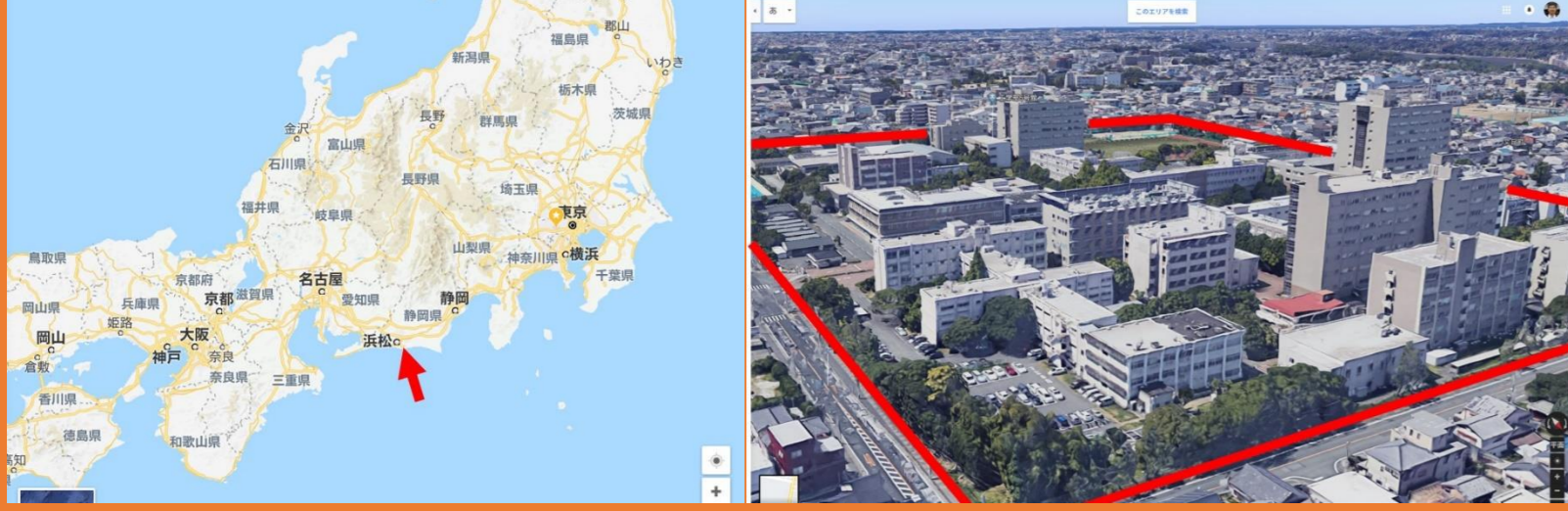# Okabe Lab. @ Shizuoka University（静岡大学 岡部研究室）

Makoto Okabe（岡部 誠）

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7 master's students and 5 undergraduates

Our laboratory is located in Hamamatsu City, which is famous for the automobile industries (Honda, Suzuki, etc.) and musical instrument industries (Yamaha, Kawai, Roland, etc.)

