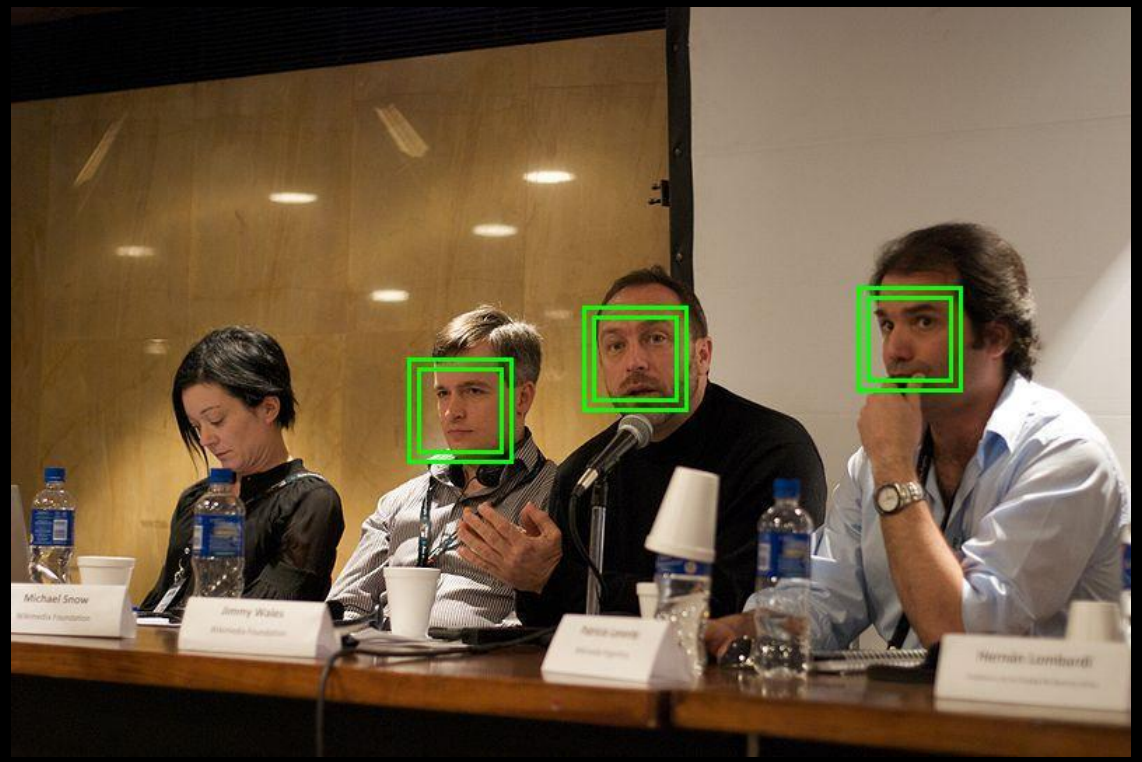
FACE DETECTION

Human face detection



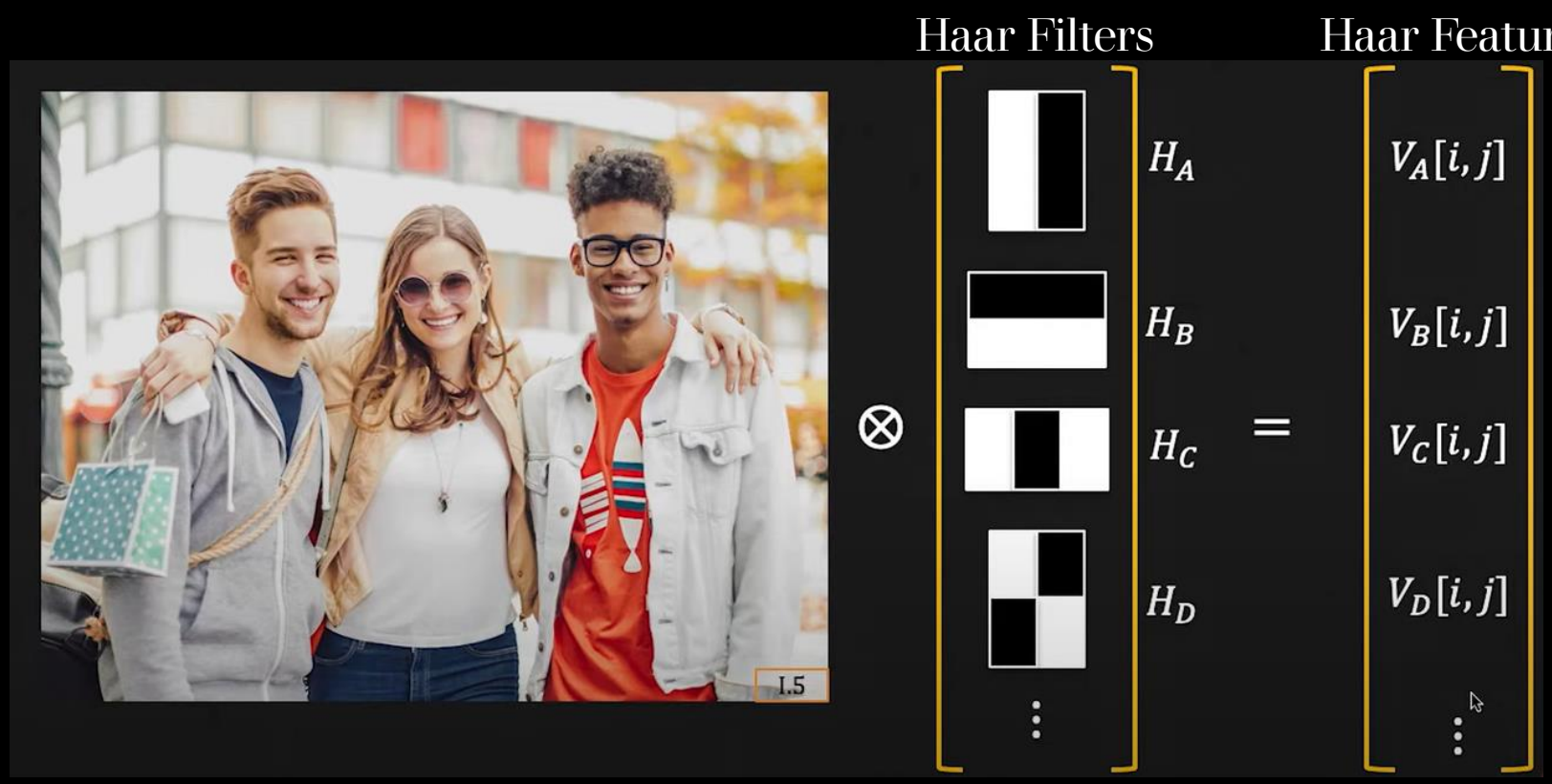
