

## Facial Recognition:

How does Facebook know that picture is you? How does security use **facial recognition** to ID people? How do we know that the image below is actually Mickey Mouse?

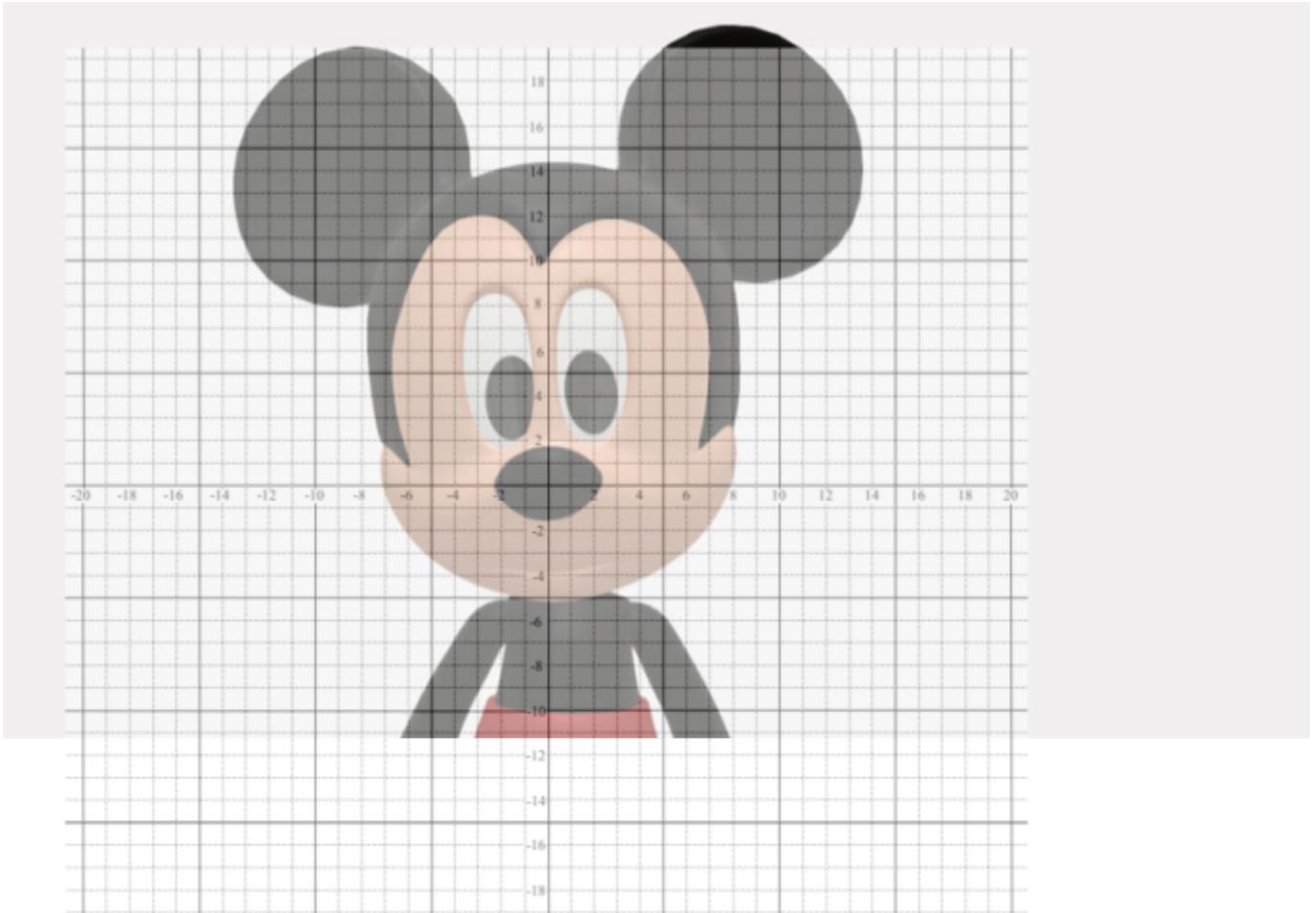


Key info:

- Most pictures are digital representation of images.
- Helpful to have a full frontal picture versus side view.
  - Smiling
  - Not smiling
- Most faces are symmetrical
- Key locations (landmarks) can be marked on a face:
  - Center of nose
  - left/right mouth
  - Parts of left/right eyes
  - Parts of left/right ears
  - And many more
- Slope of the landmarks vary by image (face)
- Distance (ratio) between landmarks vary by image (face)

Sample Image of key landmarks.

{in this photo, the tip of the nose marks the center of the grid (0, 0)}



Determine the coordinates of the following landmark points on Mickey Mouse’s face.

