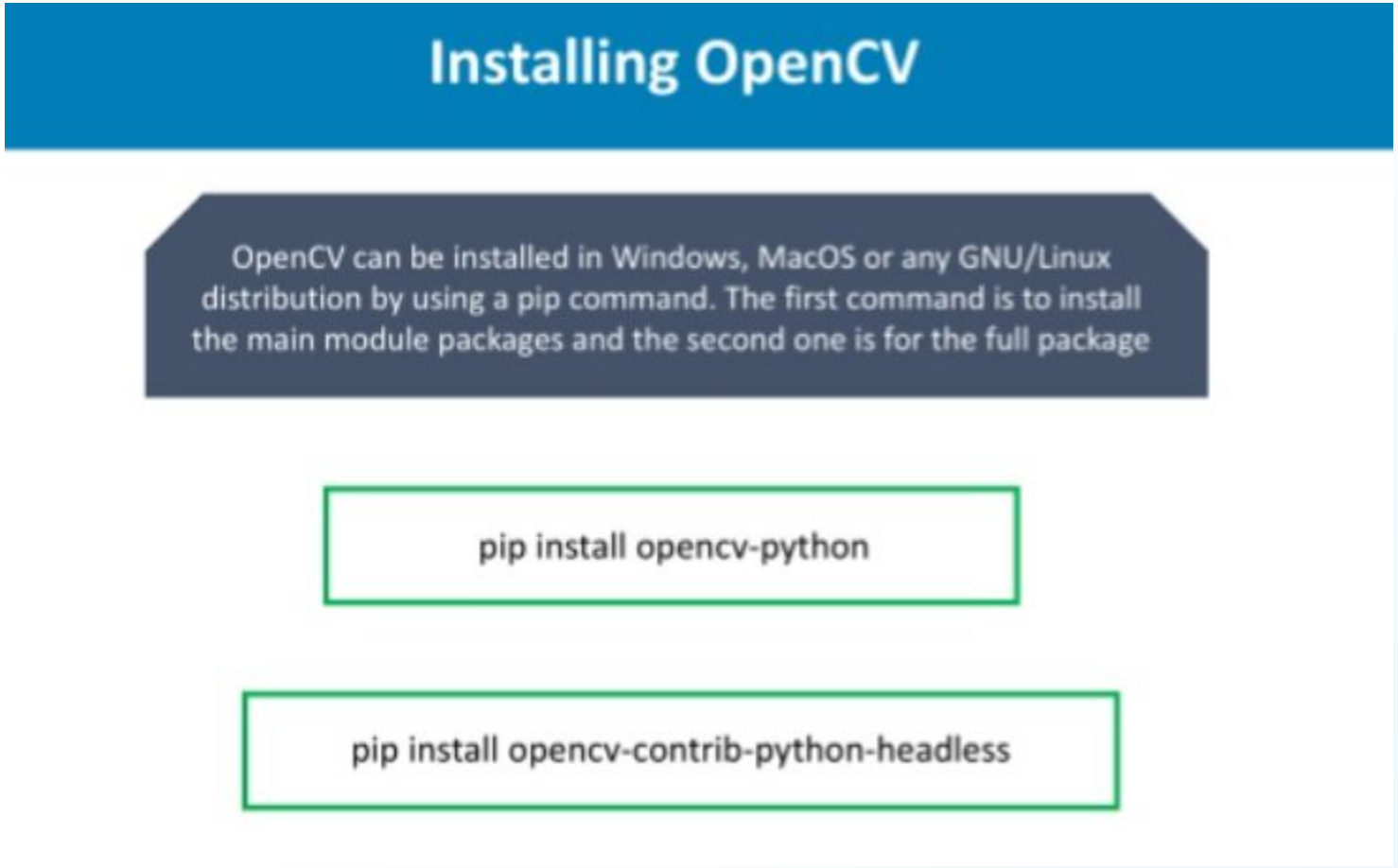
What is openCV?

