

New CAPTCHA System

Designing AI-Based Multidimensional

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☐ I'm not a robot

01 Motivation

kt 스마트메시지

KT 스마트메시지란?

dasomkwan

.....

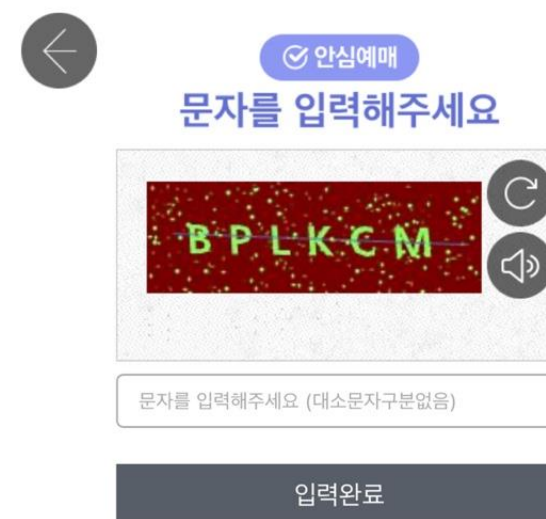
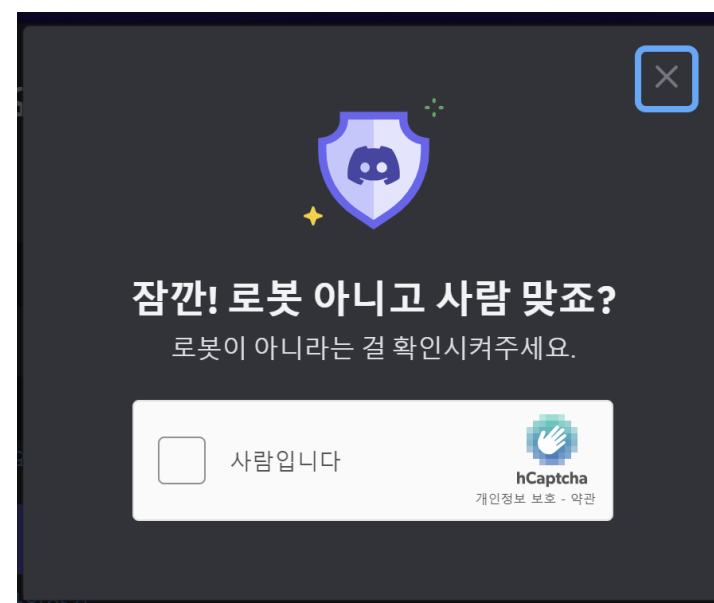
☐ 아이디저장