Left outer eye: \_\_\_\_\_

Right outer eye: (3.5, 5.5)

Left mouth edge: (-2, -3.5)

Right mouth edge: \_\_\_\_\_

Left outer ear: \_\_\_\_\_

Right outer ear: \_\_\_\_\_

Left inner eye: \_\_\_\_\_

Right inner eye: (0.5, 5.5)

**Mickey Mouse Facial Landmarks**

Facial Landmarks:	ID#	x-pixel coordinate	y-pixel coordinate
<i>m7 marks:</i>			
Left Outer eye			
Right Outer eye			
Nose Tip		0	0
Left mouth Edge			
Right mouth Edge			
Left outer ear			
Right outer ear			
Left Inner eye			
Right Inner eye			

**Mickey Mouse's slope ratio between landmarks**

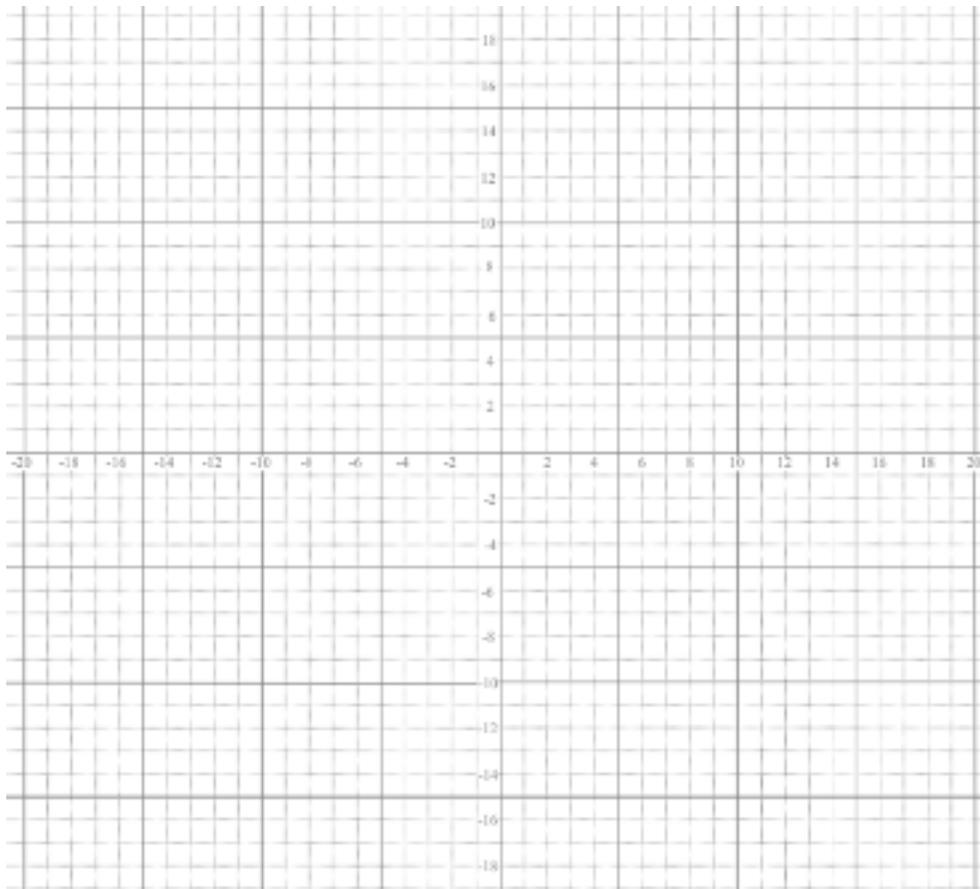
	Left Outer eye	Right Outer eye	Nose Tip	Left mouth edge	Right mouth edge	Left outer ear	Right outer ear	Left inner eye	Right inner eye
Left Outer eye	XXXX								
Right Outer eye		XXXX						0	
Nose tip			XXXX						
Left mouth edge				XXXX					
Right mouth edge					XXXX				
Left outer ear						XXXX			
Right outer ear							XXX		
Left inner eye								XXX	
Right inner eye									XXX

