

# Computer Vision 2

OpenCV를 활용한 이미지 & 동영상 처리

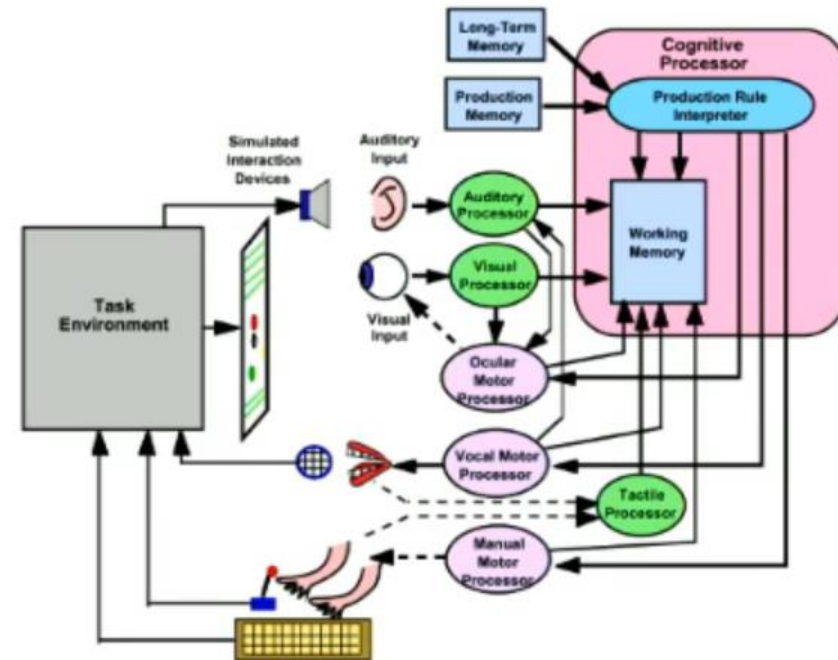
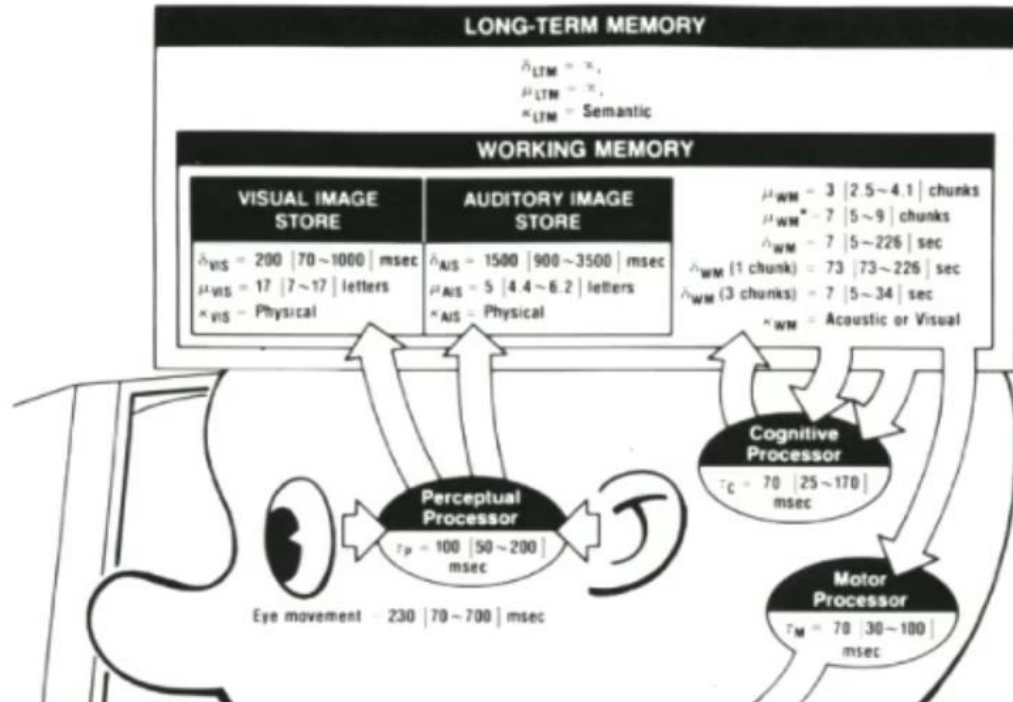
2022. 7

정 준 수 PhD

**Artificial intelligence started as a field whose goal was to replicate human level intelligence in a machine.**

**인공 지능은 인간 수준의 지능을 기계에 복제하는 것을 목표로 시작되었습니다.**

# 사람의 지각 기능과 컴퓨터 구조



The EPIC architecture for cognition and performance with application to human-computer interaction