Face detection process

Face detection framework

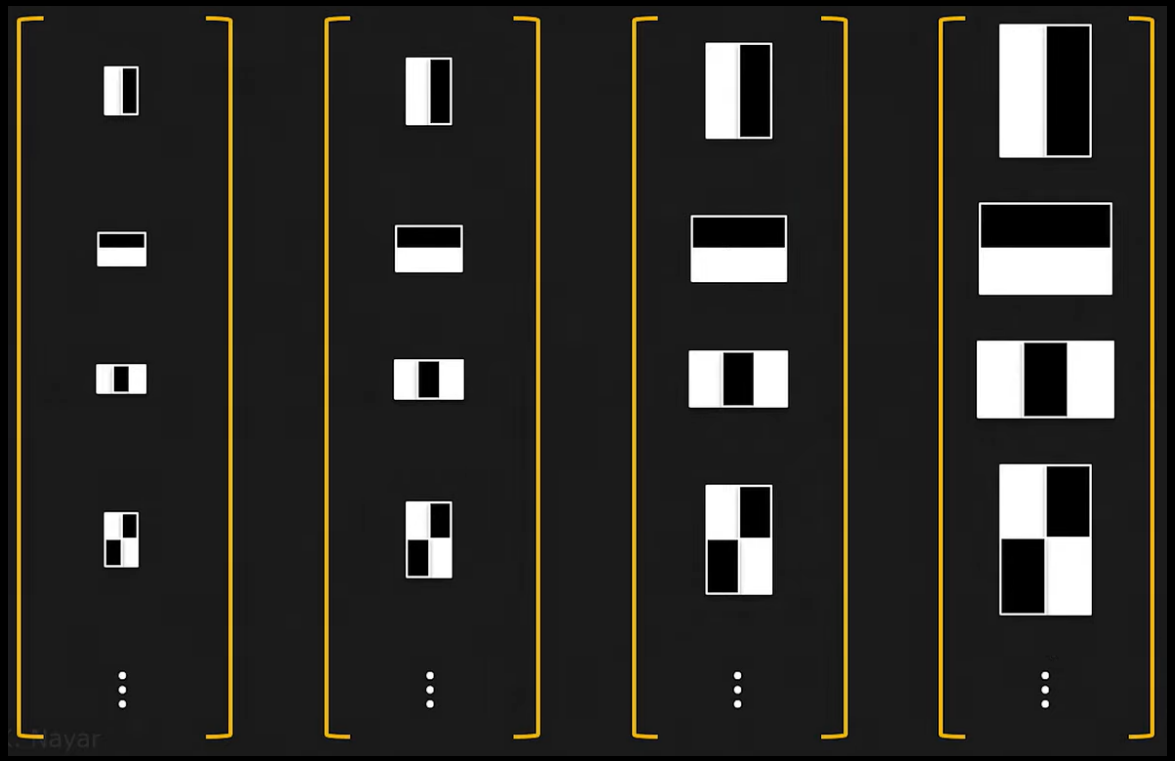
- For each window:

- Features?
- Classifier?

