심규환
Kyuhwan Shim

M.S. Student
Graduate School of Artificial Intelligence
Seoul National University

https://underthelights.github.io/

kyuhwan.shim@snu.ac.kr

Footprint

RESEARCH

Visiting student researcher
Autonomous Intellgent Systems Group, Universität Bonn
Jul 2024 – Aug 2024

Research Assistant
AIIS & CS, SNU
Dec 2023 – Aug 2024

ExploreCSR
Graduate School of Data Science, SNU
Dec 2023 – Mar 2024

EDUCATION

Seoul National University
Master's Student, Graduate School of AI
Sep 2024 ~

Sogang University
Bachelor's Degree in Computer Science
Mar 2019 – Aug 2024

Chungnam Science High School
H.S.D. in Informatics, 23rd
Mar 2016 – Feb 2019

WORK EXPERIENCE

Team TIDYBOY-DSPL
@ Seoul Nat'l University, Seoul, Korea
Mar 2024 – Aug 2024
■ Developed Vision Module
& Data management

Machine Learning Engineer Intern,
@ Nota Inc. Seoul, Korea
Mar 2023 – Aug 2023
■ [Vision] YOLO Based Models (YOLOX, YOLOv8)
■ [Edge AI]& [MLOps/DevOps]

Co-Founder
■ UNIST Startup OCONNECT
- an Easy-Insert Socket, OneStep
■ Didimdol R&D , James Dyson Award,
Ulsan Collegiate Startups

MILITARY DUTY
Yeongdong Firestation Yeongdong,
Chungbuk, Korea

ROBOT
EXPERIENCES

Robot Setting, Experiments, Research

ROS(ROS2), Robot Data Conversion,
Teleoperation, Inverse Kinematics

HSR-B

Mobile ALOHA

TIAGo++

Gello

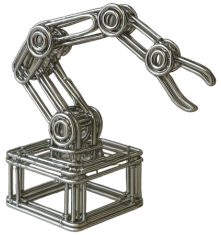
UR-5
UR-5e

RESEARCH
HIGHLIGHT

CLIP-RT: Learning Language-Conditioned Robotic Policies from Natural Language Supervision
Gi-Cheon Kang*, Junghyun Kim*, Kyuhwan Shim, Jun Ki Lee†, Byoung-Tak Zhang †
RSS 2025

KIRINO, An Interactive Chatbot System for User Persona
Ganghun Kim *, Hyunjae Kim *, Geon Choi *, **Kyuhwan Shim***, and Myoung-Wan Koo†
KCC 2024

Leveraging Language Representations for Vision-Language-Action
Theo Taeyeong Kim*, Jaemoon Park*, Kyuhwan Shim*
Ongoing Project



clip-rt.github.io

CLIP-RT

Learning Language-Conditioned Robotic Policies from Natural Language Supervision

Gi-Cheon Kang*

Junghyun Kim*

Kyuhwan Shim

Jun Ki Lee†

Byoung-Tak Zhang†

RSS 2025

SEOUL NATIONAL UNIVERSITY

Tommoro Robotics

ROBOTICS SCIENCE AND SYSTEMS

JUNE 21 - 25, 2025 | UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES

SEOUL NATIONAL UNIVERSITY

CLIP-RT

VLA model that learns language-based motion primitives via contr astive imitation learning