ID/PW찾기 회원가입

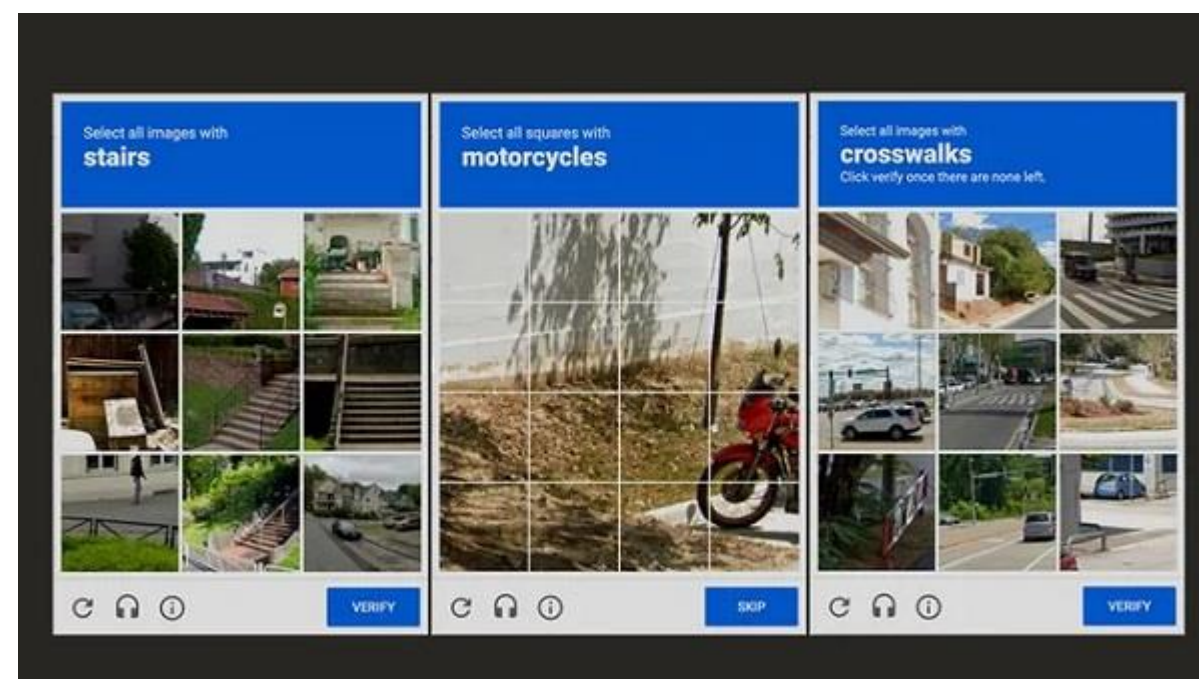
544862

음성듣기 | 새로그침

로그인



· 부정예매방지를 위해 화면의 문자를 입력해주세요.
· 인증 후 좌석을 선택할 수 있습니다.



Bot exploits the website

Protecting Server Resources

Cut costs(Dual authentication) by blocking unnecessary authentication requests early

Scraping and automated data collection

01 Motivation

[An optimized system to solve text-based CAPTCHA](#)