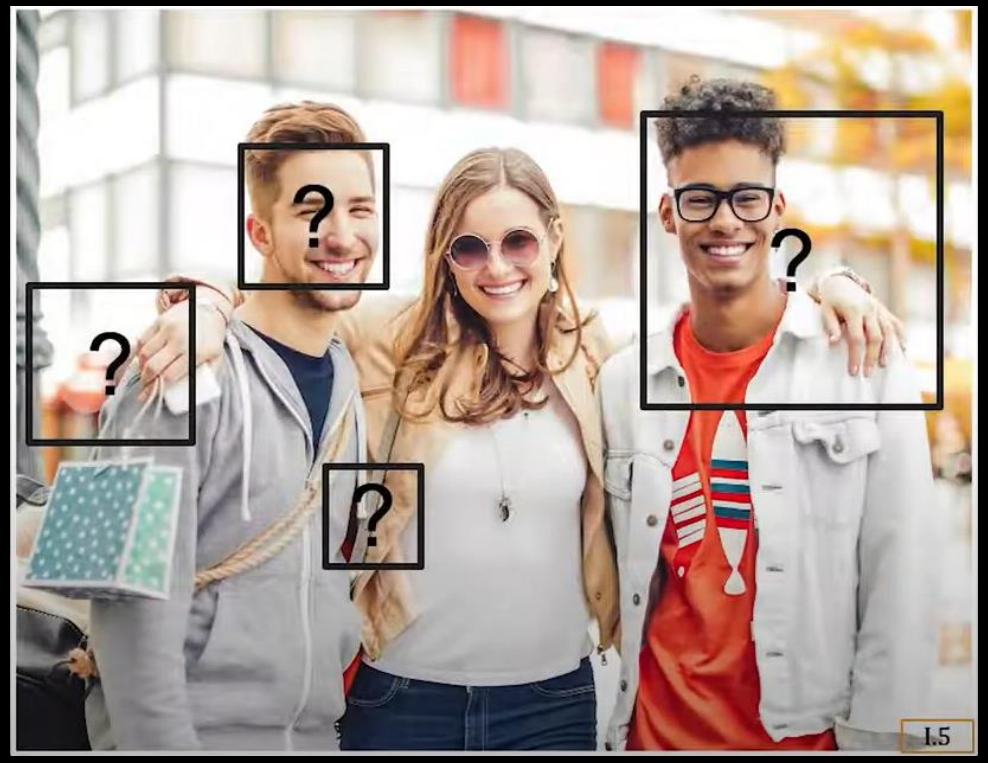
Haar features



Detecting faces of different size

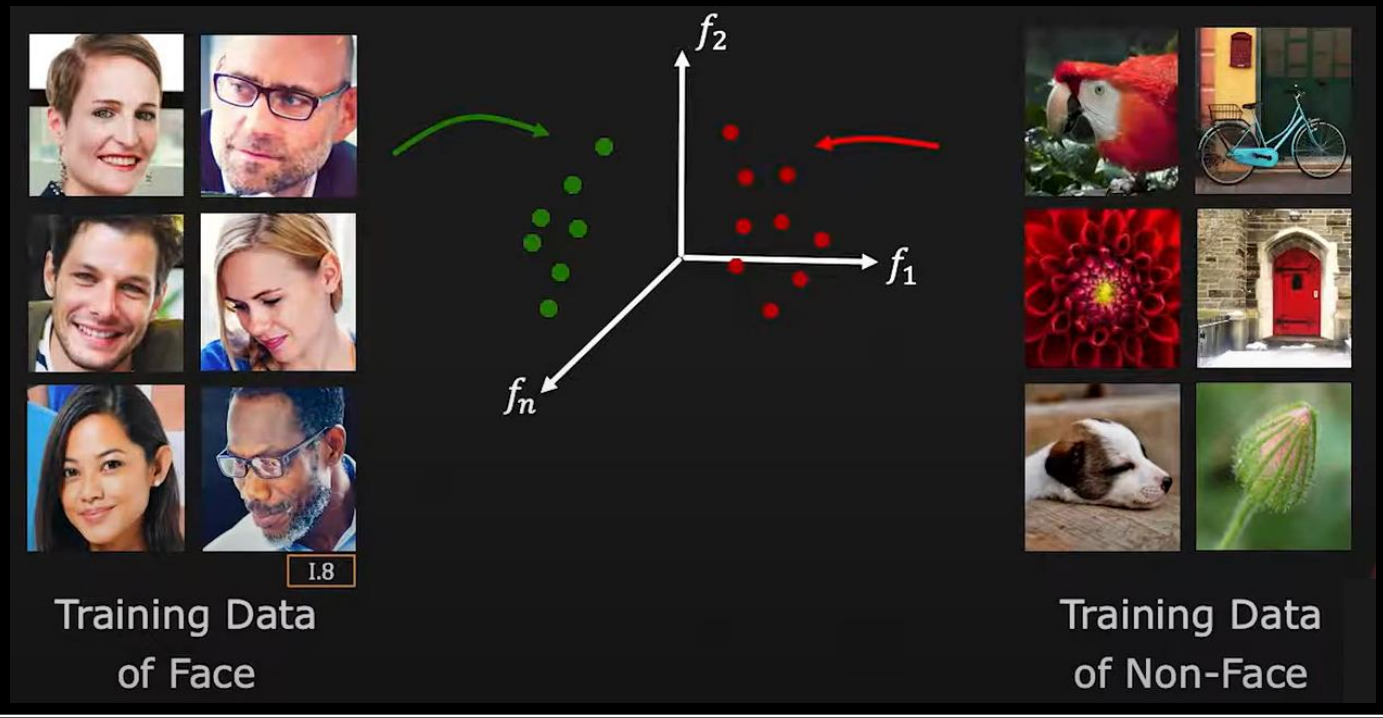


Classifier for face detection



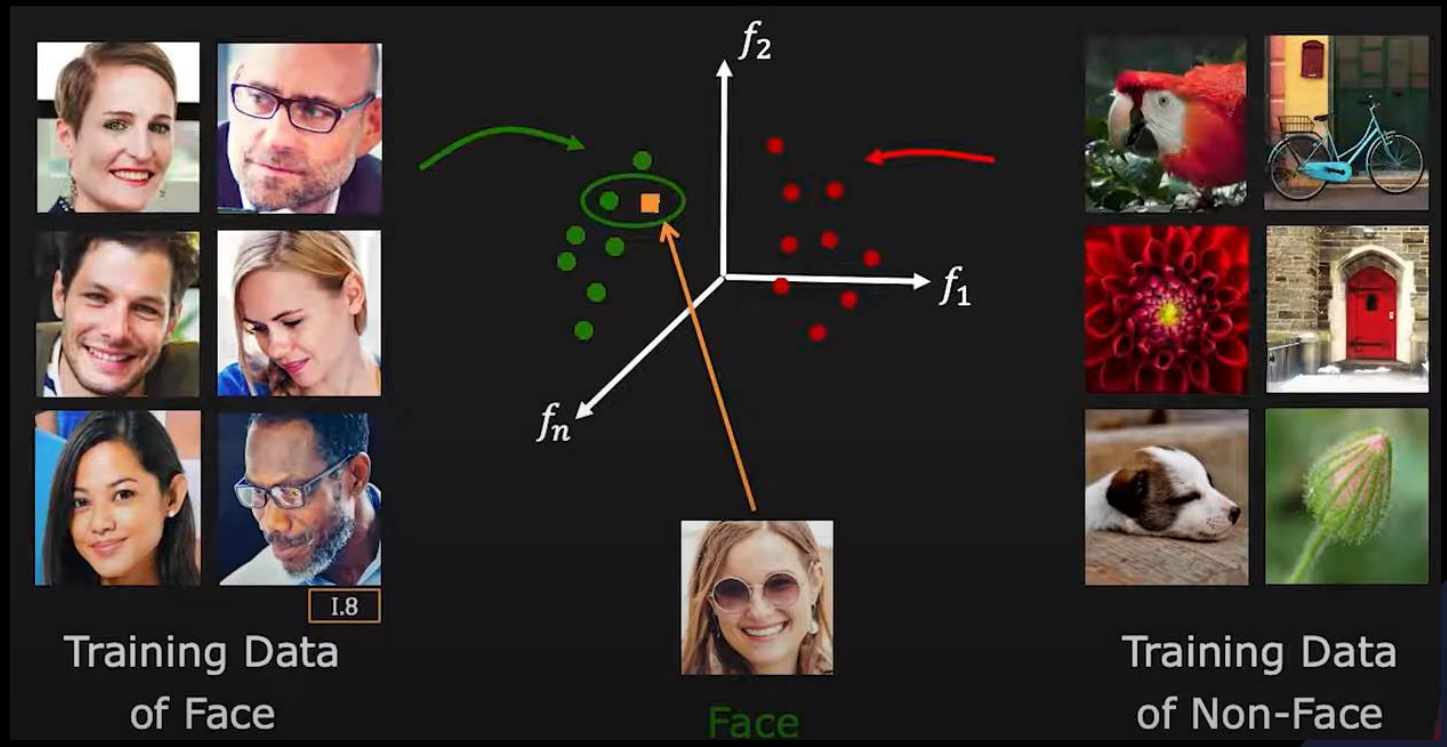
Feature Space

- Haar features f (a vector) at a pixel is a point in an n-D space, $f \in R^n$



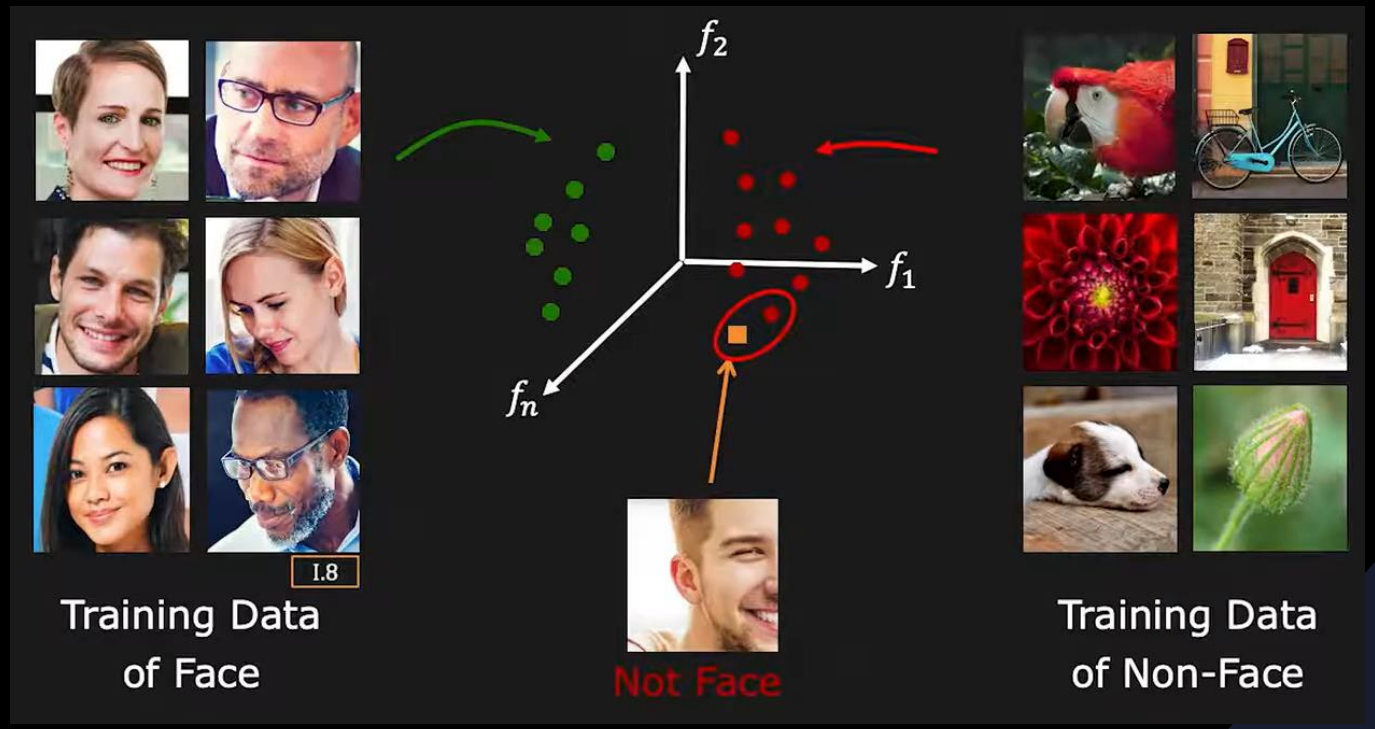
Nearest Neighbour Classifier

- Find the nearest training sample and assign the label



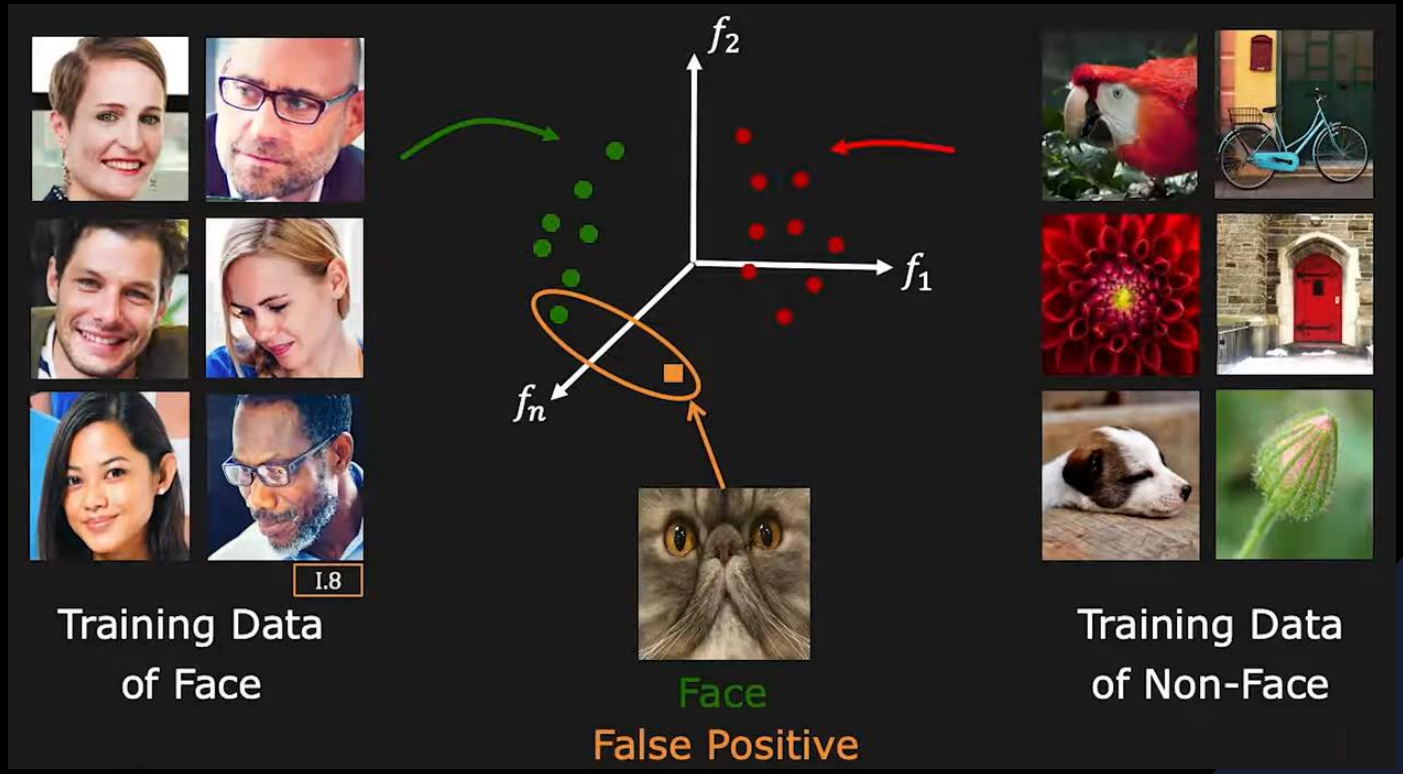
Nearest Neighbour Classifier

- Find the nearest training sample and assign the label



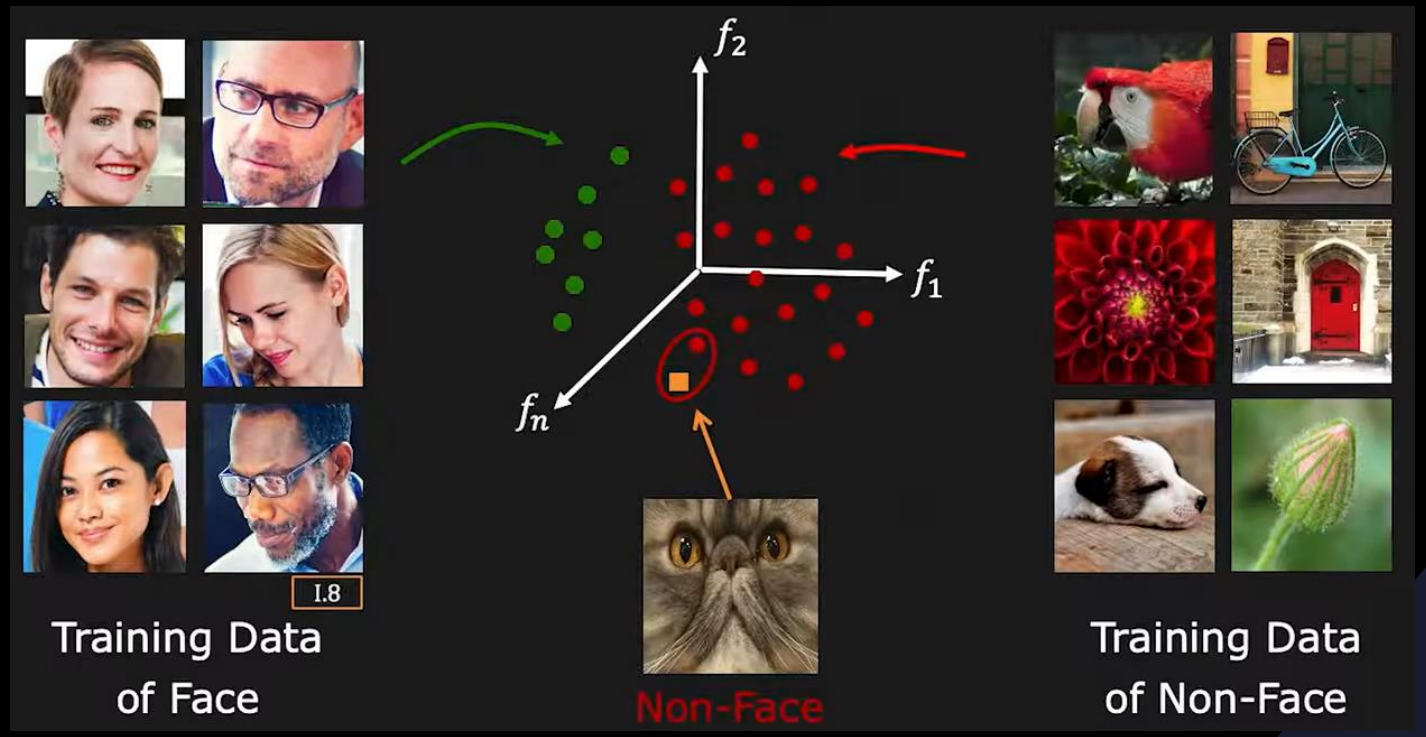
