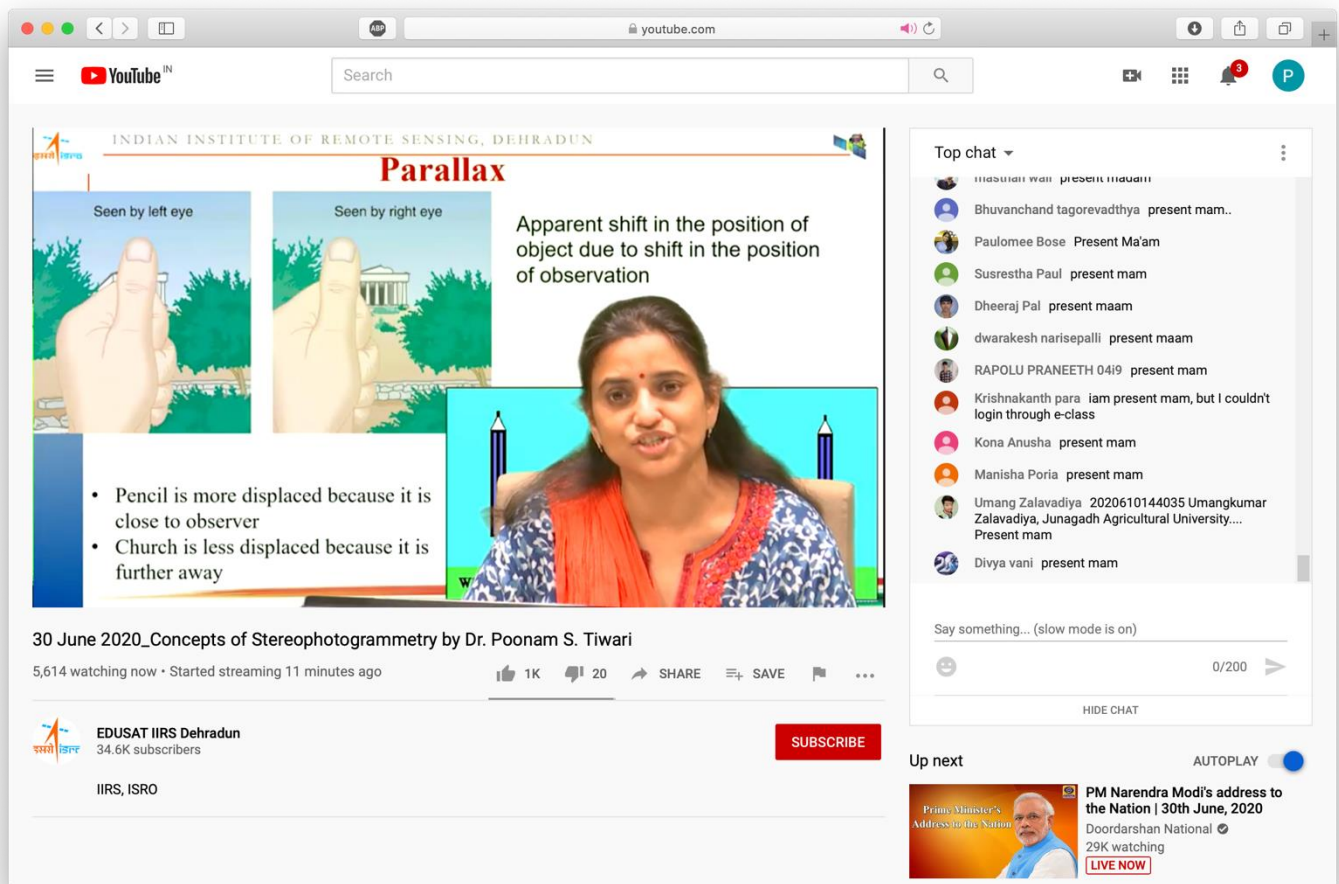


## DAILY ASSESSMENT FORMAT

<b>Date:</b>	<b>30 June 2020</b>	<b>Name:</b>	<b>Poorvi j gowda</b>
<b>Course:</b>	<b>61<sup>st</sup> IIRS Outreach programme</b>	<b>USN:</b>	<b>4AL17EC071</b>
<b>Topic:</b>	<b>Concepts of Stereophotogrammetry</b>	<b>Semester &amp; Section:</b>	<b>6<sup>th</sup> sem &amp; B sec</b>
<b>Github Repository:</b>	<b>Poorvi-2000</b>		