Paint mixing support system by machine learning
Ryotaro Doi, Makoto Okabe, VCWS 2022
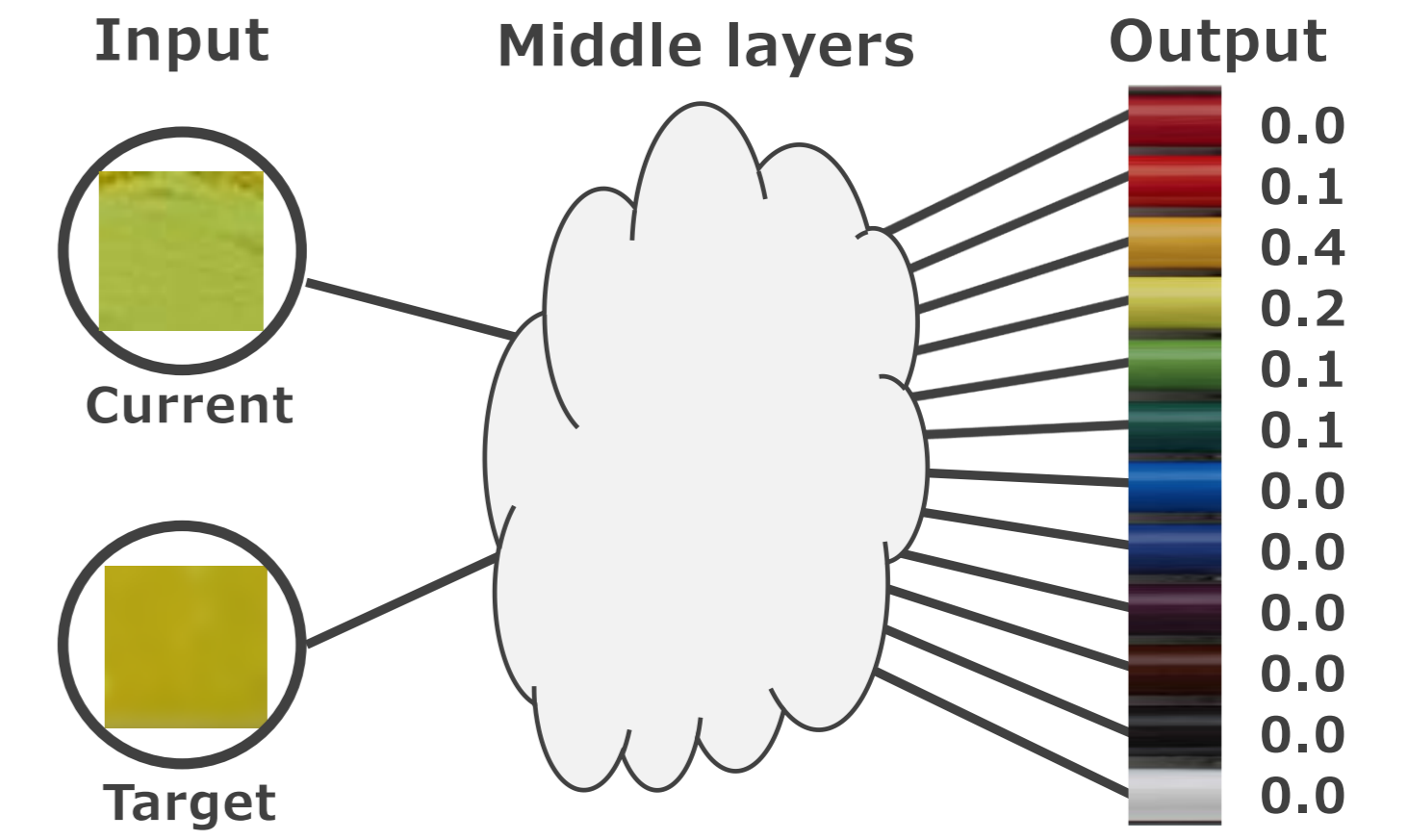
We want to

make the color by mixing paints!

…, but how?