What is OpenCV

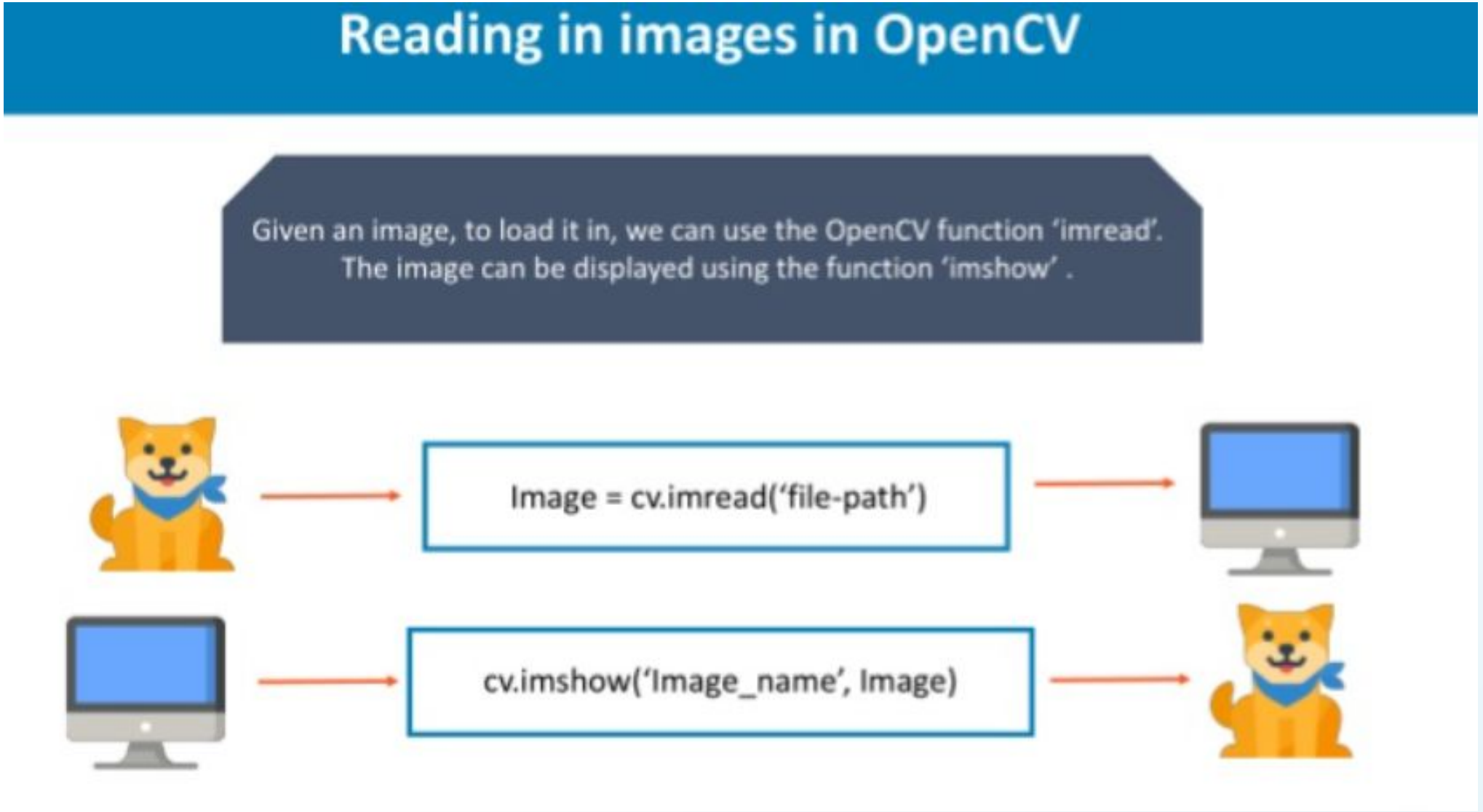
OpenCV is the huge open-source library for the computer vision, machine learning, and image processing. It can be used to process images and videos to identify objects, faces, or even handwriting of a human

OpenCV

Installing openCV



Reading in image in openCV



Resizing images and video

Resizing Images and Videos

Images read in might not be of correct size or might not fit the screen correctly. To overcome this, we can resize the image.

```
cv.resize(image, new dimensions , interpolation)
```

Drawing With openCV

Drawing in OpenCV

We can draw images in OpenCV. OpenCV allows us to draw various images such as rectangles, circles, lines and even put text over our image.