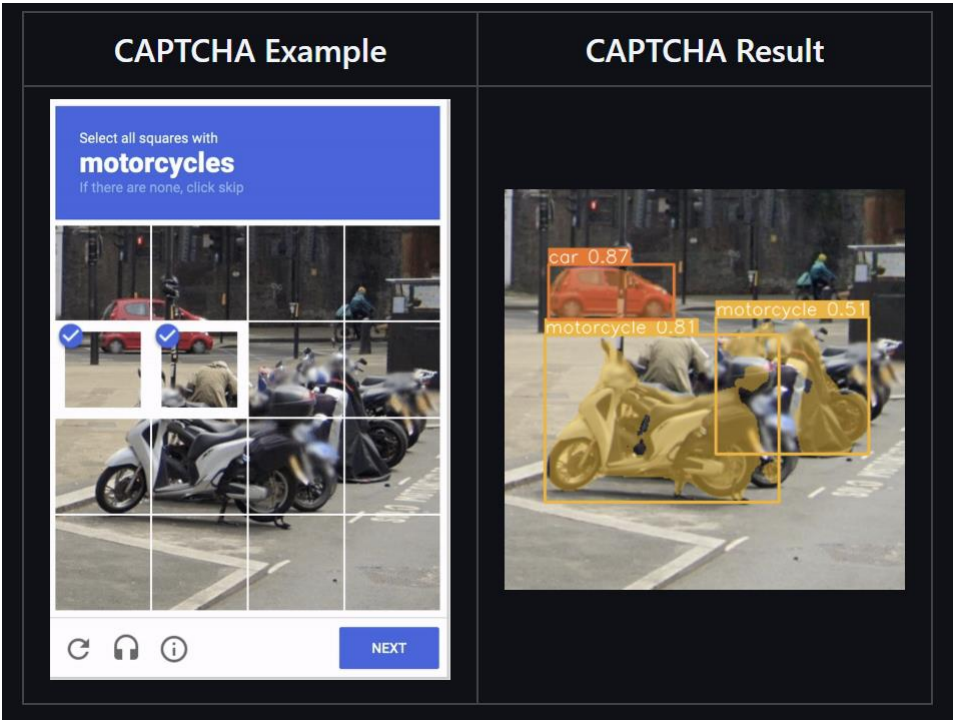
11 Jun 2018

Original CAPTCHA	Denoising	Segmentation	Output
6 减 5 等于?	6 减 5	6 减 5	['outcome=', 1]
1 加 4 等于?	1 加 4	1 加 4	['outcome=', 5]
2 乘 1 等于?	2 乘 1	2 乘 1	['outcome=', 2]
8 乘 3 等于?	8 乘 3	8 乘 3	['outcome=', 24]
6 乘 6 等于?	6 乘 6	6 乘 6	['outcome=', 36]
9 乘 1 等于?	9 乘 1	9 乘 1	['outcome=', 9]
加 0 等于?	加 0	加 0	['outcome=', 4]
qE9tAR	qE9tAR	qE9tAR	['outcome=', 'qE9tAR']
4tzfrm	4tzfrm	4tzfrm	['outcome=', '4tzfrm']
4820	4820	Denoising	['outcome=', '4820']
3774	3774	Denoising	['outcome=', '3774']
玖-玖等于几	玖-玖等于几	玖-玖等于几	['outcome = ', '0']
九乘以八等于几	九乘以八等于几	九乘以八等于几	['outcome = ', 72]
零-肆等于几	零-肆等于几	零-肆等于几	['outcome = ', -4]
5加上6等于几	5加上6等于几	5加上6等于几	['outcome = ', 11]

Fig. 11. The full process of defeating the CAPTCHA

[Breaking reCAPTCHA-v2-yolov8](#)

13 Sep 2024



<https://github.com/aplesner/Breaking-reCAPTCHA-v2>

[DMTG: A Human-Like Mouse Trajectory Generation Bot Based on Entropy-Controlled Diffusion Networks](#)

23 Oct 2024

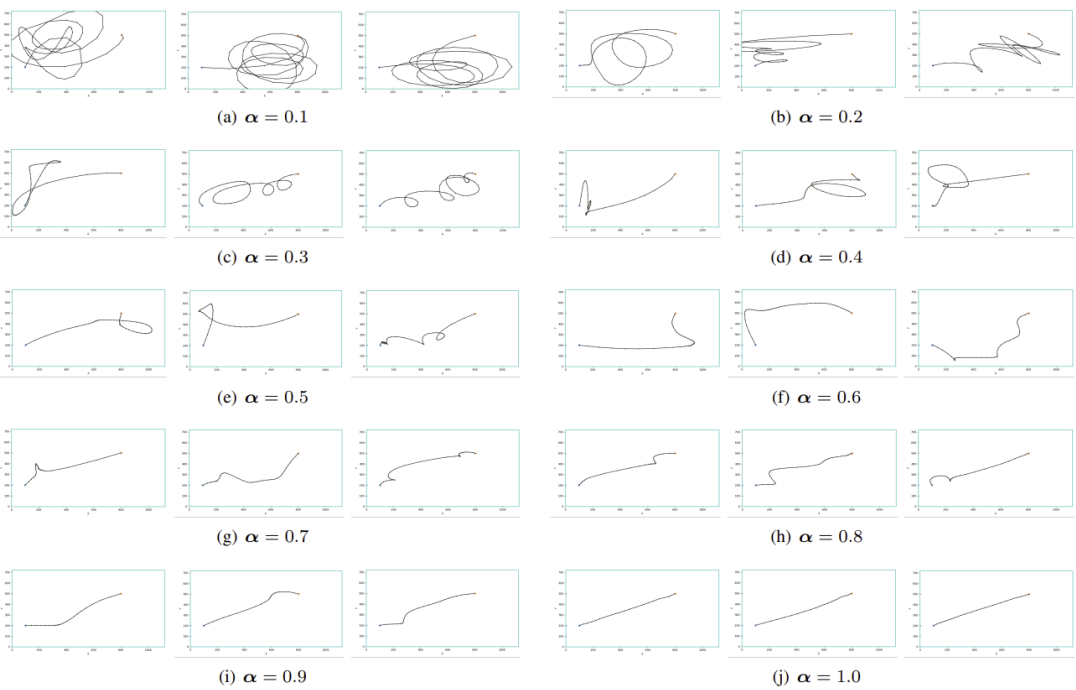


Figure 4. Examples of DMTG Curves under Different α Values in Eq. (10)

02 Demonstration

Join web page

회원가입

이름:

생년월일:

아이디:

중복 체크

비밀번호:

6자리 이상 입력하세요!