### AFTERNOON SESSION DETAILS

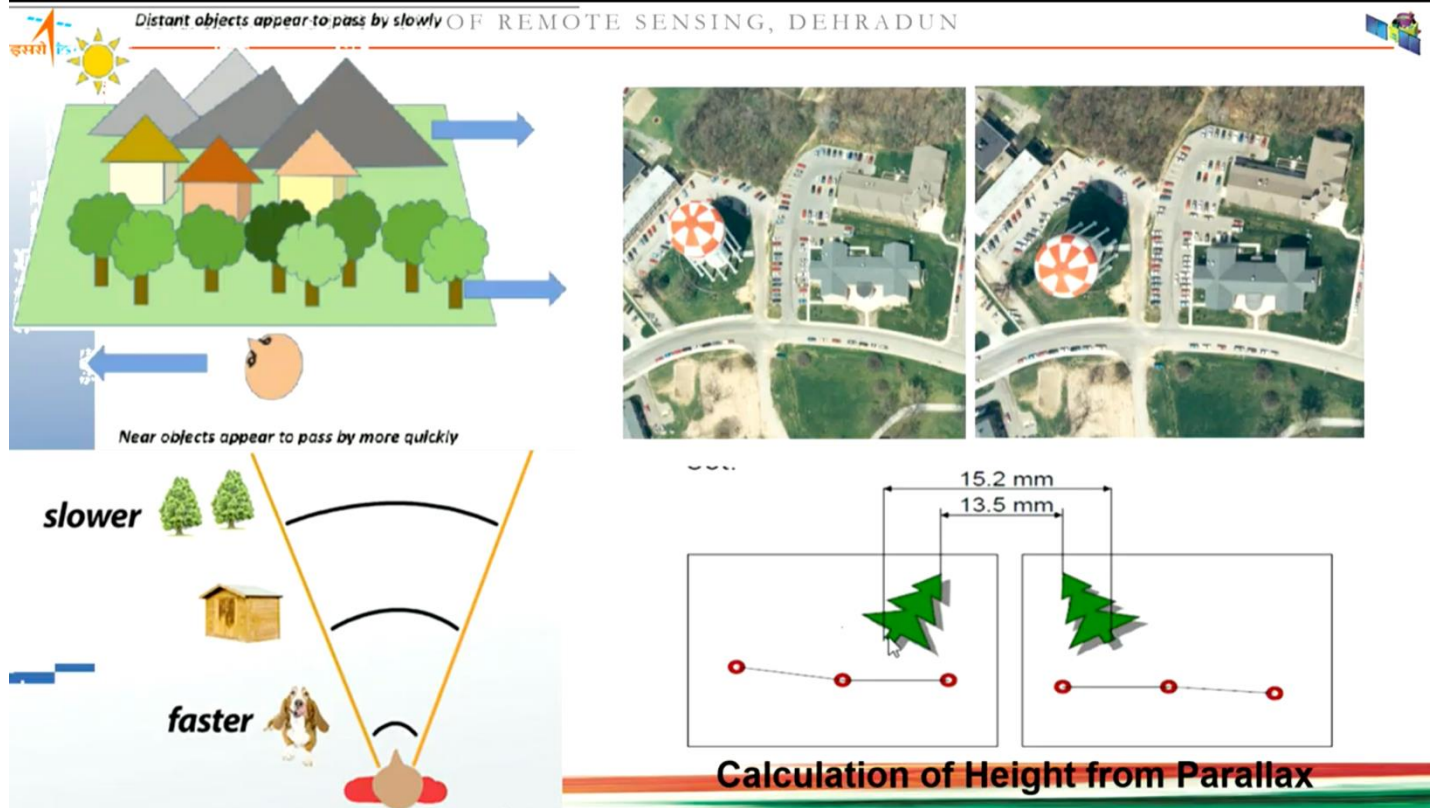
#### Image of session



## PARALLAX

Parallax is a displacement or difference in the apparent position of an object viewed along two different lines of sight, and is measured by the angle or semi-angle of inclination between those two lines.<sup>[1][2]</sup> Due to foreshortening, nearby objects show a larger parallax than farther objects when observed from different positions, so parallax can be used to determine distances.