← Actually, it was not easy…

So, we want to support us to make the color easily and accurately

Our approach

Input Middle layers Output

Current

Target

0.0
0.1
0.4
0.1
0.2
0.1
0.0
0.0
0.0
0.0

Real-time object recognition in video
Ehito Nagasawa, Exploratory IT Human Resources Project (The MITOU Program) of Information-technology Promotion Agency (IPA), 2022
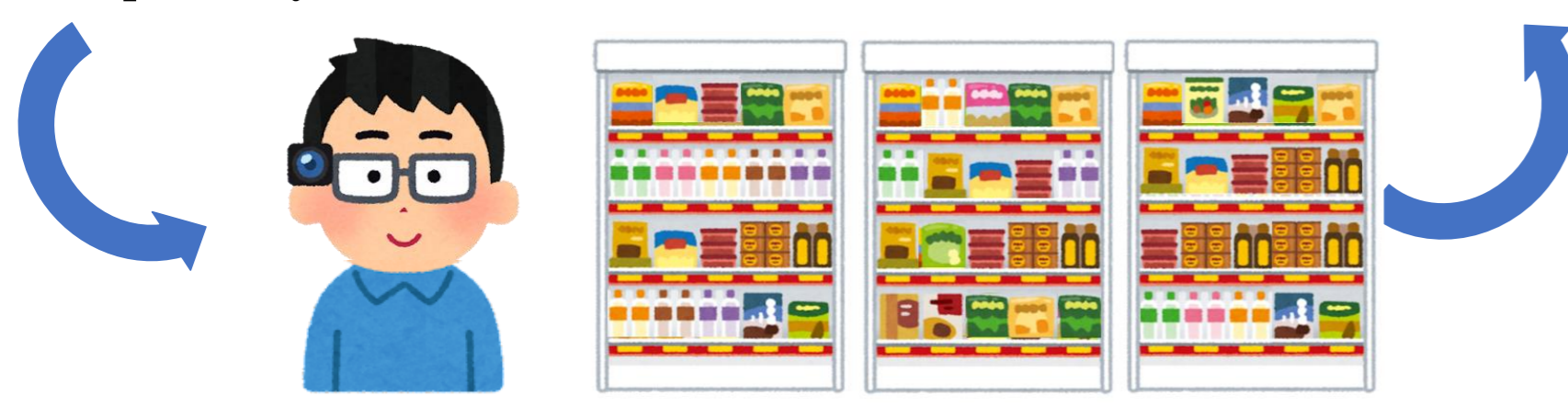
I want

Found!