# OpenCV를 활용하여 이미지와 동영상 읽고 쓰기

1. OpenCV 설치 및 conda environment 구축
2. 이미지 읽고 쓰기
3. 동영상 읽고 쓰기
4. 영상 크기 조절(resize)
5. 동영상 frame 조절하여 저장 하기

## 교안 및 실습 Code

[https://github.com/JSJeong-me/SDF-Computer\\_Vision](https://github.com/JSJeong-me/SDF-Computer_Vision)

# Color Spaces

1. RGB / BGR / Gray Image
2. HSV (hue, saturation, value)
3. L\*a\*b\* (Like longitude, latitude, and altitude –  
L\*a\*b\* color values give us a way to locate and communicate colors)
  - L\*: Lightness
  - a\*: Red/Green Value
  - b\*: Blue/Yellow Value

# 이미지 masking

(실습 예제) 자전거 바퀴 이미지 subtraction  
(Google vision api 활용)

(실습 예제) 바나나 이미지 배경 삭제

# How many caps in a box?

강의 내용 flowchart 작성





**Provide captured images or video.**

Use your data, or explore via [public.roboflow.com](https://public.roboflow.com)

**Label with any tool or workforce.**

Label with any tool or outsource labeling.

**Collaborate with your team on versioned data.**

Experiment with reproducible techniques.

**Format your images. Augment to increase size.**

Generate thousands of more image examples.

**Train using your favorite model framework.**

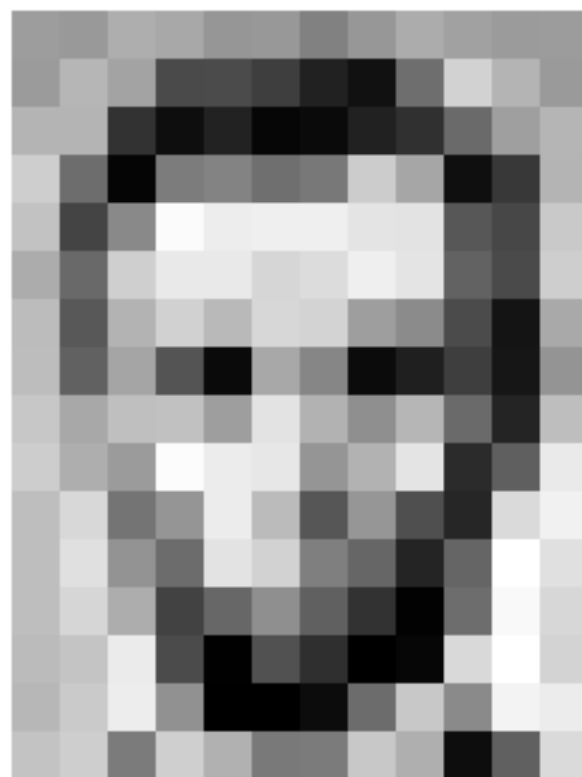
Use implementations via [models.roboflow.com](https://models.roboflow.com)

**Run your model on the cloud, on-prem, on-device.**

Use models on mobile, servers, or both.

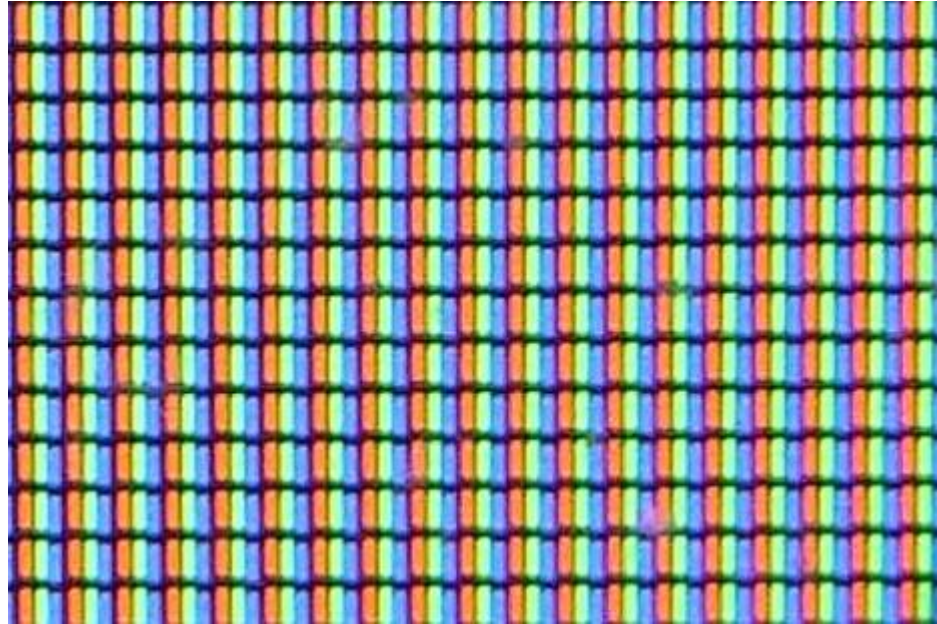
**Display your model's results in your service.**

Contextualize your model output for your users.