비밀번호 확인:

E-mail:

☐ 개인정보 활용에 동의합니다.

회원가입

CAPTCHA (DCGANs)

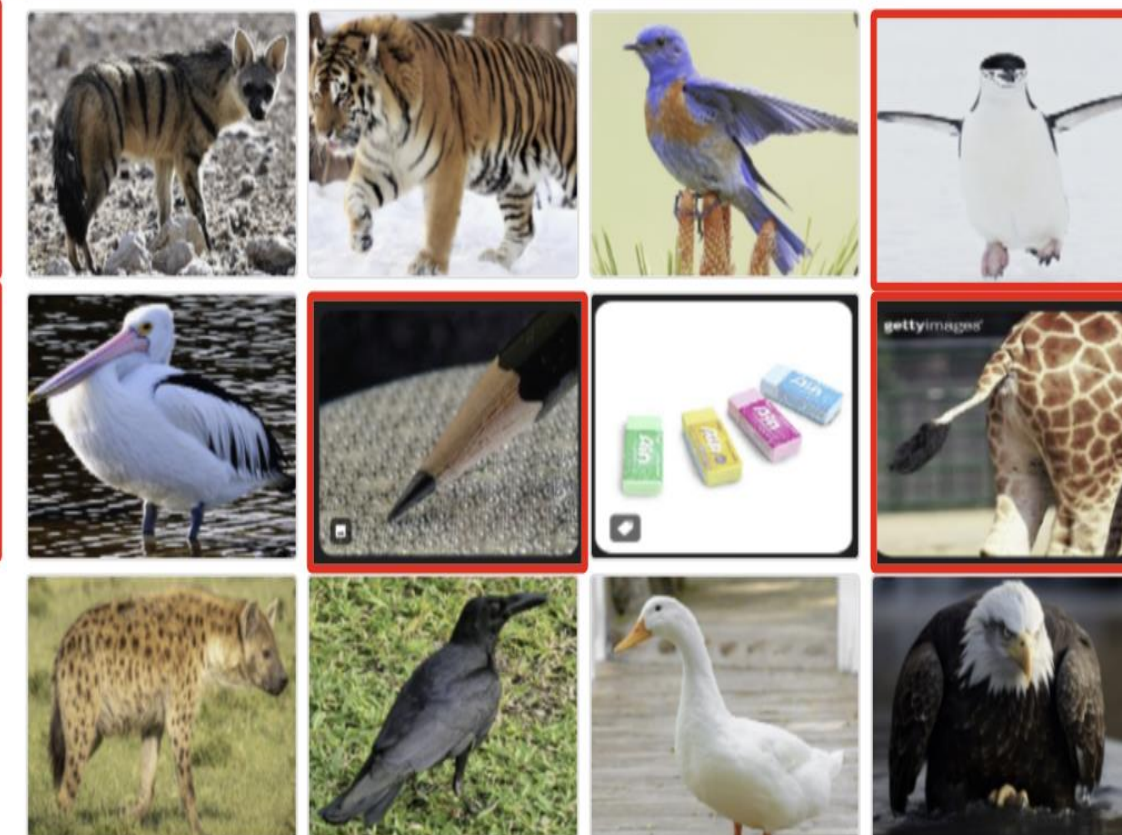
사람인가요?
오른쪽 이미지를 보고
일치하는 이미지를 모두 고르시오



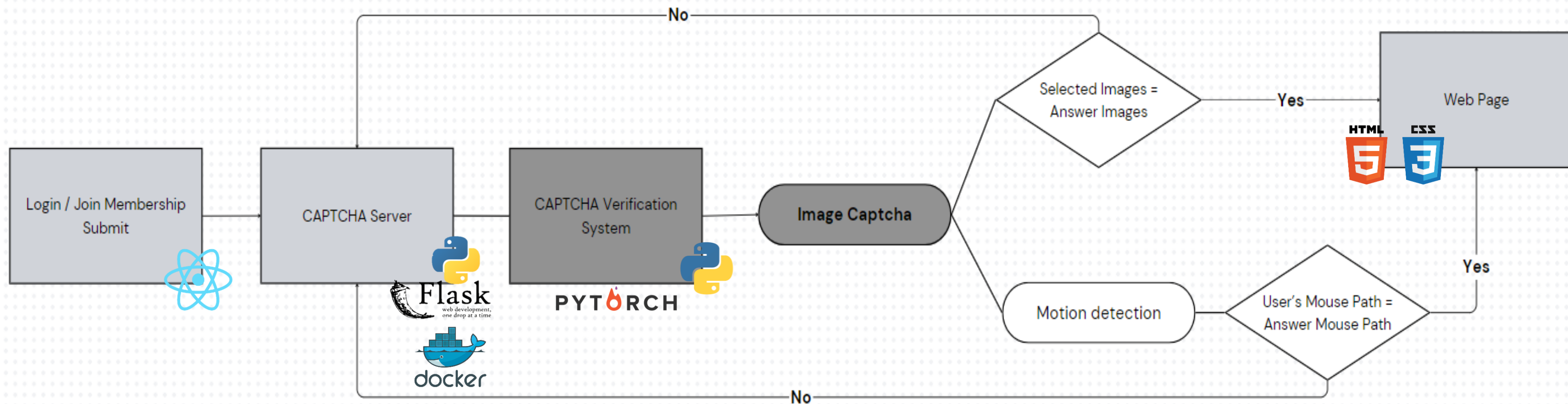
사람입니다

CAPTCHA (Diffusion)

사람인가요?
오른쪽 이미지에서
보이는 물체를 모두 고르시오



사람입니다



Main Page For User (Developer)



로그인

아이디

test

비밀번호

....

로그인

회원가입

내 애플리케이션
애플리케이션 등록
API 제휴 신청
계정 설정

애플리케이션 등록 (API 이용신청)

애플리케이션의 기본 정보를 등록하면 서버 메뉴가 만들어집니다.

애플리케이션 이름

애플리케이션 이름을 입력하세요

* 40자 이하의 영문, 숫자, 공백만 입력 가능합니다.

사용 API

선택하세요.

비로그인 오픈 API 서비스 환경

환경 추가

등록하기

취소

User Evaluation

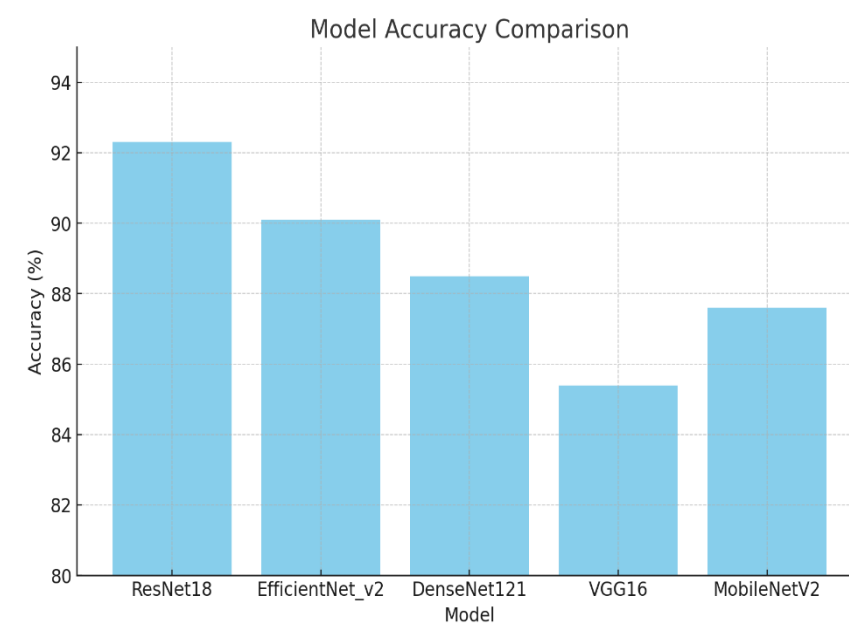
- It should be recognizable to the user
- The user resolves the problem within 5~10 seconds

Computer Evaluation

- Pre – trained ResNet18
- Segmentation Model SAM
- Detection Model Yolov11

Why use this model?