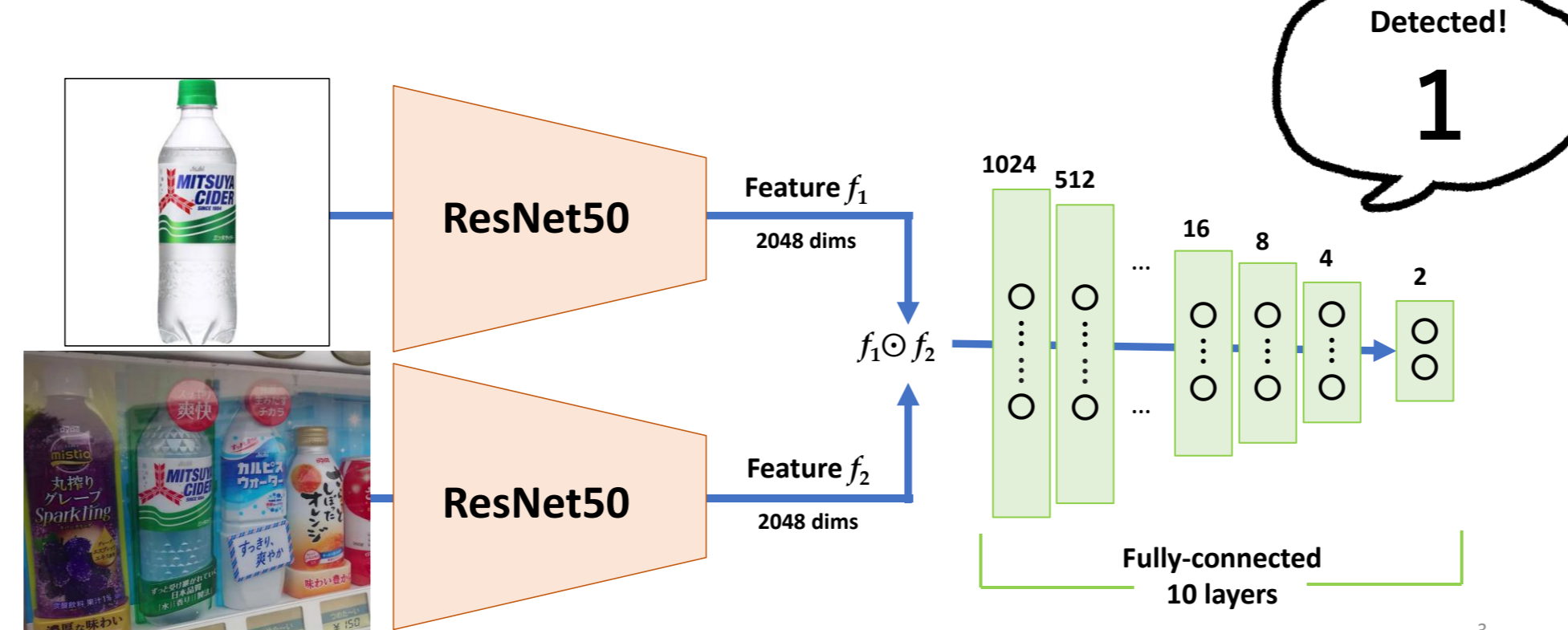1. Register the image of the product you want to find
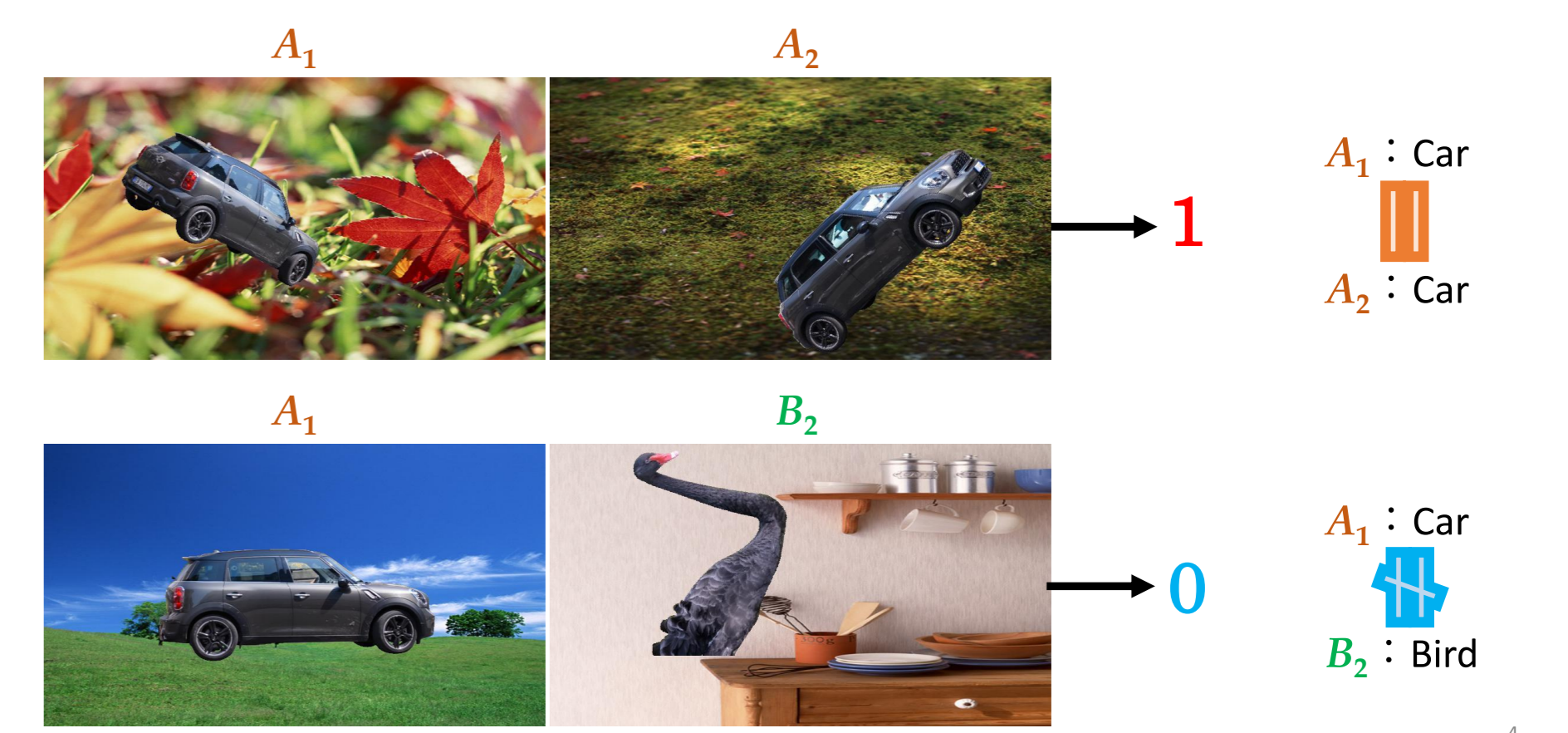
3. Our system will help you to find it!