157	153	174	168	150	152	129	151	172	161	155	156
155	182	163	74	75	62	33	17	110	210	180	154
180	180	50	14	34	6	10	33	48	106	159	181
206	109	5	124	131	111	120	204	166	15	56	180
194	68	137	251	237	239	239	228	227	87	71	201
172	105	207	233	233	214	220	239	228	98	74	206
188	88	179	209	185	215	211	158	139	75	20	169
189	97	165	84	10	168	134	11	31	62	22	148
199	168	191	193	158	227	178	143	182	106	36	190
205	174	155	252	236	231	149	178	228	43	95	234
190	216	116	149	236	187	86	150	79	38	218	241
190	224	147	108	227	210	127	102	36	101	255	224
190	214	173	66	103	143	96	50	2	109	249	215
187	196	235	75	1	81	47	0	6	217	255	211
183	202	237	145	0	0	12	108	200	138	243	236
195	206	123	207	177	121	123	200	175	13	96	218

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199	168	191	193	158	227	178	143	182	106	36	190
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183	202	237	145	0	0	12	108	200	138	243	236
195	206	123	207	177	121	123	200	175	13	96	218



Take a very close look at your LCD screen, and you'll see how this way of storing the data is directly motivated by the layout of your display's phosphors:  
Because the color data are interleaved, accessing pixel values in buffers containing RGB data is slightly more complex. Here's how you can retrieve the values representing the individual red, green and blue components of an RGB pixel at a given  $(x,y)$  location:

By contrast, observe how dilation is used in the person-detecting pipeline below:

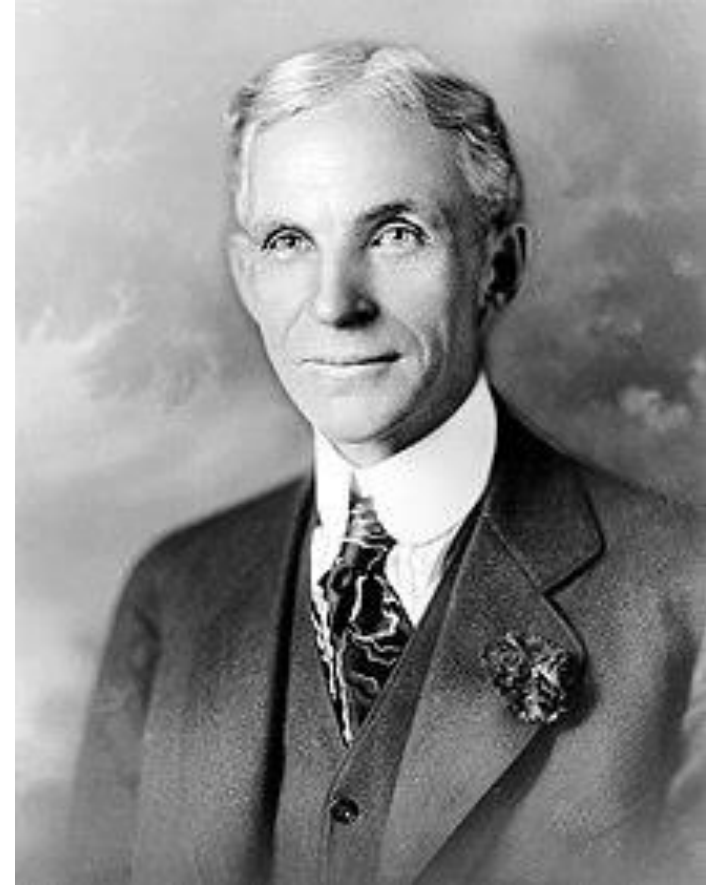


## 지금으로부터 100년전



프레더릭 윈슬로 테일러 (Frederick Winslow Taylor)