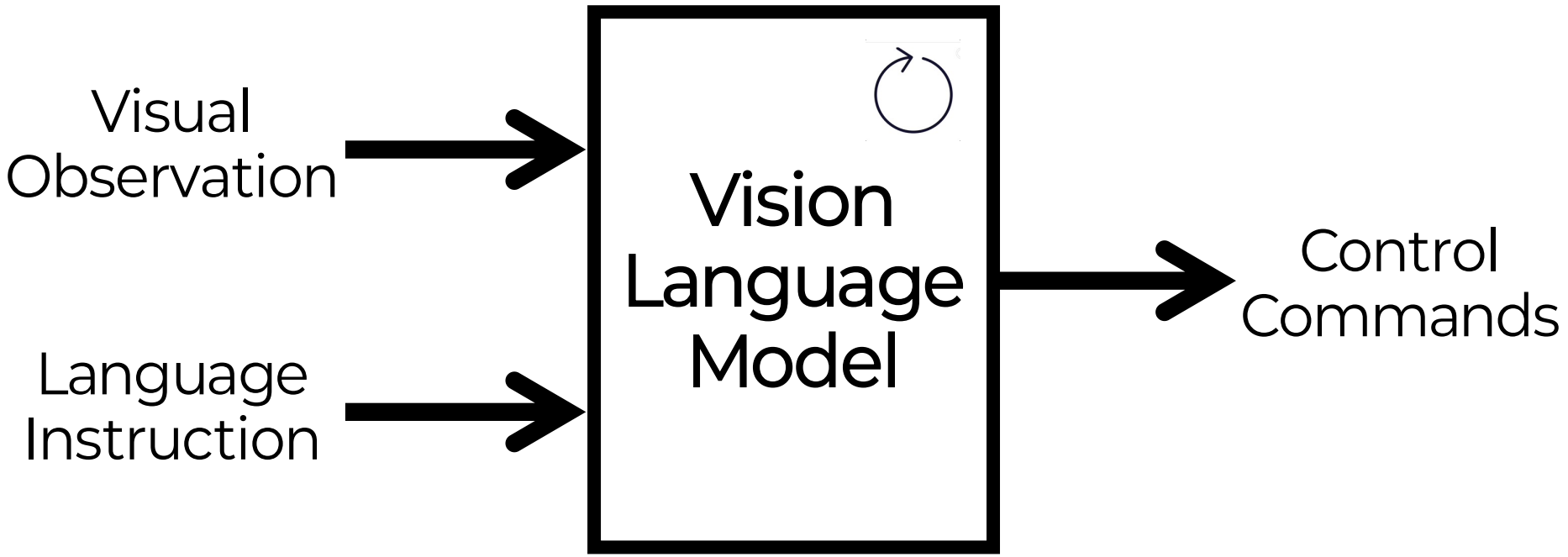
Language-based Teleoperation

Collect robotic demonstrations solely through language

CLIP-RT vs. OpenVLA

- **7× smaller** — 1B parameters
- **40× faster** — 164Hz
- **+16% (avg 93%)** — LIBERO
- **+24%** — Real-world

