

1.

The displayed image is stretched to fit the screen. (in vertical direction)

a.

I added one more line in ViewController.mm:

```
imageView.contentMode = UIViewContentModeScaleAspectFit;
```

This Scales the content to fit the size of the view by maintaining the aspect ratio. Any remaining area of the view's bounds is transparent.

This can also be done by:

```
imageView.contentMode = UIViewContentModeScaleAspectFill;
```

It Scales the content to fill the size of the view. Some portion of the content may be clipped to fill the view's bounds.

b.

Check "Copy items if needed" when adding the picture to supporting files.

To use C++ functions and classes, we have to use .mm extension.

2.

a.

The color of the bounding box is blue at first.

Reason: we at first define red color to be `Scalar(0,0,255)`, which assumes it's BGR color space.

But it's actually RGB color space.

To remedy: switch the first and third element of scalar when defining the colors.

How to get the correct path: We can't simply write the name of the file. To get access to the path of the file, we can create a `NSString` as the filename, then use another `NSString` to get access to the path. For example:

```
NSString* const faceCascadeFilename = @"haarcascade_frontalface_alt";
```

```
NSString* faceCascadePath = [[NSBundle mainBundle] pathForResource:faceCascadeFilename ofType:@"xml"];
```

b.

Allocate new space for the drawing image to avoid modifying the original image.

d.

What is delegate: A delegate is an object that acts on behalf of, or in coordination with, another object when that object encounters an event in a program.

how is it used: In the example project, the view controller is set to be the delegate of video camera.

Why it's useful: This makes sure the opencv operation is applied for each frame.

3.

a.

What's autolayout: Autolayout is a way that lets developers create user interface by defining relationships between elements.

Why it might be useful: Auto Layout dynamically calculates the size and position of all the views in your view hierarchy, based on constraints placed on those views. It allows you to build user interfaces that dynamically respond to both internal and external changes.

b.

Benefits: reusable, performance is better because they don't use memory until they have to.

Easy for prototyping. Easy for refactoring.

Drawbacks: latency to the lazy loading process. Less control than custom code. Have limitation in some cases like dynamic layouts. Suffered from merge conflicts.

c.

what's UDID: Unique Device Identifier (UDID), which is a sequence of 40 letters and numbers that is specific to your device(iphone, ipad).

Why it's a privacy concern: The security issues arise when third parties have used UDID as an access token for your account on their service so that users' private information linked to UDIDs can be de-anonymized.