세계 최초의 경영 컨설턴트

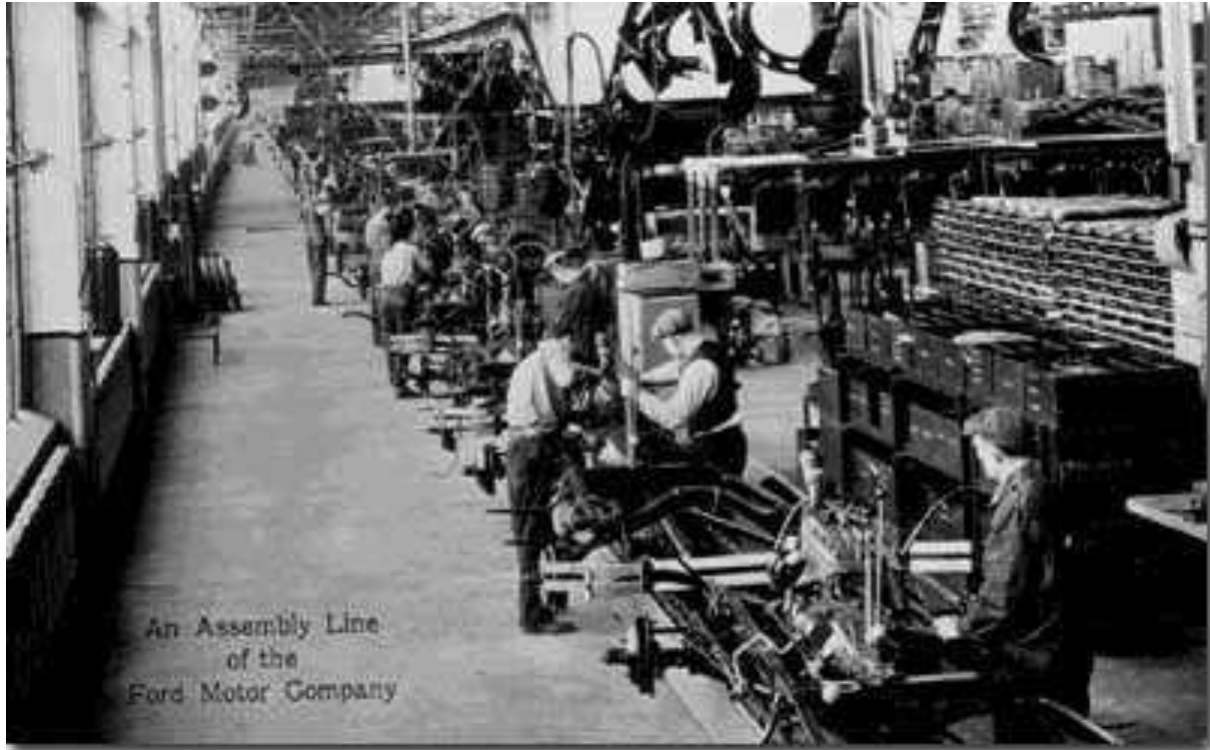


헨리 포드(Henry Ford)