# Calculation of height using Parallax



Where:  $H_o$  = Height of the object;  $H_a$  = Altitude above the surface where the photo is taken;  $D$  = Length of the displaced image;  $R$  = Radial distance from the photo nadir to the top of the object. This is the most used method of measuring heights on air photos. There are many forms of the parallax equations.

# Depth Perception



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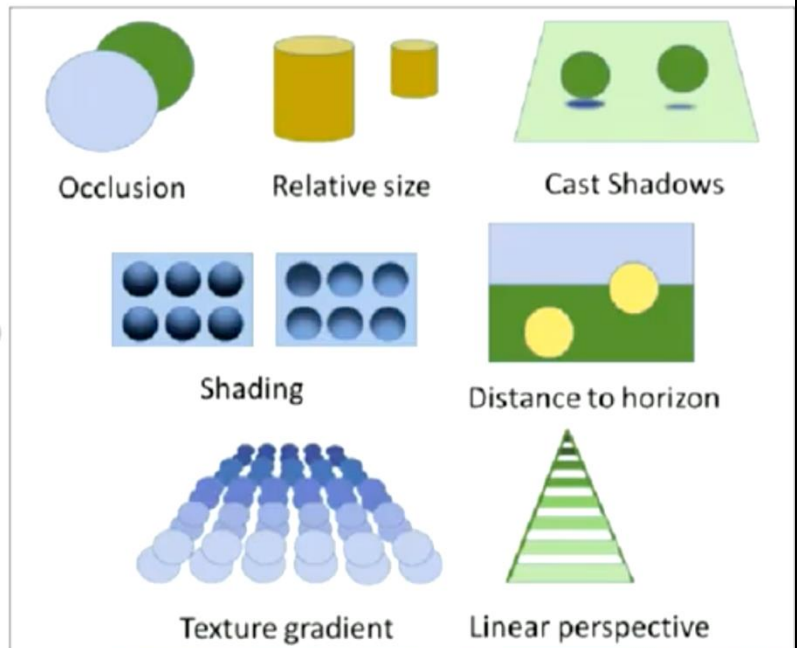
## Depth Perception