Vision-Language-Action (VLA) Model



Motivation

Most VLA models learn the mapping

Vision & Language → (Large-scale robotic data) → Low-Level Action

Forcing VLA models to learn low-level actions limits…

Generalization **Transferability** **Compositionality**

Motivation

Low-level actions are…

Hardware-specific

Not encoding universally applicable behaviors

Not naturally composing into higher-level behaviors

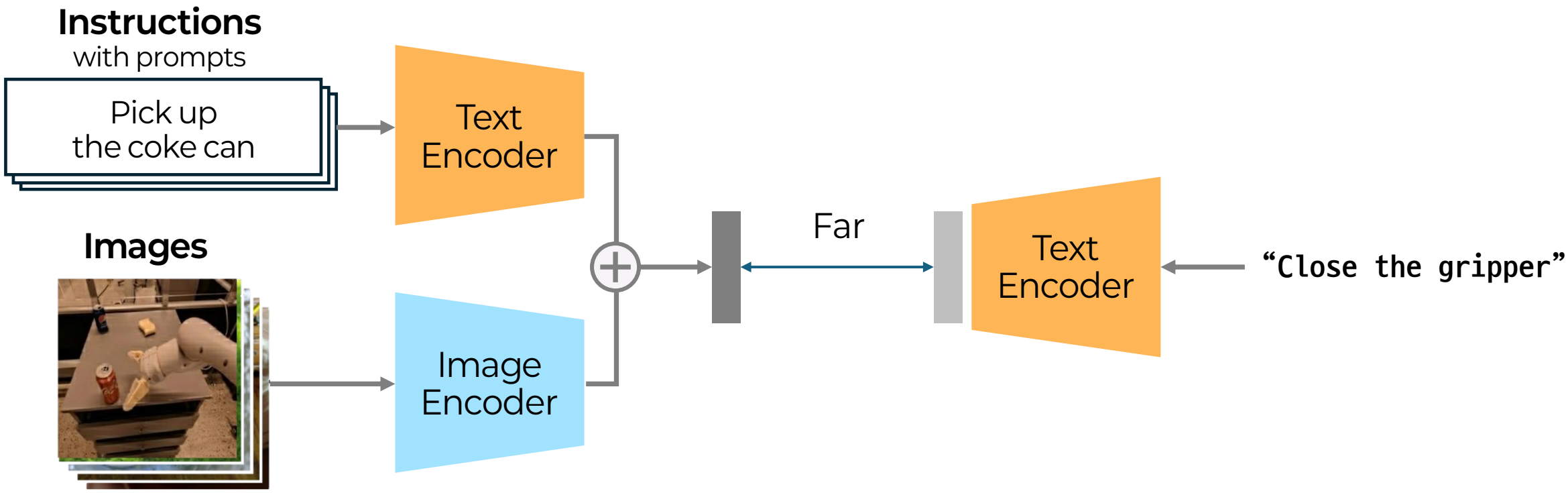
What is the alternative? 🤔

What is the alternative?

Language-based motion primitives!

- “Close the gripper”
- “Move the robot arm forward by 5cm”
- “Rotate the gripper clockwise by 90 degrees”
- “Tilt the arm up by 30 degrees”
- …

CLIP-RT
CLIP Based Robotics Transformer (CLIP-RT)