포드 모터 컴퍼니의 창설자

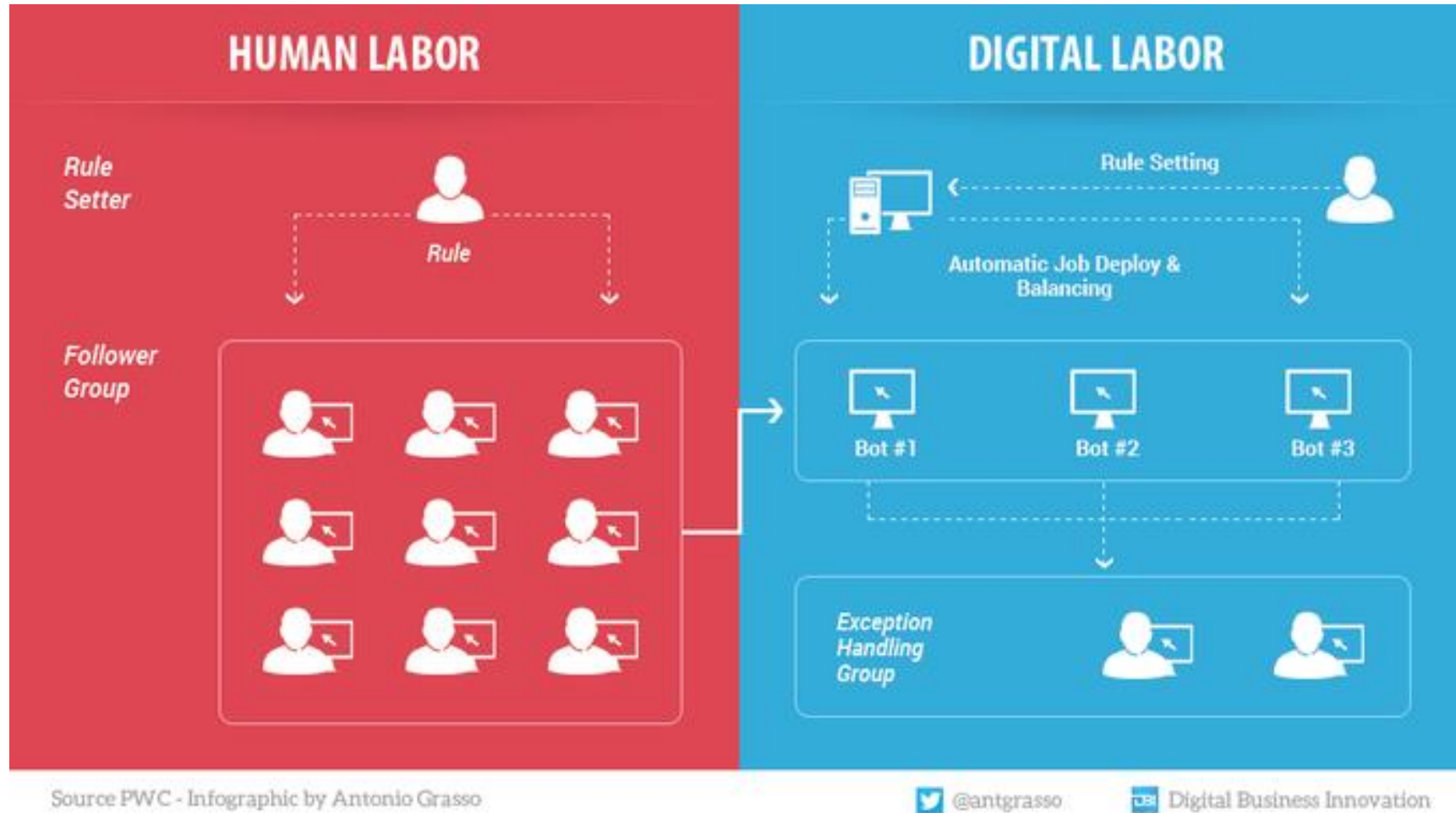


# 대량생산과 대량소비 시대를 연 컨베이어 시스템



The founder of the Ford Motor Company, and sponsor of the development of the assembly line technique of mass production. The Model T was introduced on October 1, 1908.