### ■ Methods of judging depth:

1. Monoscopic
2. Stereoscopic

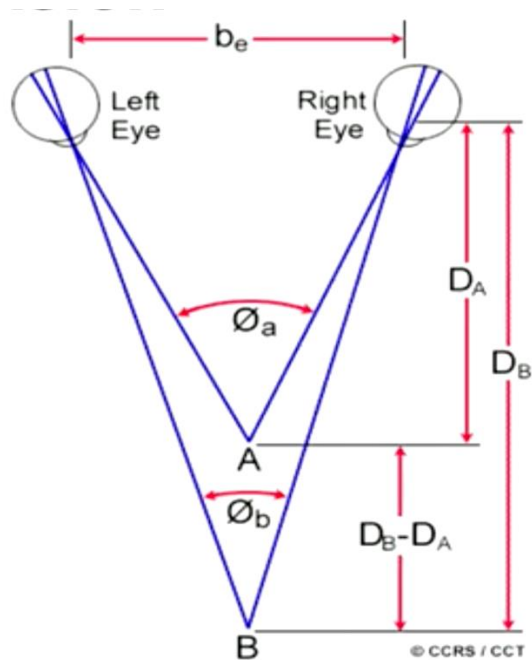
### **Monoscopic method**

1. Relative size of objects.
2. Hidden objects
3. Shadows
4. Difference in focusing of eye



## Stereoscopy / Stereovision

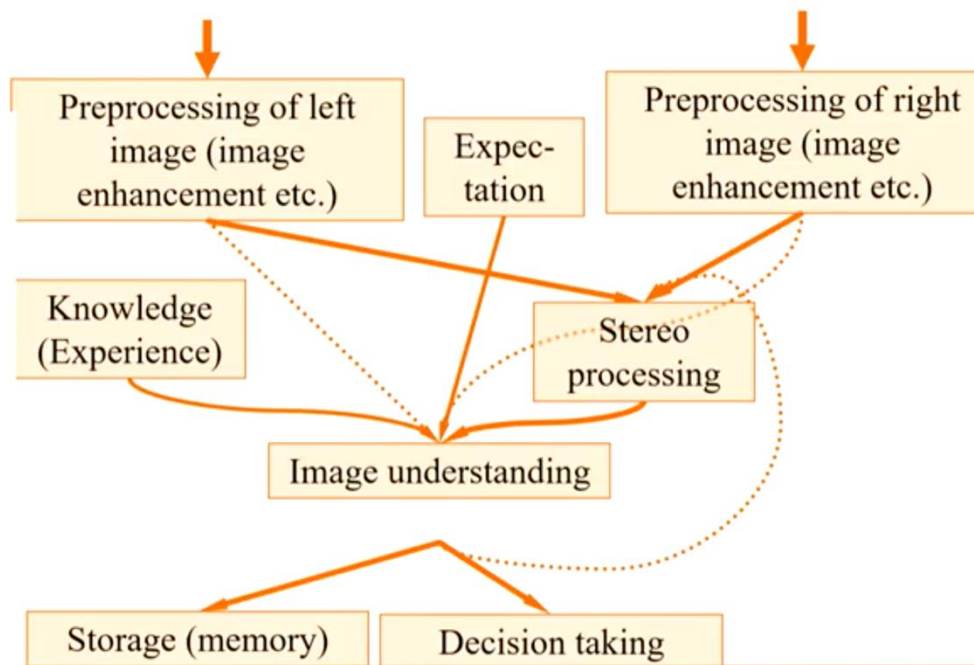
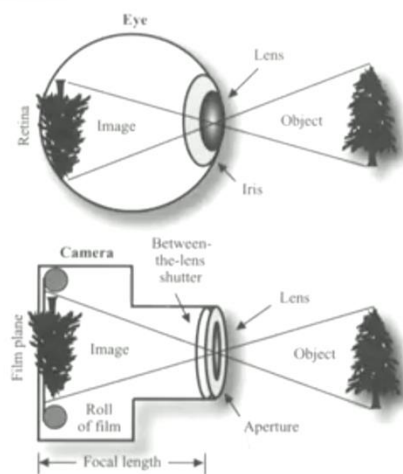
Stereoscope is to deflect normally converging lines of sight, so that each eye views a different image. For deriving maximum benefit from photographs they are normally studied stereoscopically. Instruments in use today for three dimensional studies of aerial photographs. If instead of looking at the original scene, we observe photos of that scene taken from two different viewpoints, we can under suitable conditions, obtain a three dimensional impression from the two dimensional photos. This impression may be very similar to the impression given by the original scene, but in practice this is rarely so. A pair of photograph taken from two cameras station but covering some common area constitutes and stereoscopic pair which when viewed in a certain manner gives an impression as if a three dimensional model of the common area is being seen.



