y = 2d Image

f = focal length of the camera

Z = distance between object and the camera

Now there are two different angles formed in this transform which are represented by Q.

The first angle is

$$\tan \Theta = -\frac{y}{f}$$

Where minus denotes that image is inverted. The second angle



From this equation, we can see that when the rays of light reflect back after striking from the object, passed from the camera, an invert image is formed.

We can better understand this, with this example.

For example

Assuming it has 1024 rows and it has 1024 columns. And since it is a gray scale image, it has 256 different shades of gray or it has bits per pixel. Then putting these values in the formula, we get

Size of an image = rows \* cols \* bpp

= 1024 \* 1024 \* 8

= 8388608 bits.

But since its not a standard answer that we recognize, so will convert it into our format.

Converting it into bytes = 8388608 / 8 = 1048576 bytes.

Converting into kilo bytes = 1048576 / 1024 = 1024kb, 14

enfo Converting into Mega bytes = 1024 / 1024

Thats how an image size is calo ated and it is stored. Now in the formula, if you are given the size of mige and the bits per pixel, you can and calculate the rows and columns of the image, provided the image is square(same rows and same column).

Types of Images

There are many type of images, and we will look in detail about different types of images, and the color distribution in them.

The binary image

The binary image as it name states, contain only two pixel values.

0 and 1.

Behind gray scale image:

As we have explained it several times in the previous tutorials, that an image is nothing but a two dimensional function, and can be represented by a two dimensional array or matrix. So in the case of the image of Einstein shown above, there would be two dimensional matrix in behind with values ranging between 0 and 255.

But thats not the case with the color images.

16 bit color format

It is a color image format. It has 65,536 different colors in it. It is also known as High color format.

It has been used by Microsoft in their systems that support more then 8 bit color format. Now intris 16 bit format and the next format we are going to discuss which is a 24 bit format are both color format.

The distribution of color in a color image is not as simple as it was in grayscale image.

A 16 bit format is actually divided into three further formats which are Red , Green and Blue. The famous (RGB) format.

It is pictorially represented in the image below.

## 24 bit color format

24 bit color format also known as true color format. Like 16 bit color format, in a 24 bit color format, the 24 bits are again distributed in three different formats of Red, Green and Blue.



Behind a 24 bit image.

Unlike a 8 bit gray scale image, which has one matrix behind it, a 24 bit image has three different matrices of R, G, B.