# 오늘날 Human Labor 에서 Digital Labor로 전환의 대변혁 시기



# 제조 현장에서의 컴퓨터 비전 적용 사례

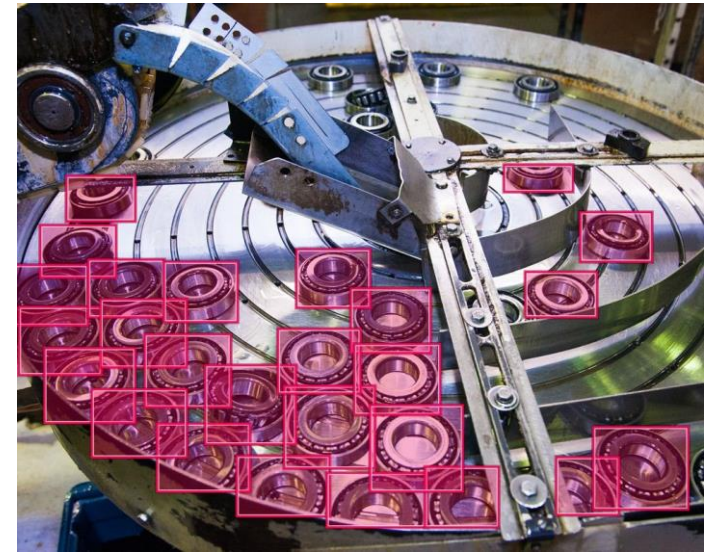
Predictive maintenance



Defect detection

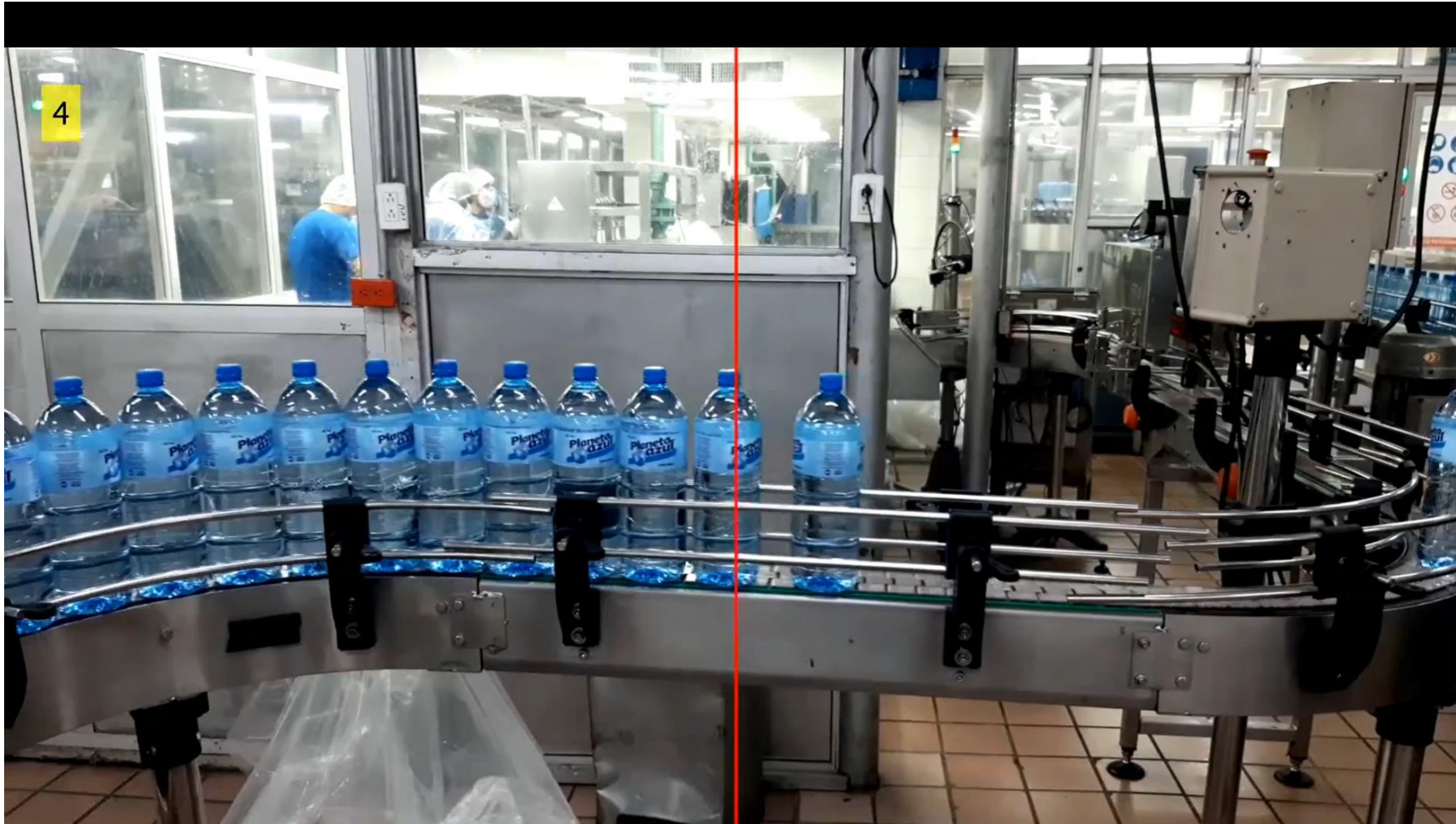


Assembling products and components

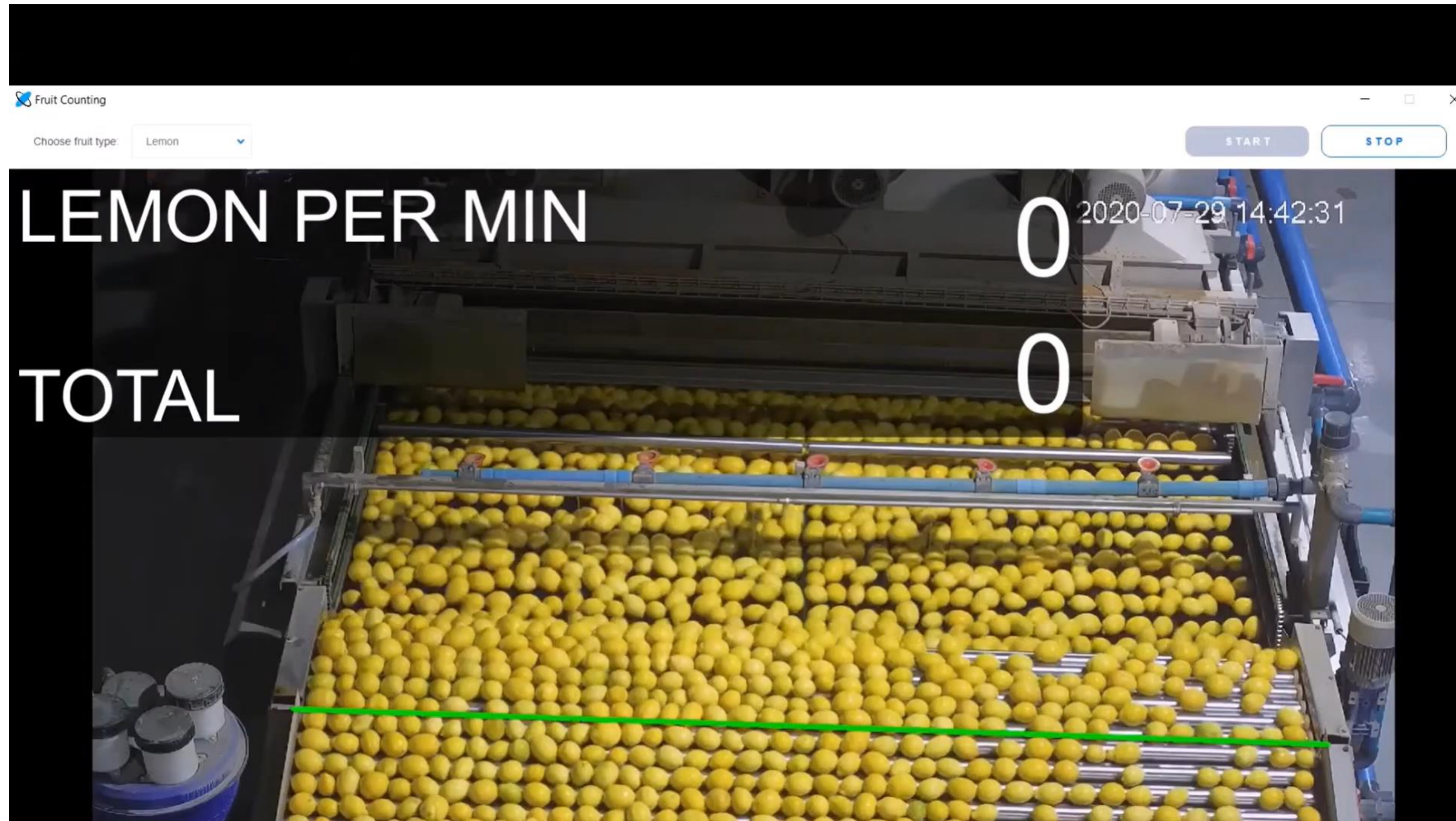




# Object Counting

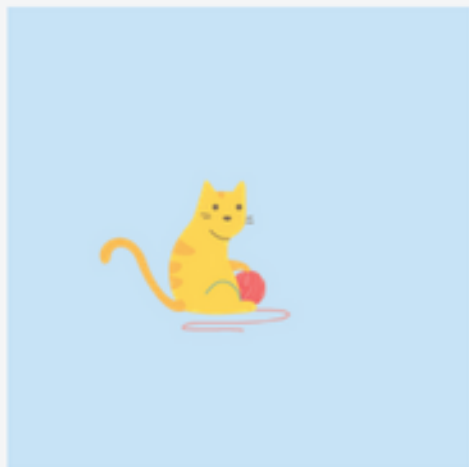