2. Shopping with your camera on

Our approach

Our dataset doesn't require images of search targets

ResNet50 Feature f_1 2048 dims

ResNet50 Feature f_2 2048 dims

$f_1 \odot f_2$

1024 512 16 8 4 2

Fully-connected 10 layers

Detected! 1

Our dataset to achieve our method

A_1 A_2 → 1 A_1 : Car A_2 : Car

A_1 B_2 → 0 A_1 : Car B_2 : Bird

REAL-WORLD VIDEO ANOMALY DETECTION BY EXTRACTING SALIENT FEATURES
Yudai Watanabe, Makoto Okabe (Shizuoka University), Yasunori Harada, Naoji Kashima (Chubu Electric Power Co.), IEEE ICIP 2022 / MIRU 2022

We want to

• Automatically find incidents from surveillance cameras

Arson?（放火？）
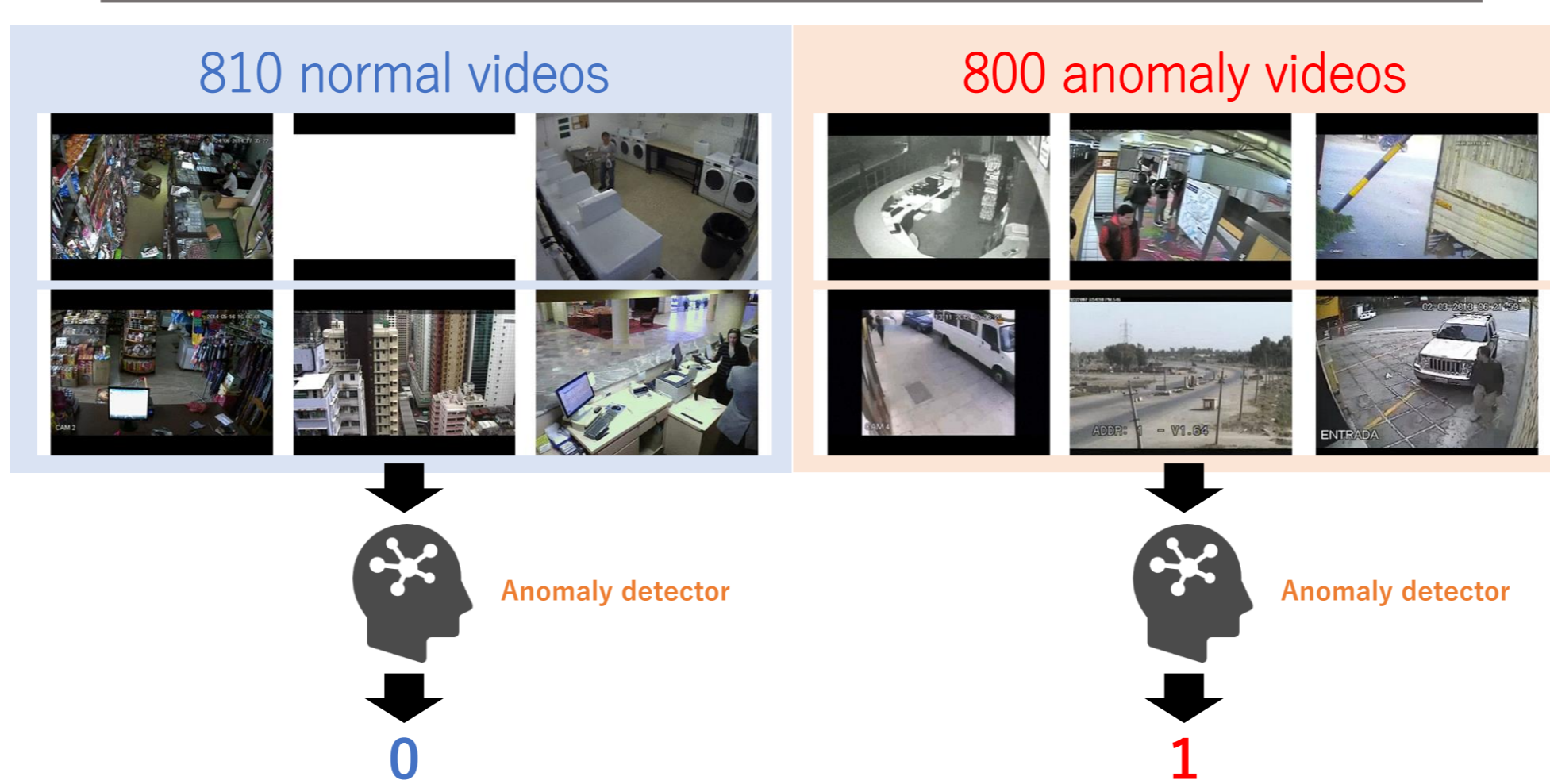
Footage of a criminal fleeing after setting fire to a car