Basic Image Functions

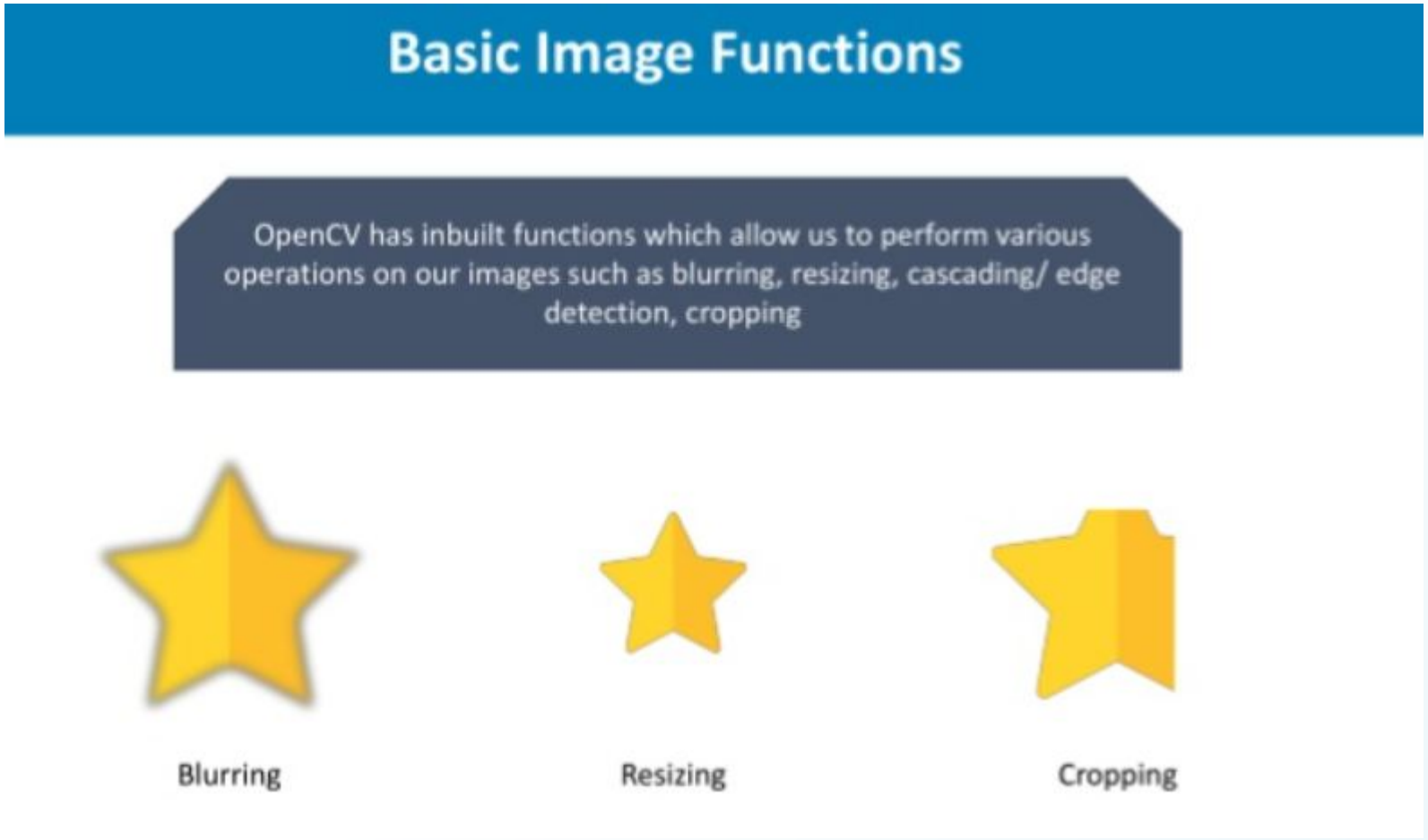


Image Transformation

We can transform the image we have read in in various ways including translation, i.e. shifting it along x or y axis, rotation, flipping and cropping.