CLIP-RT Inference

Instructions
with prompts

Pick up
the coke can

Images

Text
Encoder

Image
Encoder

Text
Encoder

Predefined Motions

Rotate gripper 45°

Close the gripper

⋮

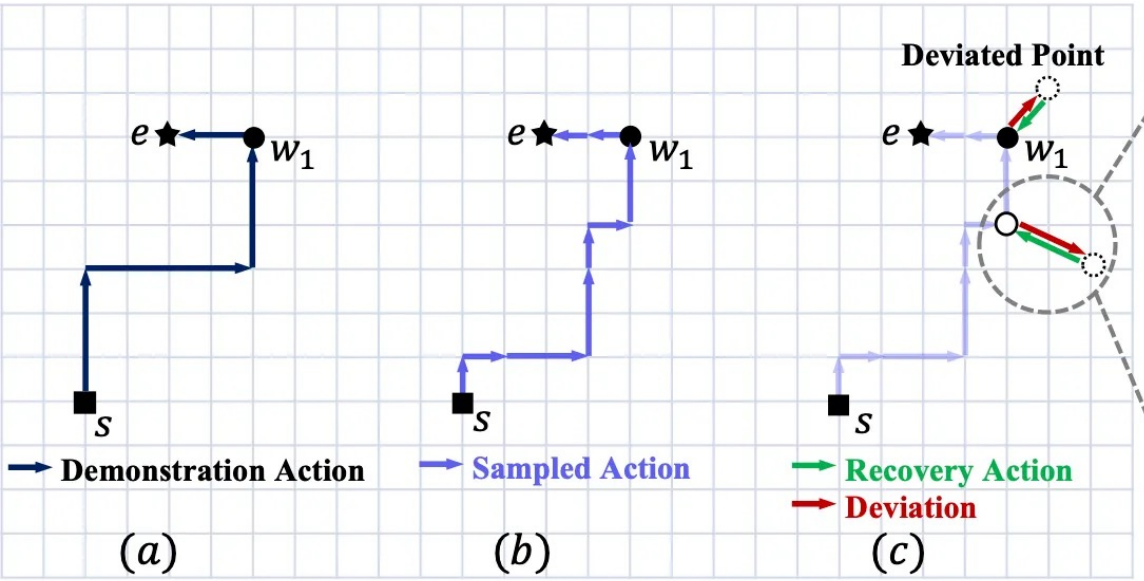
Move left by 10c

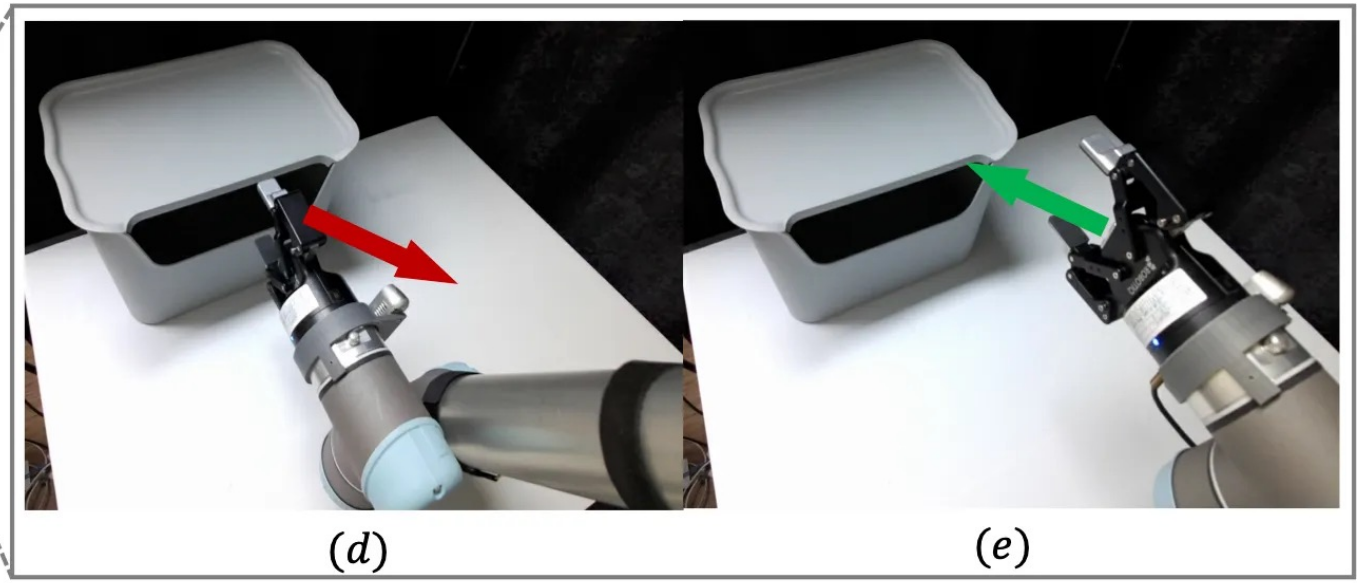
Lookup Table

SEOUL NATIONAL UNIVERSITY

Stochastic trajectory diversification (STD)

Augment the demonstration data collected by humans



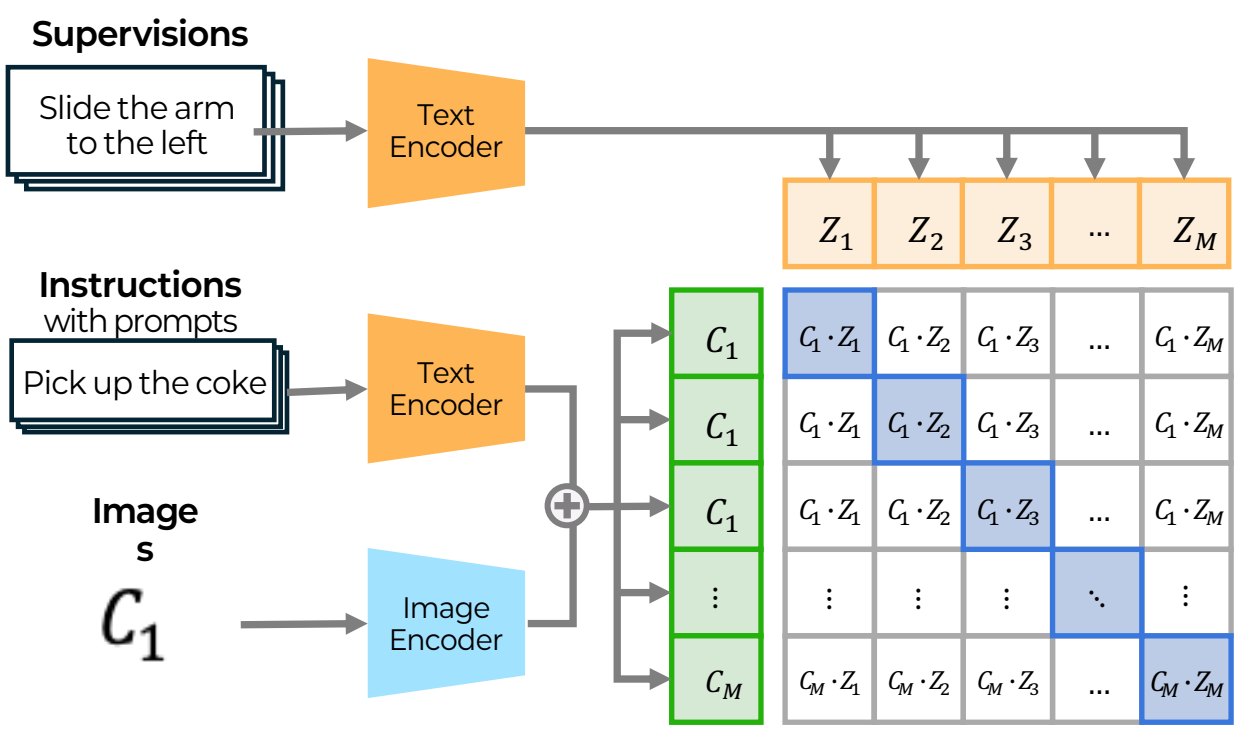


(1) **The Diversification phase** diversifies the expert trajectory into multiple alternative trajectories
(2) **The Recovery phase** intentionally deviates from the original trajectory and then executes a recove ry action to return to the original path. Recovery action is utilized in training

Stochastic Trajectory Diversification for Language-based Robot Action Learning
Junghyun Kim*, Gi-Cheon Kang*, **Kyuhwan Shim**, Jun Ki Lee † and Byoung-Tak Zhang †
Korea Software Congress 2024 / 🏆 Excellence Paper Presentation Award

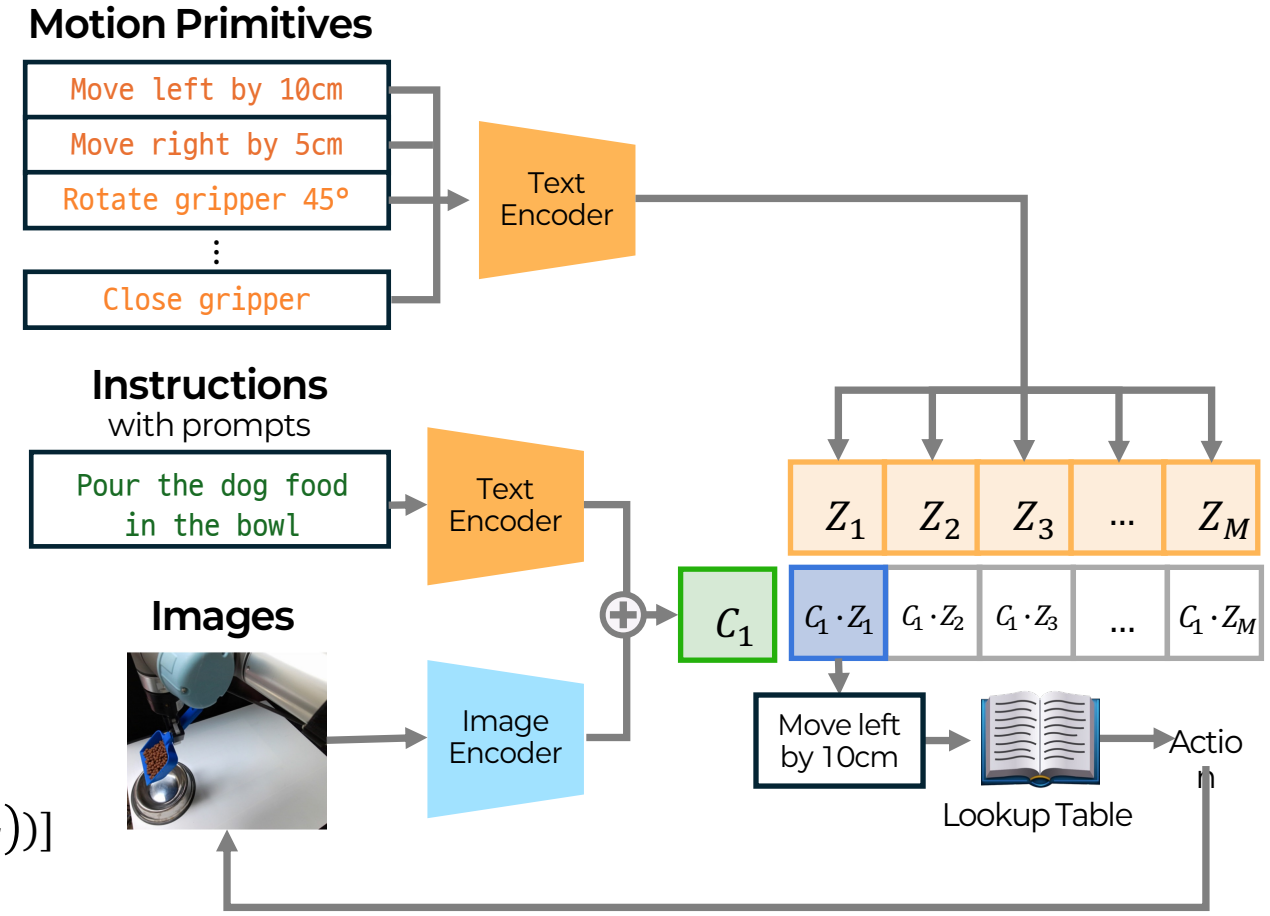
CLIP-RT ARCHITECTURE

Contrastive Imitation Learning



$$\mathcal{L}_{CIL} = -\frac{1}{M^2}\sum_{i=1}^{M}\sum_{j=1}^{M}\left[y_{ij}\log\sigma(\hat{\boldsymbol{c}}_i \cdot \hat{\boldsymbol{z}}_j) + (1-y_{ij})\log(1-\sigma(\hat{\boldsymbol{c}}_i \cdot \hat{\boldsymbol{z}}_j))\right]$$

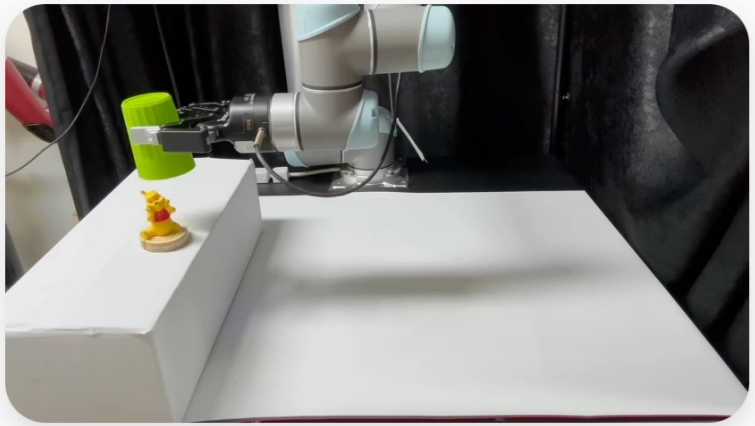
Closed-Loop Robot Control



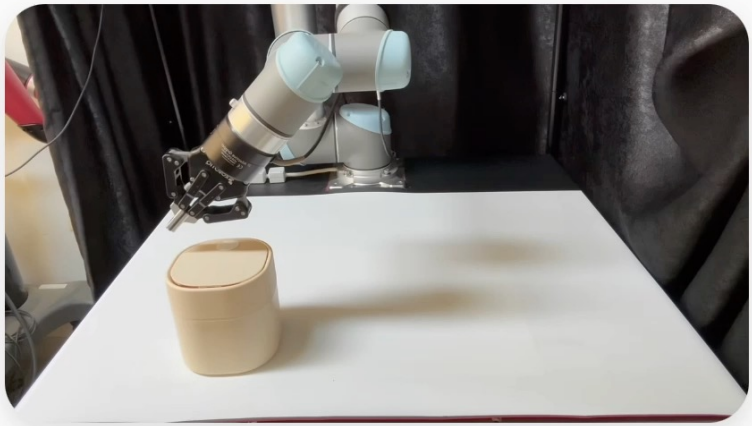
CLIP-RT
DEMONSTRATION

SEOUL NATIONAL UNIVERSITY

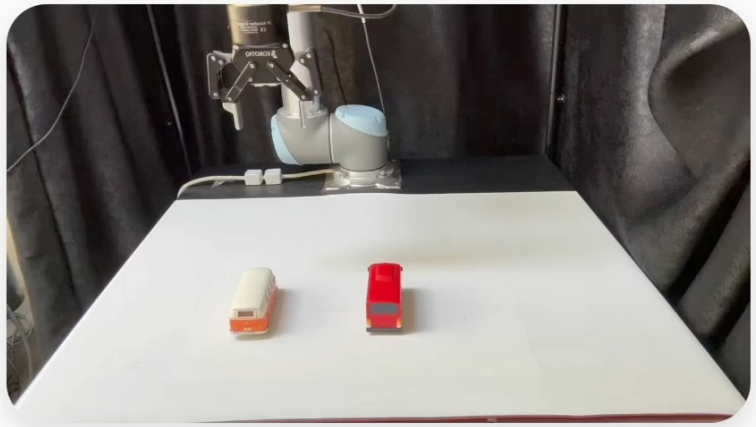
Close the laptop



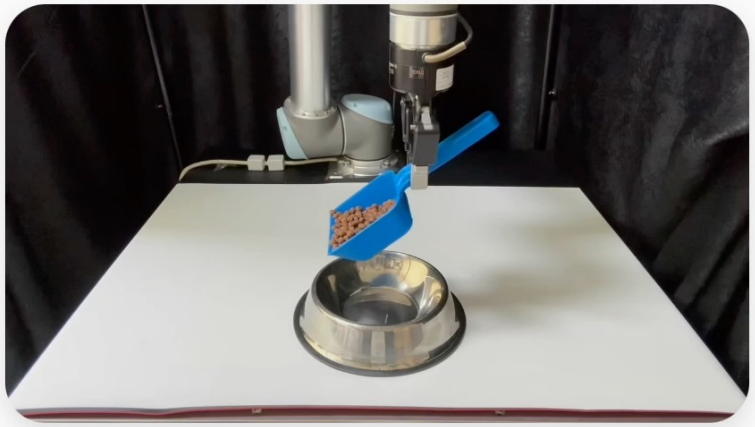
Hide the Pooh with the green cup



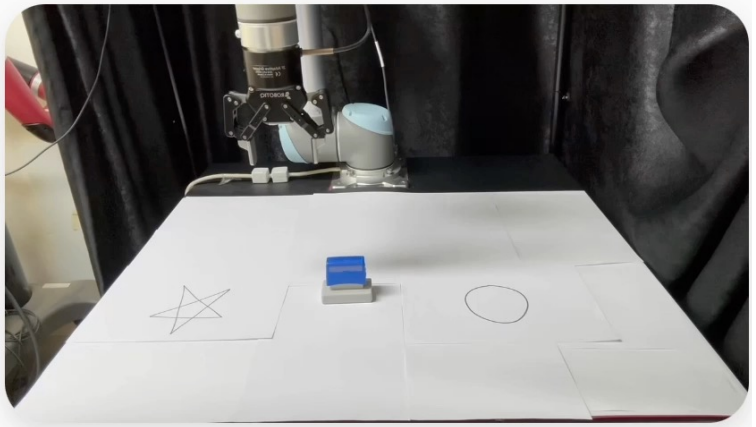