Nearest Neighbour Classifier

- Find the nearest training sample and assign the label

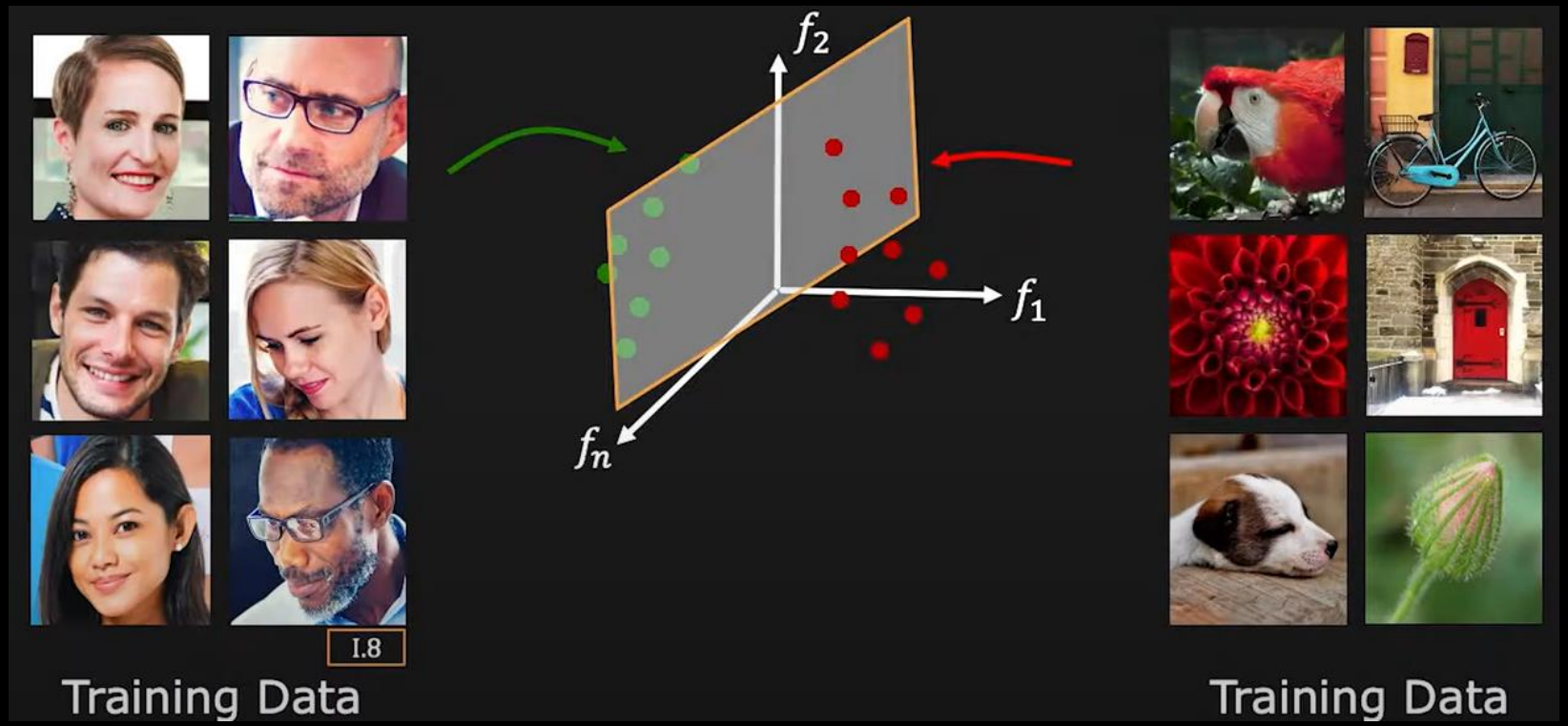


Nearest Neighbour Classifier

- Large training set
- Robust NN classifier
- Slower the NN classifier

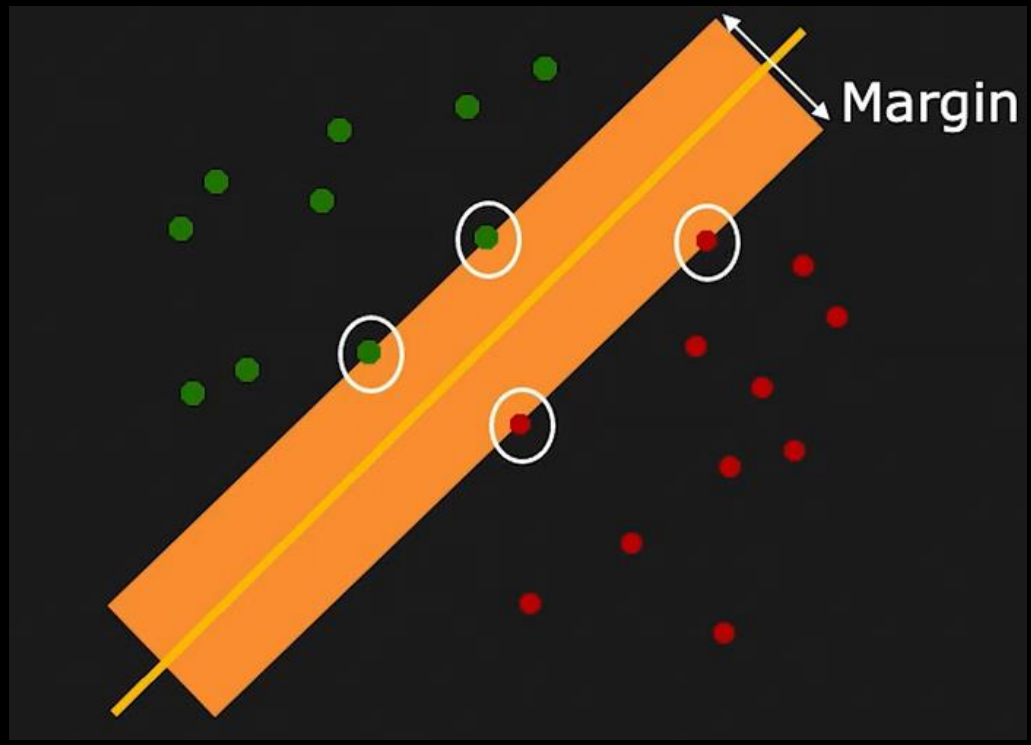


Decision boundary

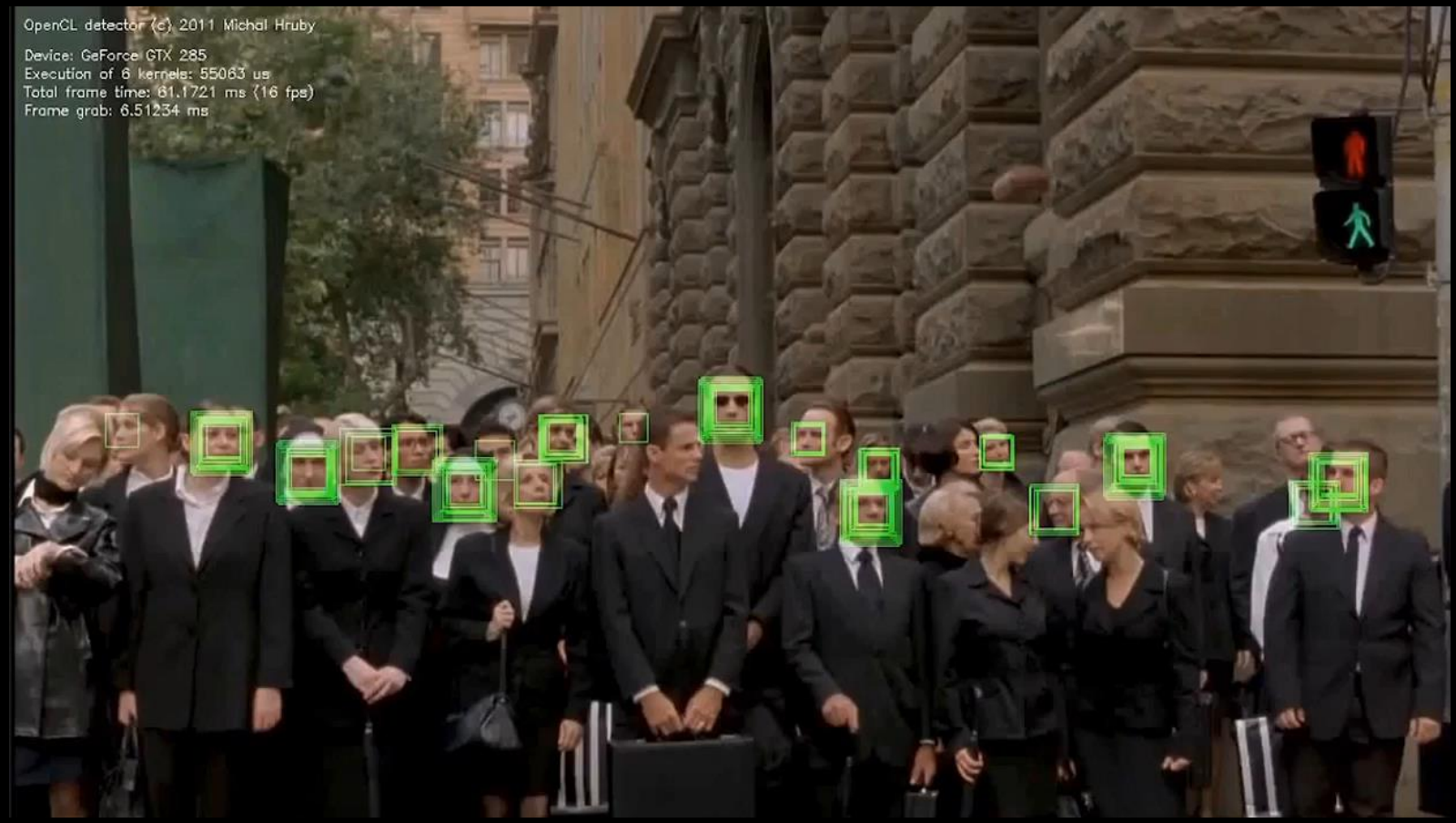


Support Vector Machine (SVM)

Support Vectors: Closest data samples to the boundary



Results


OpenCL detector (c) 2011 Michal Hruby
Device: GeForce GTX 285
Execution of 6 kernels: 55063 us
Total frame time: 61.1721 ms (16 fps)
Frame grab: 6.51234 ms