Rotation

Flipping

Cropping

Contour Detection

Contour Detection

A contour is a curve or line joining all points which have the same color or intensity. Contours help us find the points which lie on the same plane and assist in edge detection

Color Channels

Reading in images in OpenCV

Any image is basically a combination of three main colours Red, Green and Blue (RGB). OpenCV allows us to split our image into its respective color channels.

Color Spaces

Color Spaces

Color spaces are a way to represent the color channels present in an image. They tell us the various color channels which are contributing to a particular hue

Blurring

Blurring is a method used to remove noise from an image by applying a low pass filter over an image. We smooth out the edges and make the transition from one color to another very smooth.

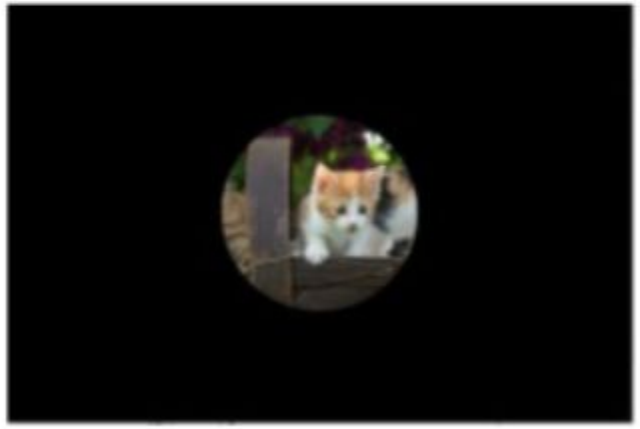
Bitwise Operations

BITWISE Operations

BITWISE Operators are operators such as AND, OR, XOR etc. In image processing, they are used to create a new image or for masking. The operation is done between each pixel of two images.

Masking

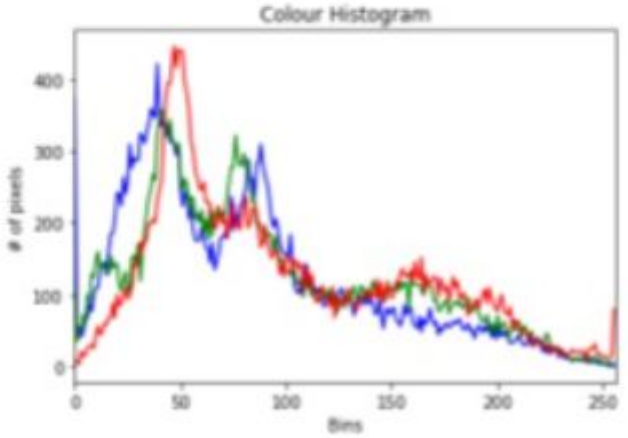
Masking is used to bring certain parts of an image into focus by lowering the definition over other parts. This is done by reducing the pixel quality of other parts of the image



Histograms

Histograms

In image processing, histograms typically refer to a graph of pixel intensity values. The intensity of each pixel is plotted in a histogram



Thresholding

Thresholding

A method of image segmentation. It is used to convert an image o binary by setting a threshold intensity value and deeming all values above it as 1 (converted to white) and below as 0 (black)