# Object Counting



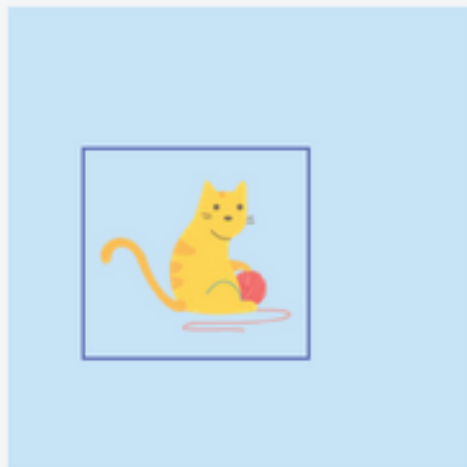
# Computer Vision Problem Types

Classification



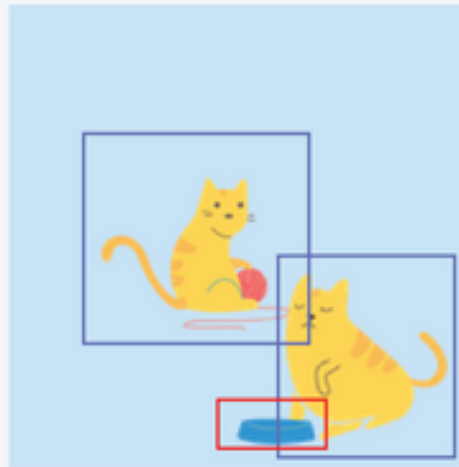
CAT

Classification  
+ Localization



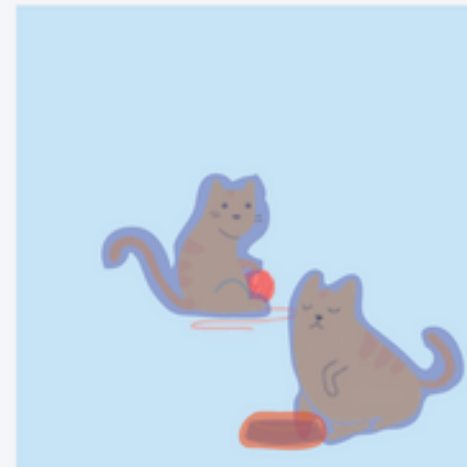
CAT

Object Detection



CAT, CAT, BOWL

Semantic  
Segmentation



CAT, CAT, BOWL

Single Object

Multiple Objects

roboflow



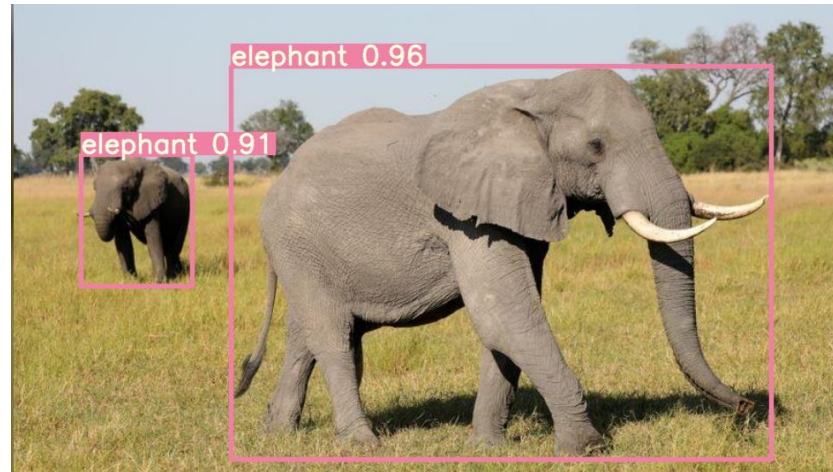
