

**MUHAMMAD & HELMY**

**FACE DETECTION USING HAR CASCADE**

**EPISODE 5**

The background features several thin, curved lines in light gray and white, creating a sense of motion and depth. A prominent purple shape, resembling a speech bubble or a stylized 'C', is positioned on the left side, containing the title text.

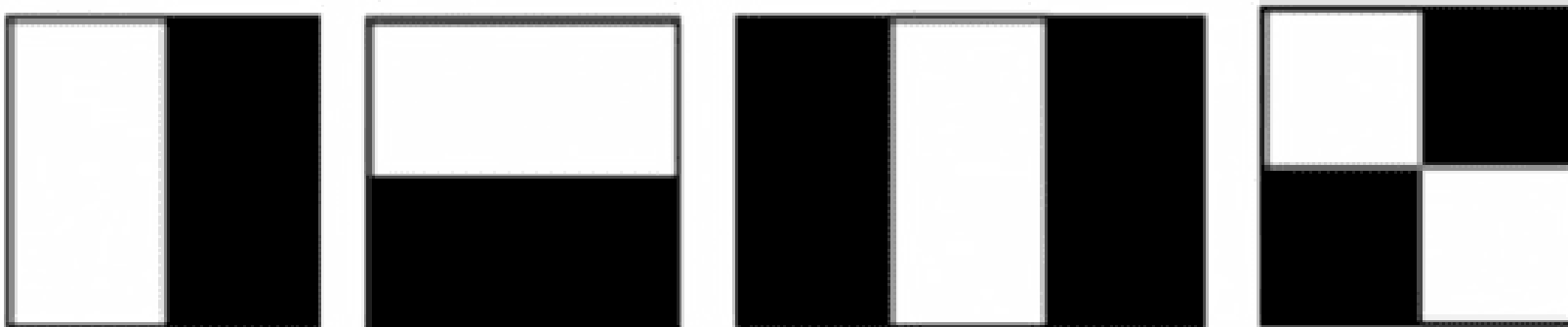
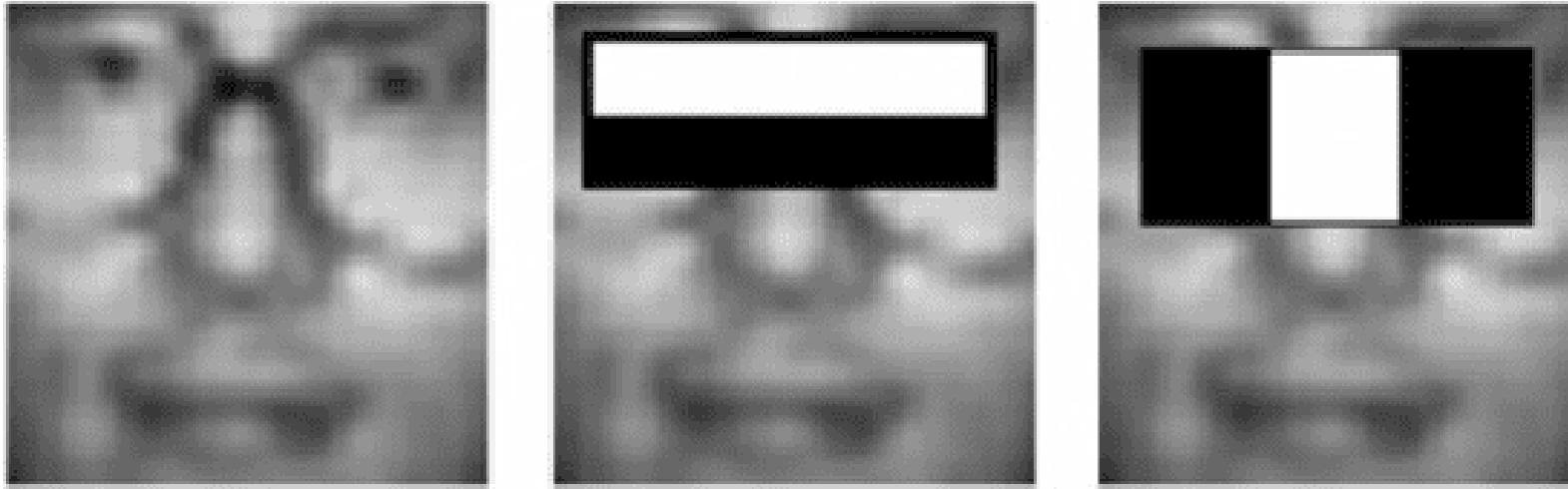
## **CASCADE CLASSIFIERS**

**IT IS A MACHINE LEARNING  
BASED APPROACH IN  
WHICH A CASCADE  
FUNCTION IS TRAINED  
FROM A LOT OF POSITIVE  
AND NEGATIVE IMAGES. IT  
IS THEN USED TO DETECT  
OBJECTS IN OTHER  
IMAGES.**

## **- HOW IT WORK?**

**HERE WE WILL WORK WITH FACE DETECTION. INITIALLY, THE ALGORITHM NEEDS A LOT OF POSITIVE IMAGES (IMAGES OF FACES) AND NEGATIVE IMAGES (IMAGES WITHOUT FACES) TO TRAIN THE CLASSIFIER.**

THEN WE NEED TO EXTRACT FEATURES FROM IT. FOR THIS, HAAR FEATURES SHOWN IN BELOW IMAGE ARE USED.



# FACE DETECTION



## USING CASCADE CLASSIFIERS RESULT

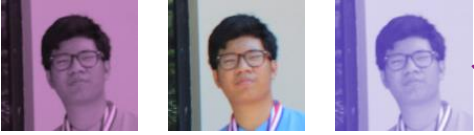


# USING CASCADE CLASSIFIERS

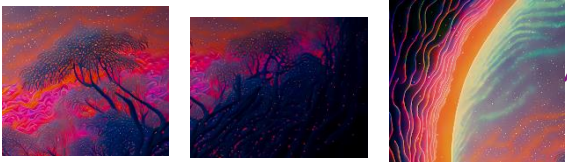


# HOW IT WORK? CASCADE CLASSIFIERS

POSITIVE IMAGE



NEGATIVE IMAGE



TRAIN  
CASCADE  
OBJECT  
DETECTOR AS  
FUNCTION

CASCADE CLASSIFIER

STAGE ONE  
STAGE TWO  
STAGE THREE

STORED AS AN  
XML\_FILE

VISION.CASCADE  
OBJECT  
DETECTOR

SYSTEM  
OBJECT