- ResNet18
 - Best for 128x128 image datasets



Weight Initialize

Weight Initialization	Image	Human Evaluate	Suitability
Random Init	<p>Image size (width, height): (4464, 1770) Resized image size (width, height): (128, 128)</p>	인간이 이해하는 것 이해하지 못하는 이미지가 모여있다.	보류
Normal Distribution initilaize	<p>Image size (width, height): (4464, 1770) Resized image size (width, height): (128, 128)</p>	인간 이해	적합
He initialization	<p>Image size (width, height): (4464, 1770) Resized image size (width, height): (128, 128)</p>	인간 이해 불가능	부적합

Batch Shape

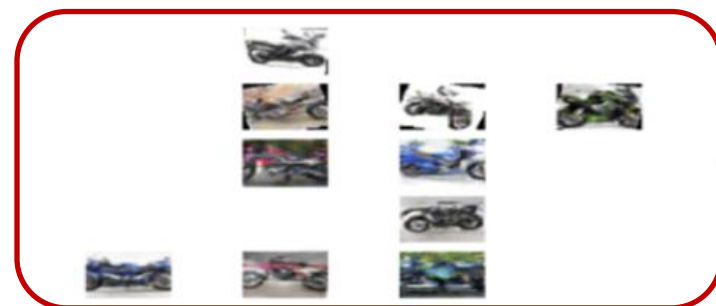


Accuracy : 47% -> 12%

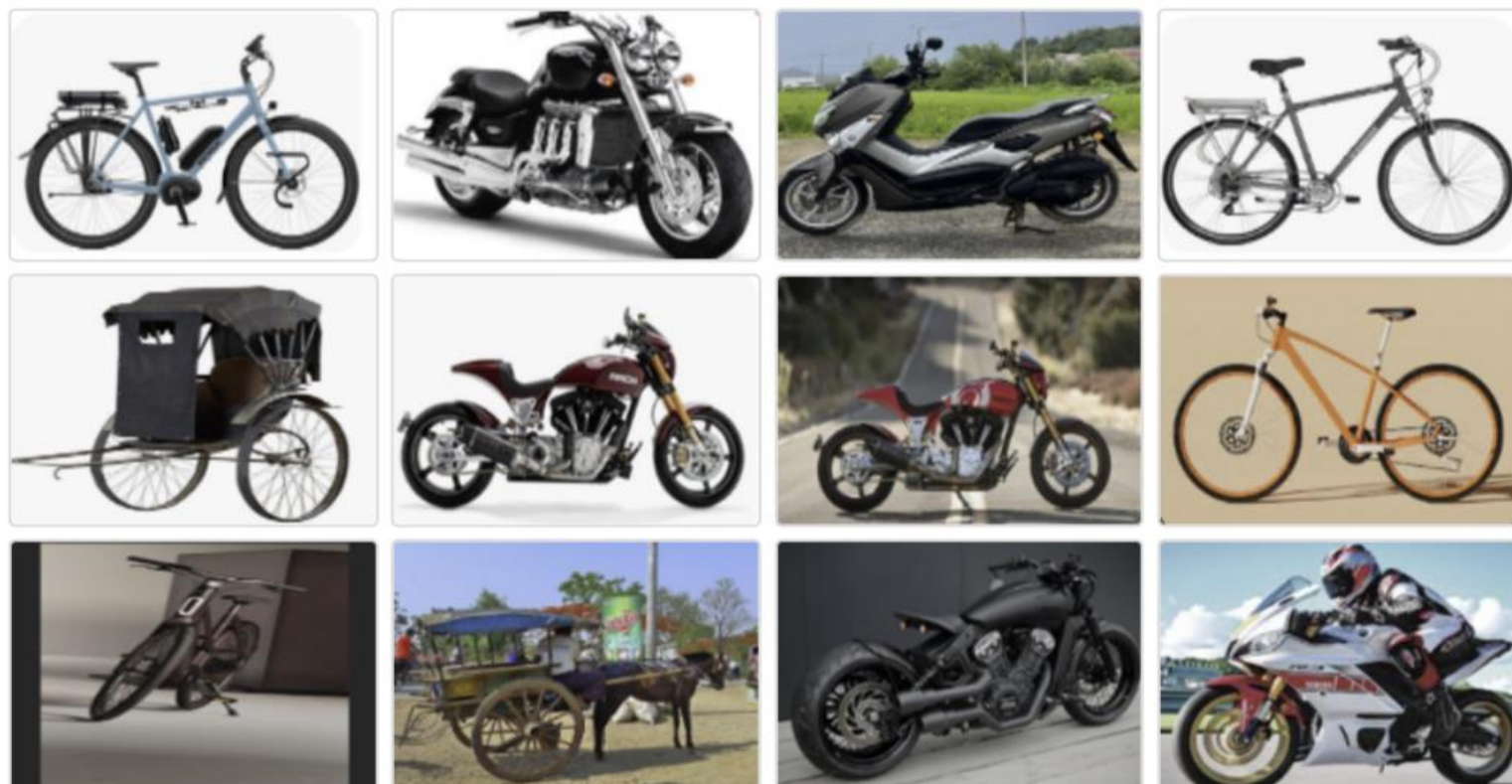
06 Technology_Generative adversarial Networks