## 구현 사례 1: Object Counting



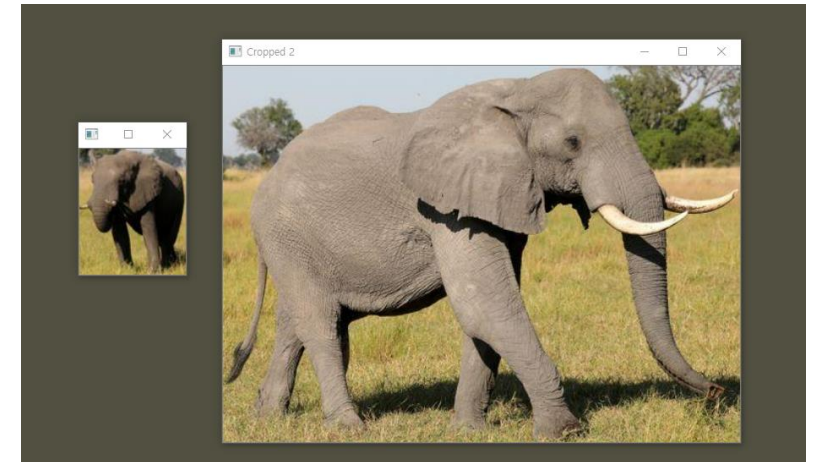
## 구현 사례 2: Image Classification & Object Detection



Source Image

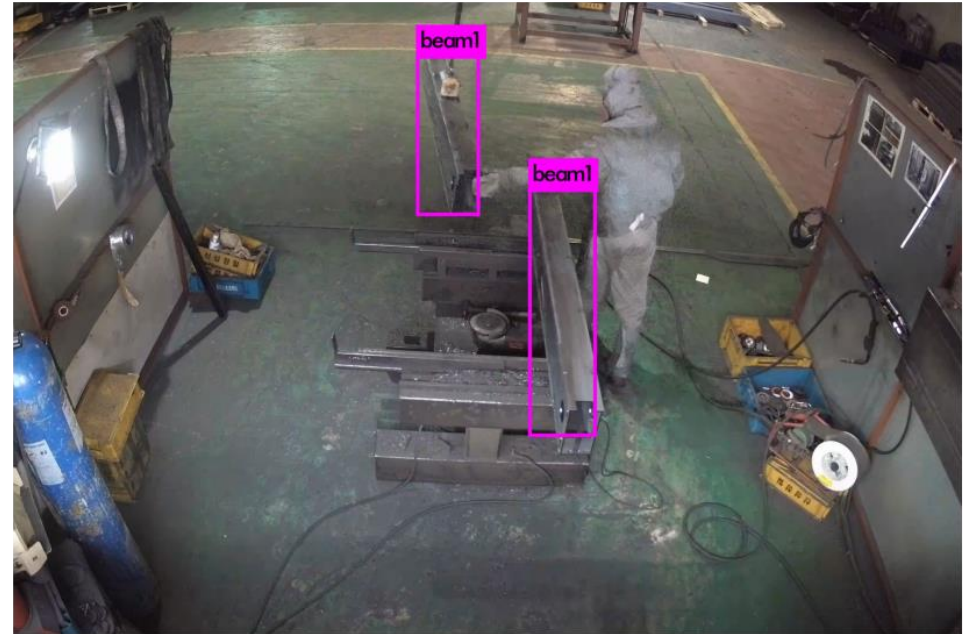


Object Detection



Cropped Image

## 구현 사례 3: CCTV 영상을 이용한 작업 수량 확인



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- 전문분야: 시각 모델링, 머신러닝(ML), RPA
- <https://github.com/JSJeong-me/>