Research & Product development

- Chhavi Sharma, Dhruv Pande and Vikas Upadhyaya (2014), “Object Detection and Path Finding Using Monocular Vision”, International Conference on Signal Propagation and Computer Technology PP. 376-379. DOI: 10.1109/ICSPCT.2014.6885028.
- Debesh Bar, Dhruv Pande, Manveer S. Sandhu and Vikas Upadhyaya (2015), “Real-time Security Solution for Automatic Detection and Tracking of Intrusion”, International Conference on Image Information Processing, PP. 399-402. DOI: 10.1109/ICIIP.2015.7414804.
- Pranith K. Thadagoppula and Vikas Upadhyaya (2016), “Vehicle speed detection using Image processing”, International Conference on Computer, Control, Informatics and its applications, PP. 11-16. DOI: 10.1109/IC3INA.2016.7863015.

Research & Product development

- Shashank Ramesh and Vikas Upadhyaya (2016), “Vehicle Classification and Lane Categorization”, International Conference on Computer, Control, Informatics and its applications, PP. 17-22. DOI: 10.1109/IC3INA.2016.7863016.
- Vikas Upadhyaya and Soharab H. Shaikh (2016), “Vehicle speed detection and notification for highway monitoring” Information-An International Interdisciplinary Journal, 19(9), PP. 4169-4176.
- Vikas Upadhyaya and Deependra Sharma (2016), “Relative Object Tracking using Background Features” International Journal on Imaging and Robotics, 16(4), PP. 107-124.

Research & Product development

- Siddharth Shashikar and Vikas Upadhyaya (2017), “Traffic Surveillance and anomaly detection using image processing”, International Conference on Image Information Processing, PP 1-6. DOI: 10.1109/ICIIP.2017.8313721
- Vikas Upadhyaya and Soharab H. Shaikh (2018), “Traffic Monitoring using Multiple sensors” International Journal of Sensors, Wireless Communications and Control, 8(1), PP. 1-13. DOI: 10.2174/2210327908666180307154048.
- Vikas Upadhyaya and Soharab H. Shaikh (2018), “Smart Traffic Security and Surveillance System” International Journal of Tomography and Simulation, 31(3), PP. 42-56

Research & Product development

- Lokesh Venkata Sai Mamidi, Pisupati Chaitanya, Vikas Upadhyaya (2019), “Application of Image Processing in E-Commerce” International Journal of Engineering and Advanced Technology, 9(2), PP. 355-359. DOI: 10.35940/ijeat.B3036.129219.
- Vikas Upadhyaya (2022), “A Proposed Security System Using Object Proposals via Superpixel Segmentation”, ADBU Journal of Engineering Technology, 11(1), PP. 1-6.