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## In the brain

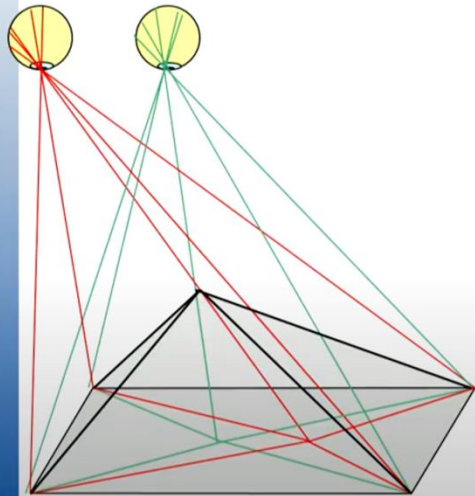




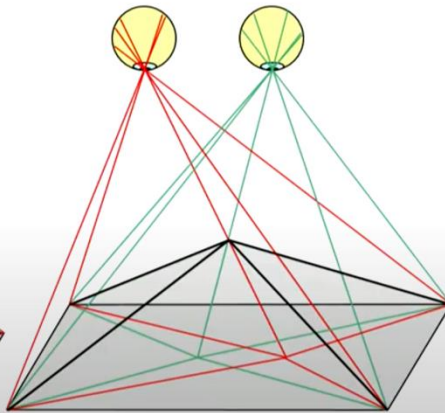


## Depending on

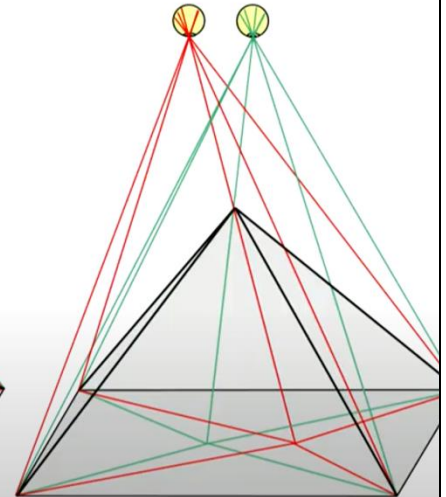
Viewing Position



Viewing Distance



Magnification

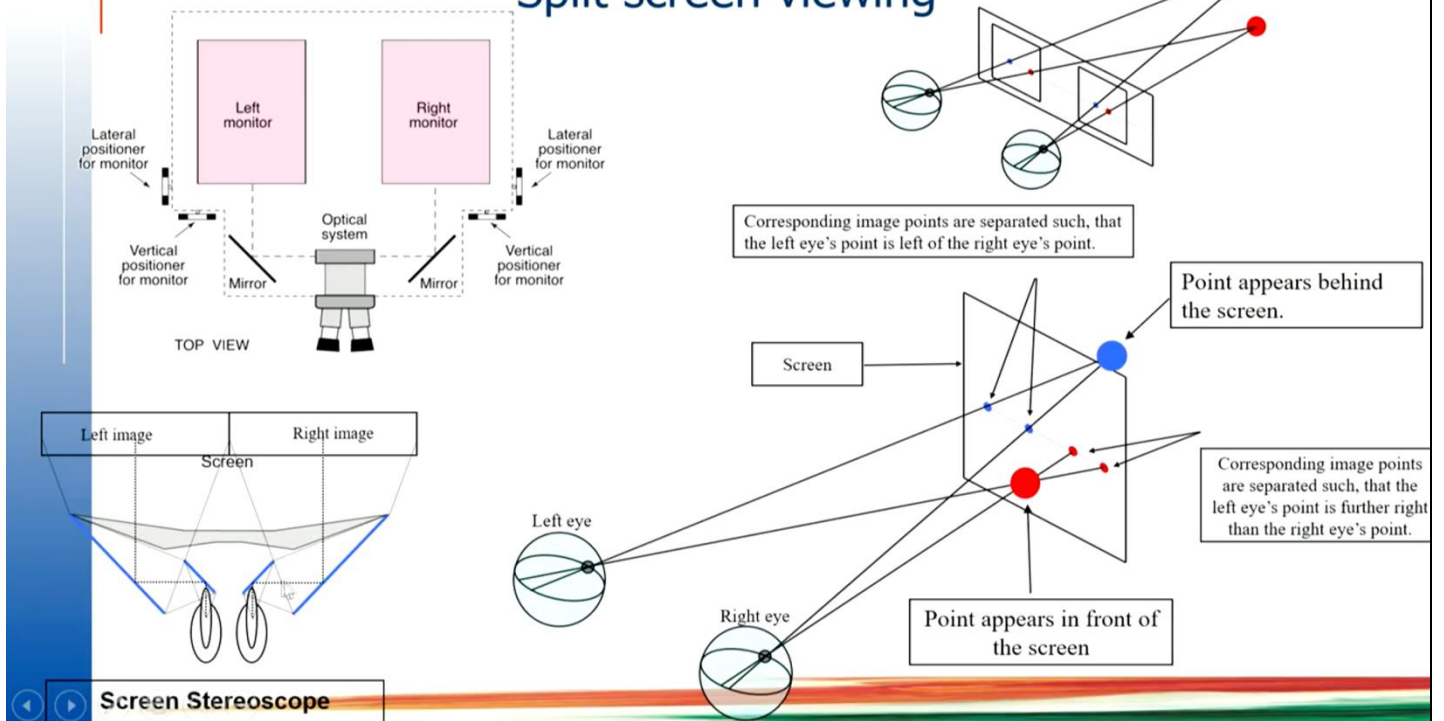


## Viewing Stereophotographs in Analog Environment

Three basic types of Stereoscopes:

- Pocket
- Mirror
- Scanning

## Split screen viewing



## Anaglyph viewing

Anaglyph 3D is the [stereoscopic](#) 3D effect achieved by means of encoding each eye's image using filters of different (usually chromatically opposite) colors, typically [red](#) and [cyan](#). Anaglyph 3D images contain two differently filtered colored images, one for each eye. When viewed through the "color-coded" "anaglyph glasses", each of the two images reaches the eye it's intended for, revealing an integrated [stereoscopic image](#). The [visual cortex](#) of the brain fuses this into the perception of a three-dimensional scene or composition.



- Stereophotogrammetry is the general term applied to the science of measurement from photographs when an overlapping stereopair of photographs is used.
- In contrast to single photographs, which can only extract 2D information, stereophotogrammetry allows 3D information to be extracted.
- An overlapping stereopair is a pair of photographs on which the same object or area of terrain is pictured, but from different views or perspectives.

### **Rotation matrix**

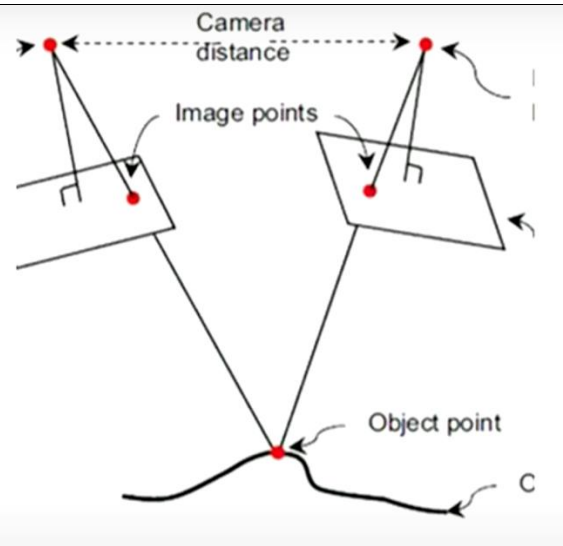
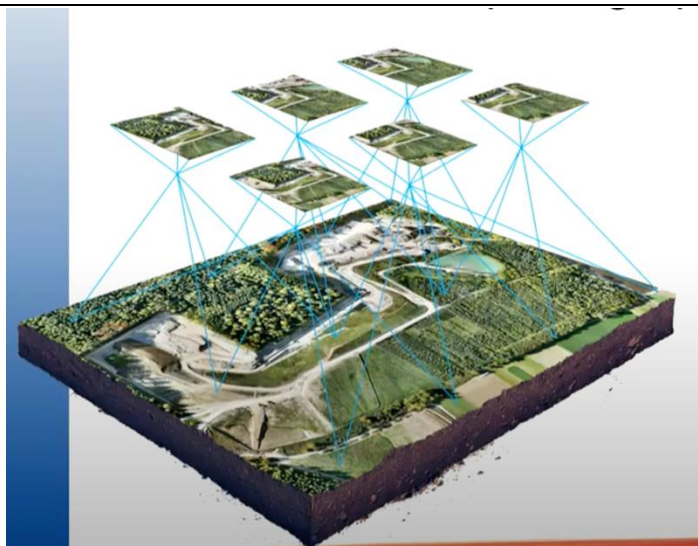
In linear algebra, a rotation matrix is a matrix that is used to perform a rotation in Euclidean space. For example, using the convention below, the matrix. rotates points in the xy-plane counterclockwise through an angle  $\theta$  with respect to the x axis about the origin of a two-dimensional Cartesian coordinate system.

$$M = \begin{bmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{bmatrix}$$

### **Orientation of Stereopair**

Recreating same condition as existed at time of photography

- Inner/interior orientation
- Relative orientation
- Absolute orientation. } Exterior orientation



## Result (3D stereo model)