Footage of a fight on a subway platform

UCF-Crime dataset (Sultani et al, CVPR 2018)

810 normal videos **800 anomaly videos**

Anomaly detector 0

Anomaly detector 1

Summary

• A simple model: a self-attention mechanism and 2 fully-connected layers
• Lightweight and easy-to-handle neural network
  - Only 1.3% trainable parameters compared with the existing method
• Achieves top-class detection accuracy
  - Confirmed using UCF-Crime, ShanghaiTech, and XD-Violence datasets
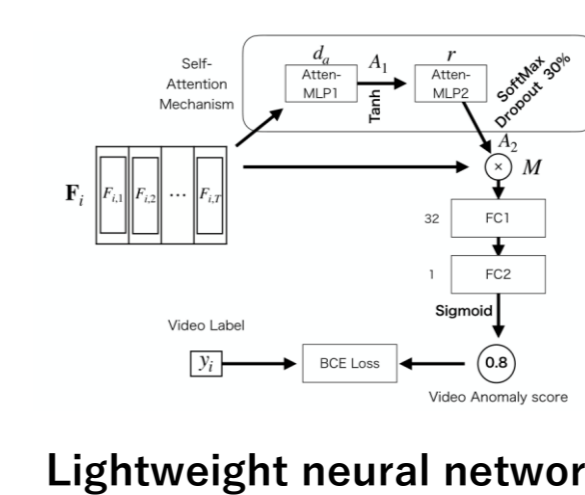
Method	Feature Type	AUC(%)
Sultani et al. [5]	C3D RGB	75.41
GCN-Anomaly [12]	TSN RGB	82.12
CLAWS Net [13]	C3D RGB	83.03
Wu et al. [10]	I3D RGB	82.44
MIST [14]	I3D RGB(Fine)	82.30
RTFM [6]	I3D RGB	84.30
Ours ($d_a = 64, r = 3$)	I3D RGB	84.74
Ours ($d_a = 128, r = 7$)		84.91

Lightweight neural network Top-class detection accuracy

Scene Retrieval for Observing Player Behavior in Fighting Games
Keitaro Mitsui, Makoto Okabe, WISS 2021

How to be strong in Smash Bros.

▸ Practice with the opponent in mind
  ▸ Fight various people
 ▸ Learn how strong players fight ← we wanna support!