**Mickey Mouse’s distance between landmarks**

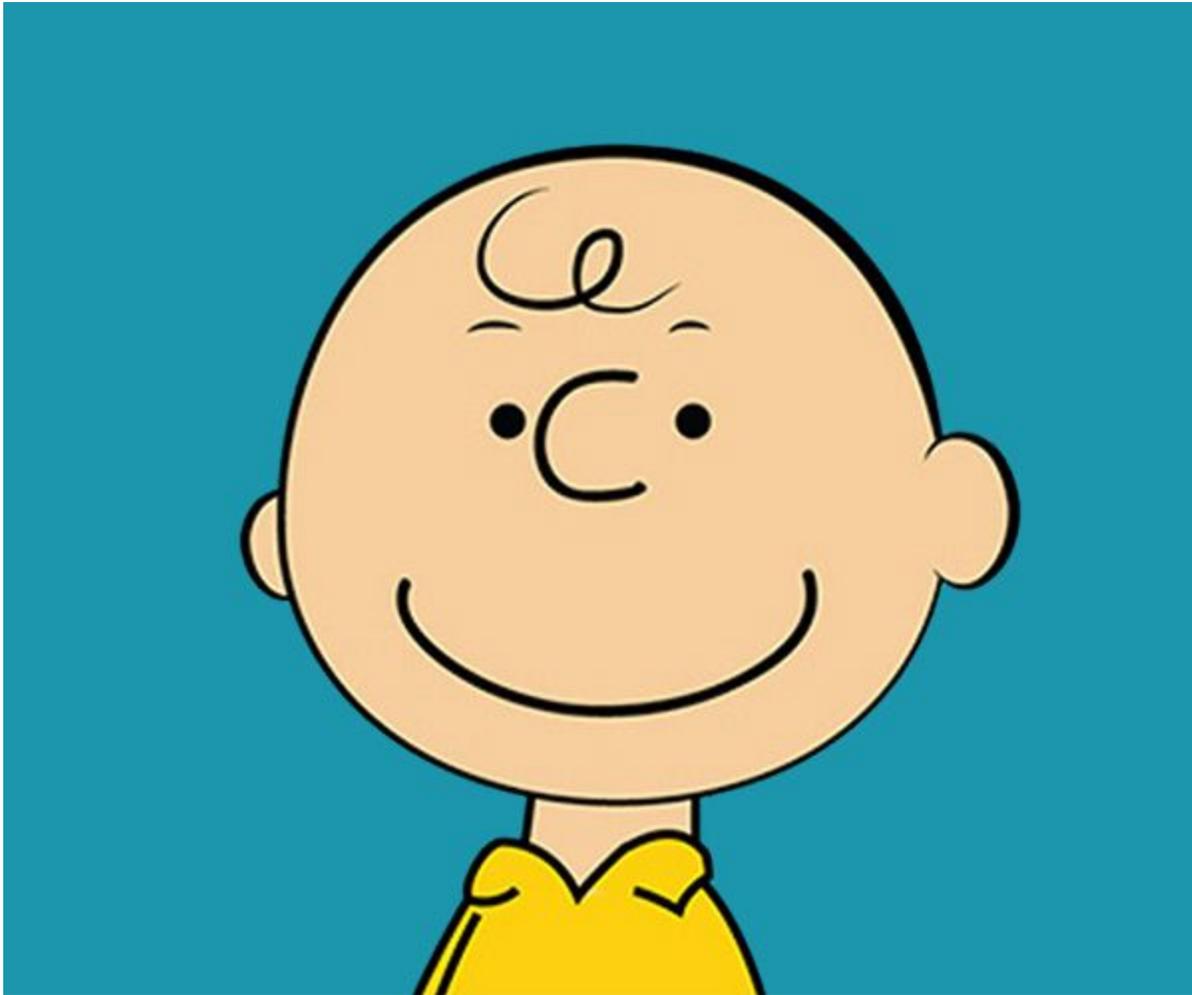
	Left	Right	Nose	Left	Right	Left	Right	Left	Right
	Outer	Outer	Tip	mouth	mouth	outer	outer	inner	inner
	eye	eye		edge	edge	ear	ear	eye	eye
Left Outer eye	XXXX								
Right Outer eye		XXXX							
Nose tip			XXXX						
Left mouth edge				XXXX					
Right mouth edge					XXXX				
Left outer ear						XXXX			
Right outer ear							XXX		
Left inner eye								XXX	
Right inner eye									XXX

RATIOS OF key DISTANCES:

50% transparency xy-grid:



## Facial Recognition Lab:



Click on the picture of Charlie Brown above and press CTRL-C to copy it.

Open a google docs document. Type an opening statement regarding facial recognition and what you think it is.

In the menu bar, select Insert → Drawing. Press CTRL-V to paste Charlie Brown.

Return to the shared document " ".

Copy (CTRL-C) the 50% transparency xy-grid. Return to your "Drawing" on your new document and press Paste (CTRL-V).

Move the origin of the transparency grid to the nose of Charlie Brown.

50% transparency xy-grid:

