

# Introduction to Intel® Distribution of **OpenVINO™** toolkit for Computer Vision Applications

100: Beginner-level  
Lesson 02

# Introduction to Intel® Distribution of **OpenVINO™** toolkit for Computer Vision Application

## OpenVINO 100 – Course agenda

**Lesson 1:** Introduction, why do we need Artificial Intelligence (AI).

**Lesson 2:** What is Video, what is computer vision, how do we accelerate it on modern computers.

**Lesson 3:** How to accelerate Video processing

**Lesson 4:** How to accelerate Neural Network for vision applications

**Lesson 5:** Video Analytics pipeline

**Lesson 6:** Demos, OpenVINO at work

**Lesson 7:** The full flow, from Data to a product using Intel tools-Part 1.

**Lesson 8:** The full flow, from Data to a product using Intel tools-Part 2.

**Lesson 9:** Summary, intro to next course (200)



# Some interesting statistics



**500 000 000**

people watch Facebook videos  
every day.

**1/3**

of the time  
people spend online is devoted  
to watching videos.

**74%**

of all internet  
traffic is video



**2017**



**2019**

**80%**  
of all internet traffic  
will come from video

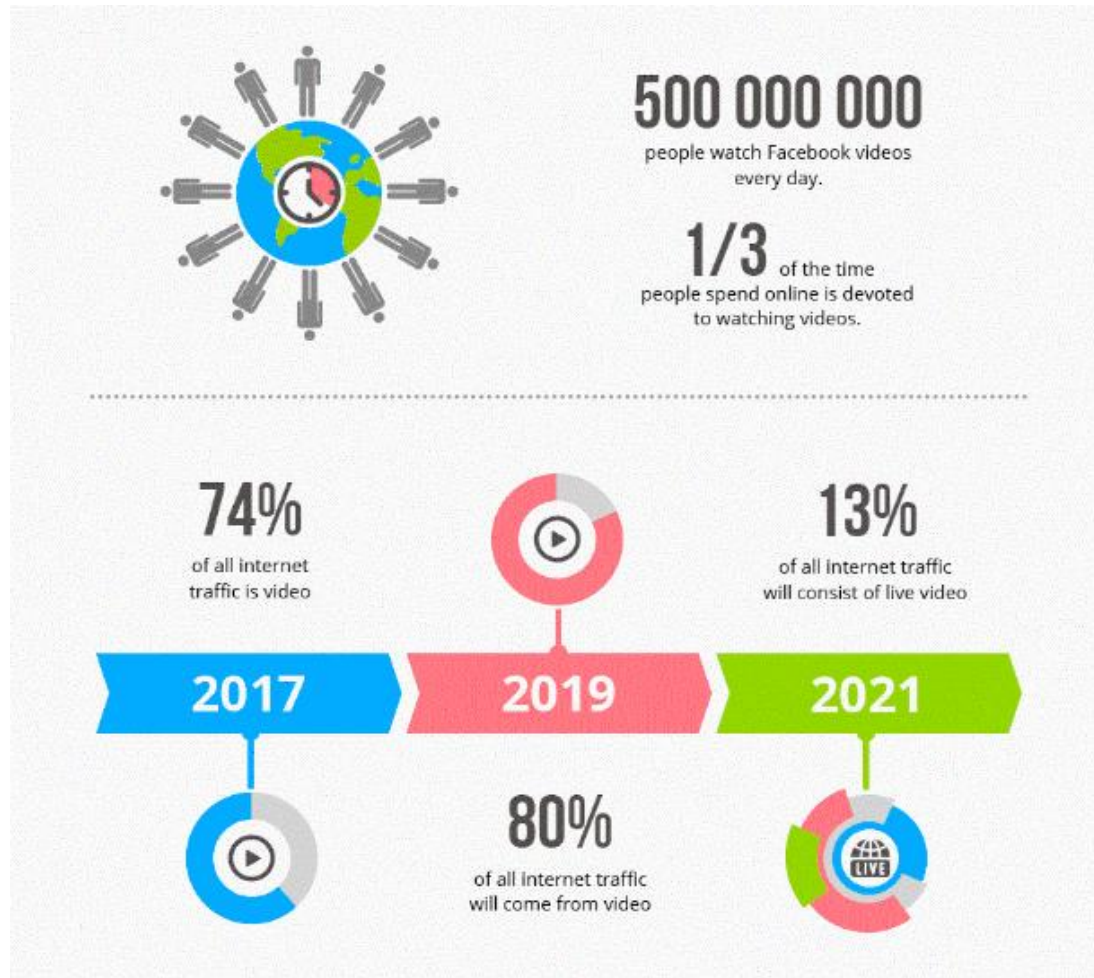
**13%**

of all internet traffic  
will consist of live video



**2021**

# Some interesting statistics



## GLOBAL APPLICATION TRAFFIC SHARE

1	NETFLIX	14.97% ↓	2.92% ↑
2	HTTP MEDIA STREAM	13.07% ↓	4.84% ↑
3	YOUTUBE	11.35% ↓	3.03% ↑
4	RAW MPEG-TS	4.39% ↓	4.11% ↑
5	HTTP (TLS)	4.06% ↓	2.06% ↑
6	QUIC	3.87% ↓	1.43% ↑
7	AMAZON PRIME	3.69% ↓	0.87% ↑
8	HTTP DOWNLOAD	3.69% ↓	1.45% ↑
9	HTTP	3.22% ↓	4.80% ↑
10	PLAYSTATION DOWNLOAD	2.67% ↓	0.45% ↑

## GLOBAL APPLICATION CATEGORY TRAFFIC SHARE

1	VIDEO STREAMING	57.69% ↓	22.43% ↑
2	WEB	17.01% ↓	20.98% ↑
3	GAMING	7.78% ↓	2.68% ↑
4	SOCIAL	5.10% ↓	3.73% ↑
5	MARKETPLACE	4.61% ↓	1.90% ↑
6	FILE SHARING	2.84% ↓	22.05% ↑
7	MESSAGING	1.72% ↓	8.12% ↑
8	SECURITY	1.41% ↓	7.48% ↑
9	STORAGE	1.41% ↓	9.37% ↑
10	AUDIO STREAMING	1.05% ↓	0.46% ↑







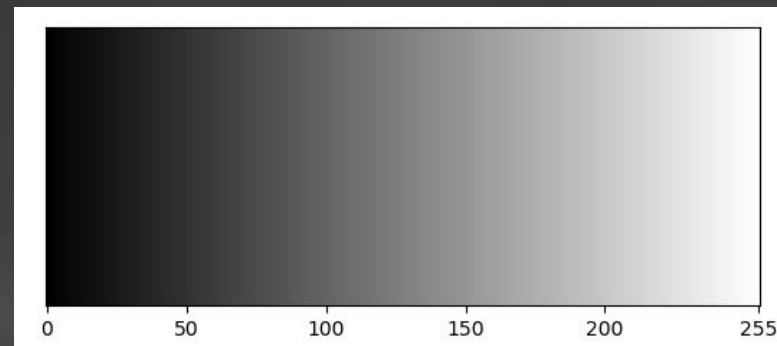














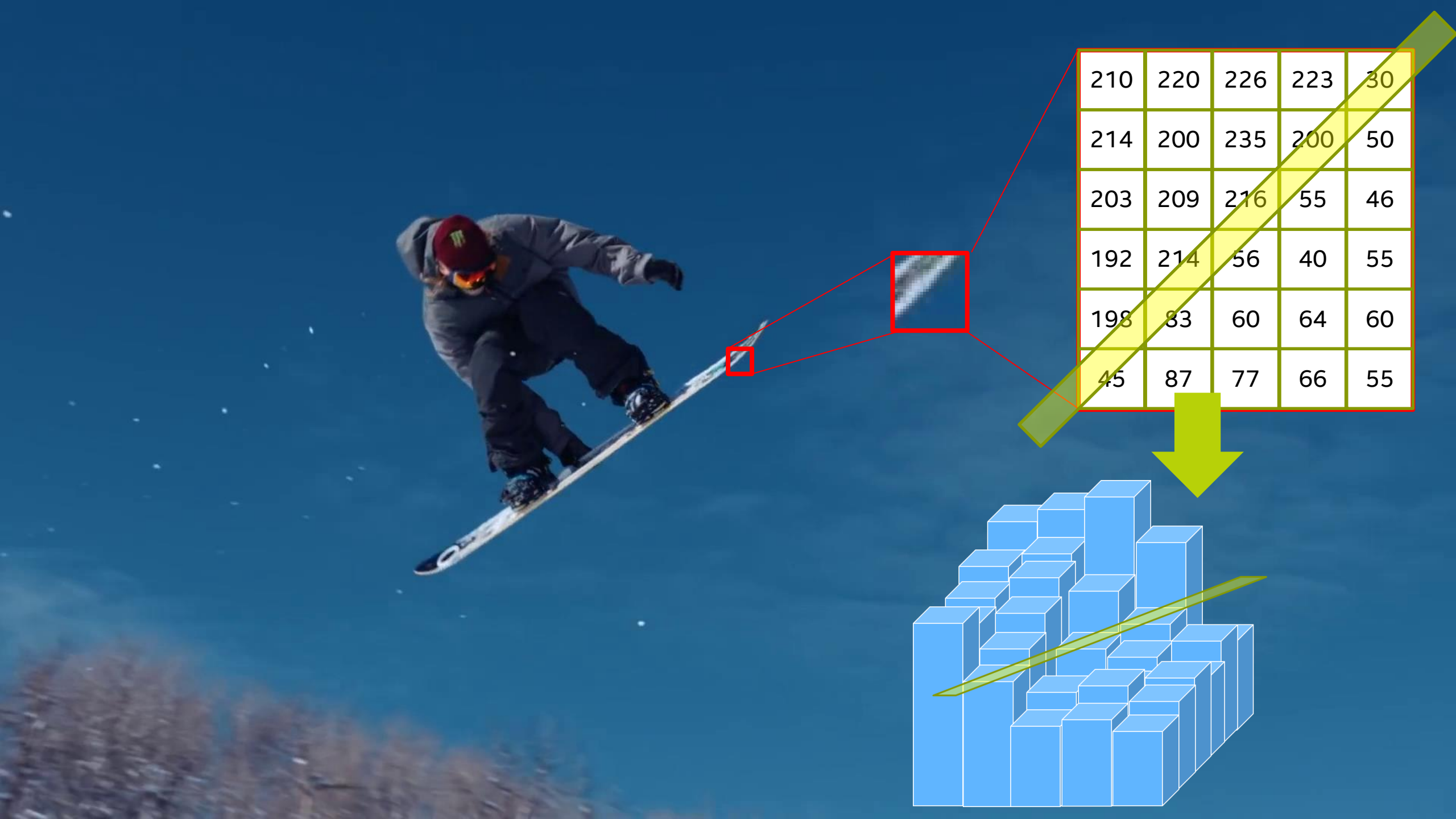
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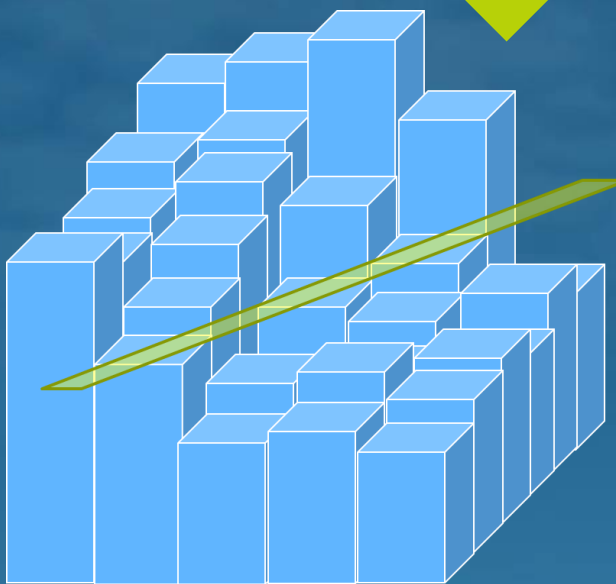




210	220	226	223	30
214	200	235	200	50
203	209	216	55	46
192	214	56	40	55
198	83	60	64	60
45	87	77	66	55

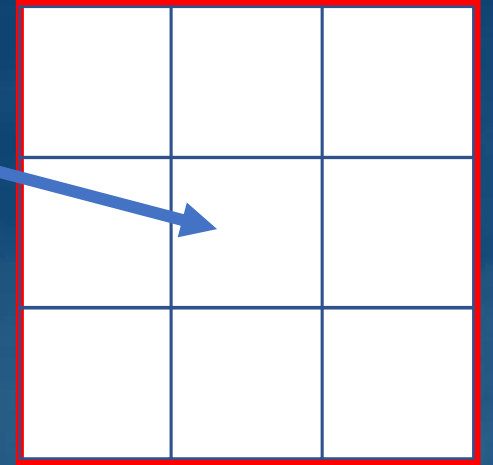


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Value =  
average of 8 neighbors









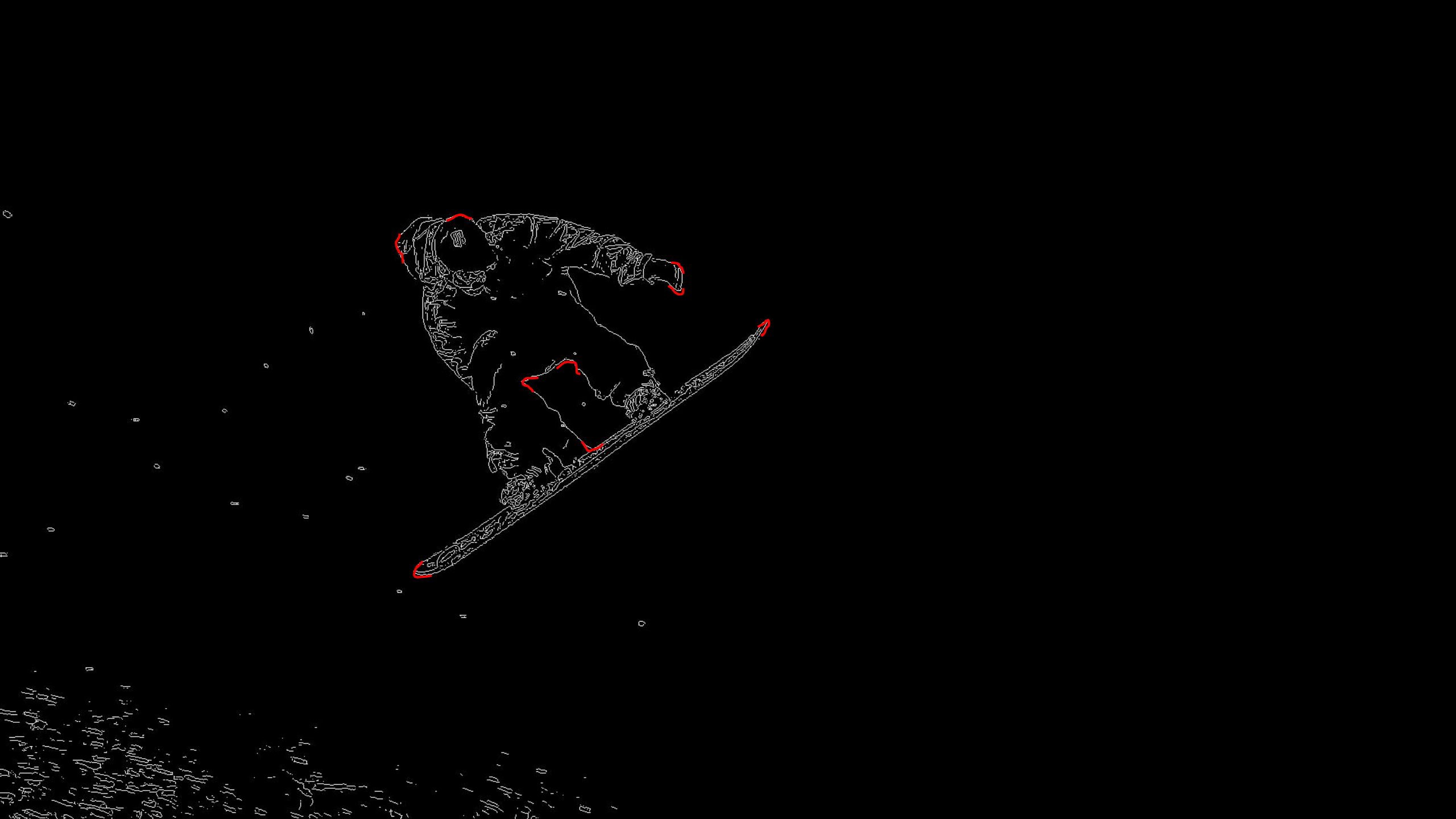








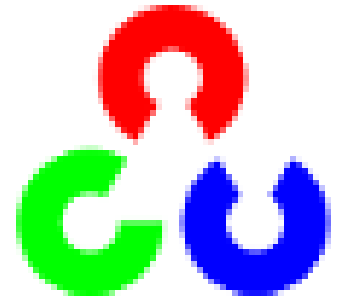




# Accelerating Computer Vision

## OpenCV (Open Source Computer Vision Library)

- Optimized C/C++, cross-platform implementation of major CV functions
- Uses HW acceleration
- Uses Math Kernel Libraries (Intel® MKL). Can also use Intel® Threading Building Blocks (Intel® TBB) and Intel® Integrated Performance Primitives (Intel® IPP) for optimized performance on Intel platforms





# Accelerating Computer Vision

## OpenCV (Open Source Computer Vision Library)

- OpenCV have most functions required by computer-vision developers.
- Read/write images
- Image color change, resize, rotate, filter, blur, sharpen etc.
- Find edges, features
- Many more..



# Intel® Distribution of **OpenVINO™** toolkit

## Traditional Computer Vision

### Optimized Libraries & Code Samples

OpenCV\*

OpenVX\*

Samples

For Intel® CPU & GPU/Intel® Processor Graphics

Intel® Architecture-Based  
Platforms Support



Intel® Vision Accelerator  
Design Products &  
AI in Production/  
Developer Kits

**OS Support:** CentOS\* 7.4 (64 bit), Ubuntu\* 16.04.3 LTS (64 bit), Microsoft Windows\* 10 (64 bit), Yocto Project\* version Poky Jethro v2.0.3 (64 bit), macOS\* 10.13 & 10.14 (64 bit)

# Summary

- **Video** is 80% of the Internet traffic
- Video is a series of **continuous images** one after the other
- An Image is an array of **pixels**, each pixel has intensity level
  - or color as blended from R,G,B values.
- We can **manipulate pixels** to blur, sharpen or perform other tasks
- We can detect **features** in an image (edges, lines, corners → objects)
- **OpenCV** is Intel Software to accelerate Computer-Vision
- OpenCV is included in **OpenVINO**