Our System Tasks : Human easy, Computer hard

사람인가요?
오른쪽 이미지를 보고
일치하는 이미지를 모두 고르시오



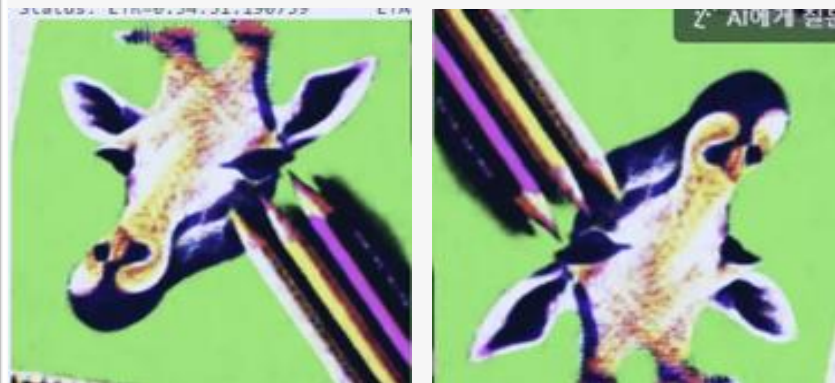
Our System



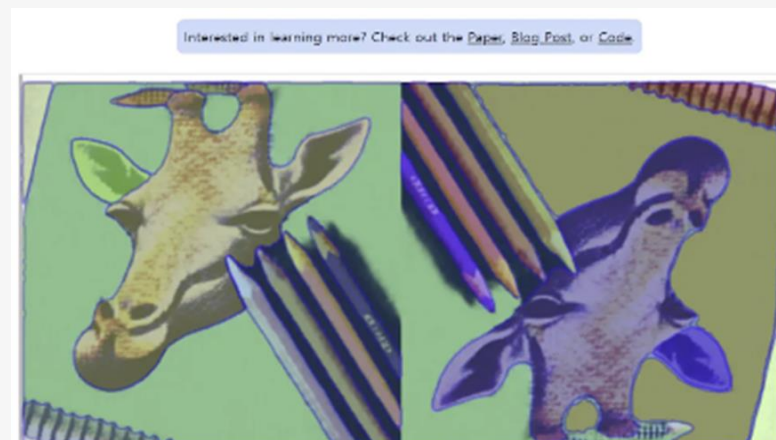
06 Technology_illusion Diffusion

AI Evaluate

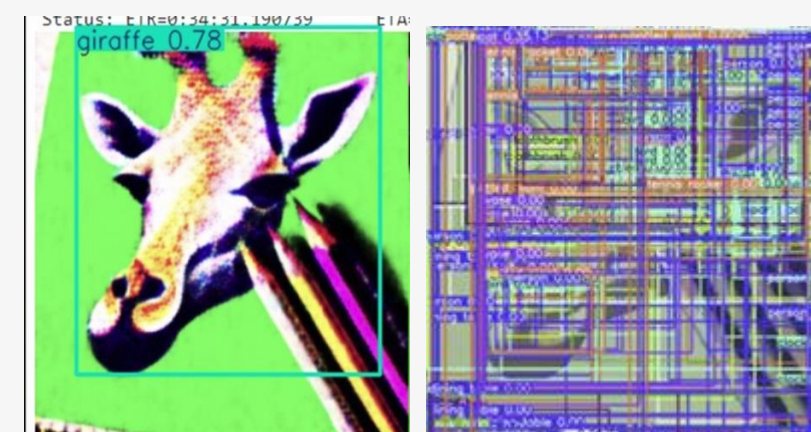
Flip Illusion



SAM



Yolov11



cat	0.13
Potted plant	0.008
Person	0.002
Sicssors	0.000

Tasks : Ask Abstraction Questions

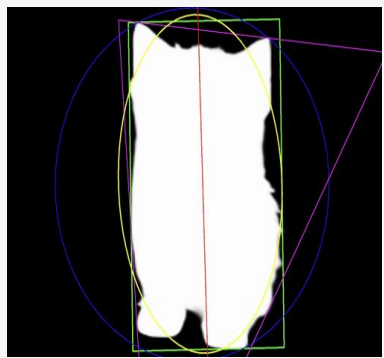
- Choose all objects that you can see



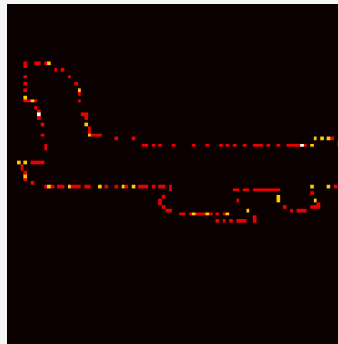
CHAPTER

06 Technology_Multi-Dimension CAPTCHA

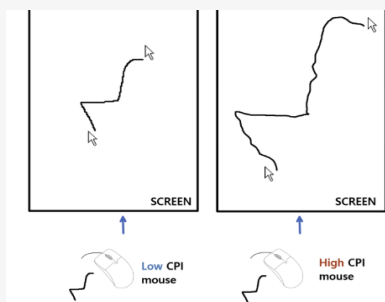
OpenCV - Contour



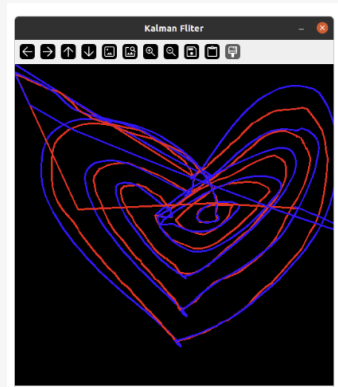
CNN Heatmap



Detect Mouse pointer



KalmanFilter

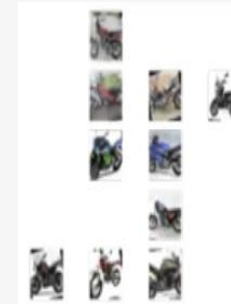


Action



Visual

DCGAN



Flip Illusion



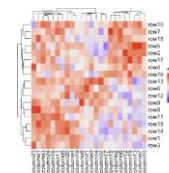
Background



PyTorch

The SAM model

ultralytics
YOLO11



08 Monthly Plan

Month	Main	Specific
3	Image & Multidimensional CAPTCHA	<ul style="list-style-type: none">- Develop various visible task only for user not AI- Expand Multidimensional CAPTCHA image and combine mouse detection- Functional testing & Performance testing
4	Developer Assist & Control Console	<ul style="list-style-type: none">- Add Control Console to make system manage and setting easier-> Dashboard, Customizing option, User manage, Log and monitoring- Write precise document(How to use, Error code, Guide step)
5	Docker & API	<ul style="list-style-type: none">- Compose Docker and select Cloud Service- User testing & Security testing- Expand and enhance performance
6	Deploy	<ul style="list-style-type: none">- Integration testing- Pre-deployment testing- Automated testing

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Thank You!

Project Repository



[Youtube](#)



[Notion Page](#)



[GitHub Page](#)