▸ Watch videos of strong players
  ▸ Many videos of strong players on YouTube → Learn strong behavioral patterns
 ▸ e.g., when the opponent is right below you, watch out for his attack!

▸ However, it is difficult to find the scene we want to watch
  ▸ There are very many videos on YouTube
  ▸ We propose a scene retrieval method for fighting games

Our scene retrieval method

A query image as input

Query
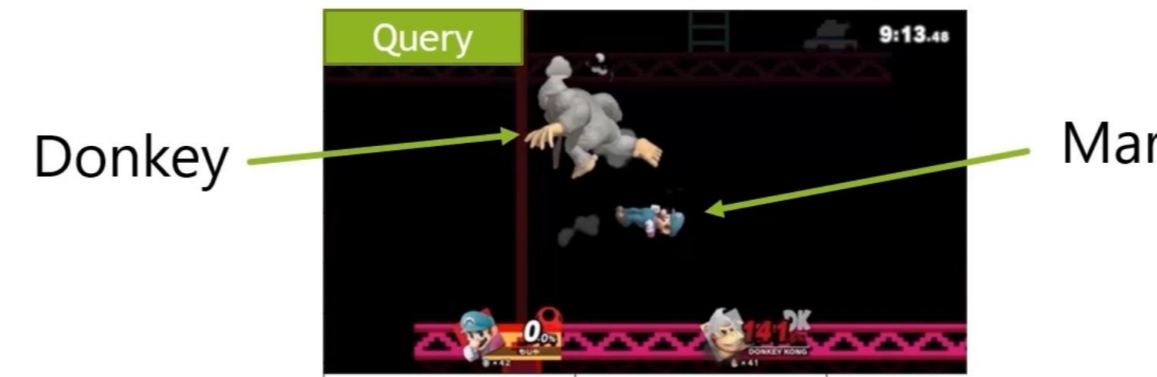
Donkey Mario

Retrieve scenes where the positional relation of Mario and Donkey is similar

Result 1 Result 2 Result 3
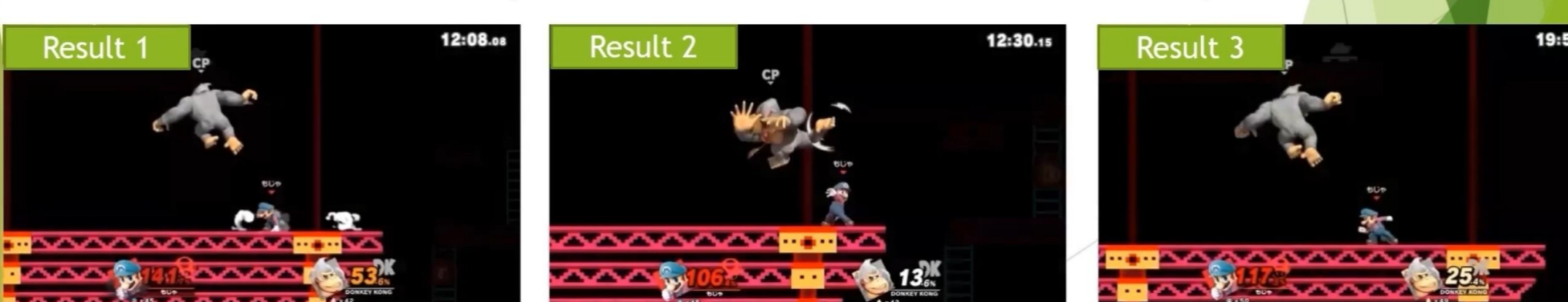
Our approach for scene retrieval

▸ These images have different backgrounds but the characters' situation is the same.

NN NN NN

▸ These images have different backgrounds and different characters' situations.

NN NN NN

▸ The same feature vectors for the above images and different feature vectors for the below images.
▸ Such a neural network achieves the desired scene retrieval
  Taking only characters' situations into account and ignoring the backgrounds.