Edge Detection

Edge Detection

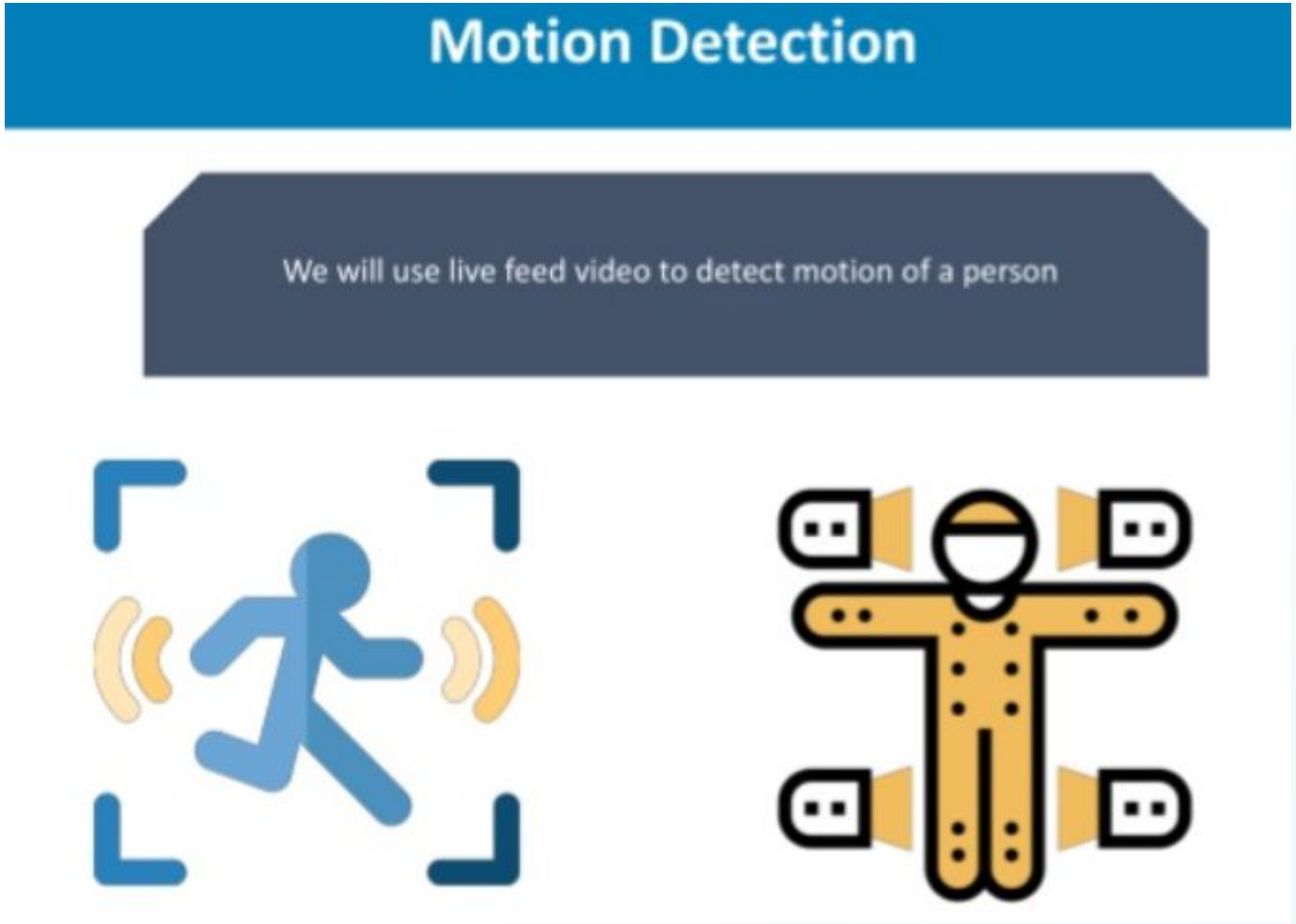
Edge detection is used to find the boundaries of an image by finding inconsistencies in brightness. It is used for image segmentation and data extraction

Demo

Face Detection and Recognition

In this demo, we will be using OpenCV and the haar_face vector to detect how may faces are present in an image. We will then train our system to recognize faces of prominent celebrities

Demo


Motion Detection
We will use live feed video to detect motion of a person

Let’s Practice!

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Terima Kasih