Open the trash can



Play with the orange car



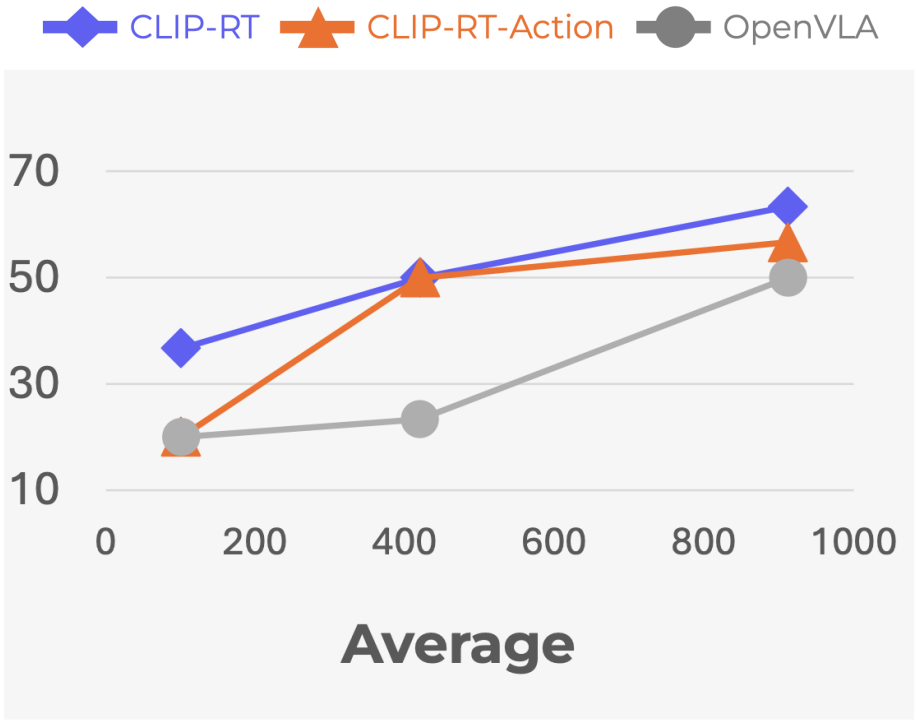
Pour the dog food in the bowl



Stamp near the circle

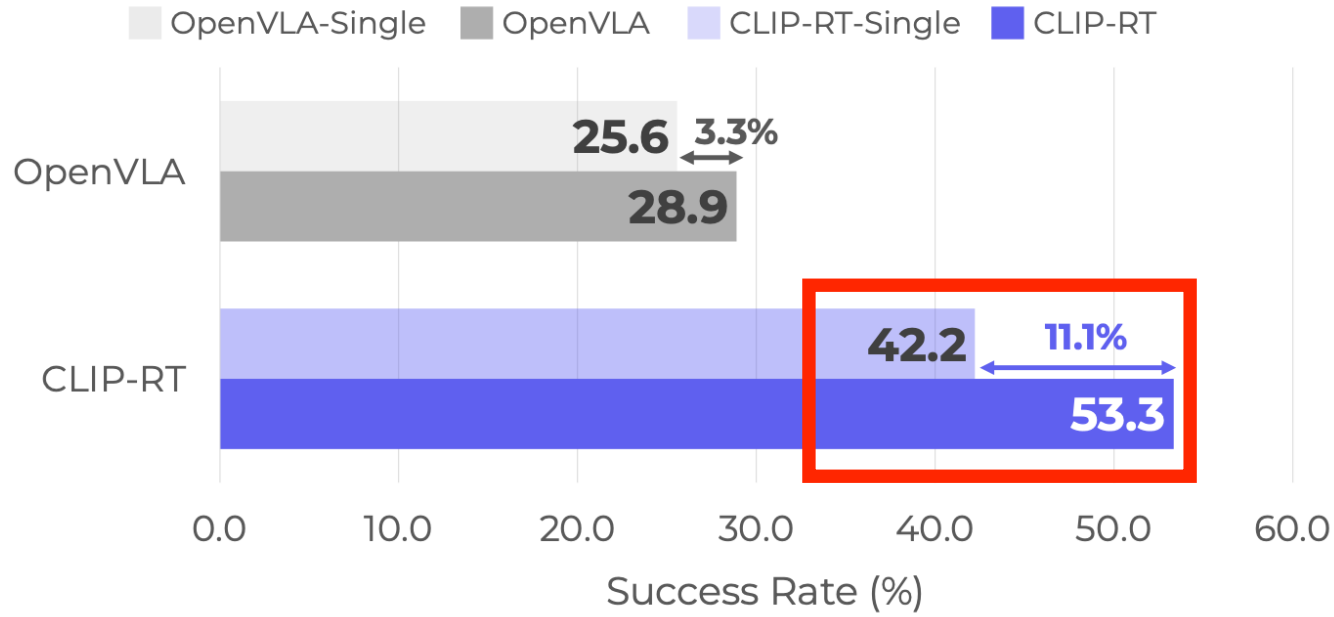
Real-world Evaluations

Few-shot generalization



X : # of Transition,
Y : Success Rate

Enhanced task transfer
vs. OpenVLA



Abstraction-Precision Trade-off

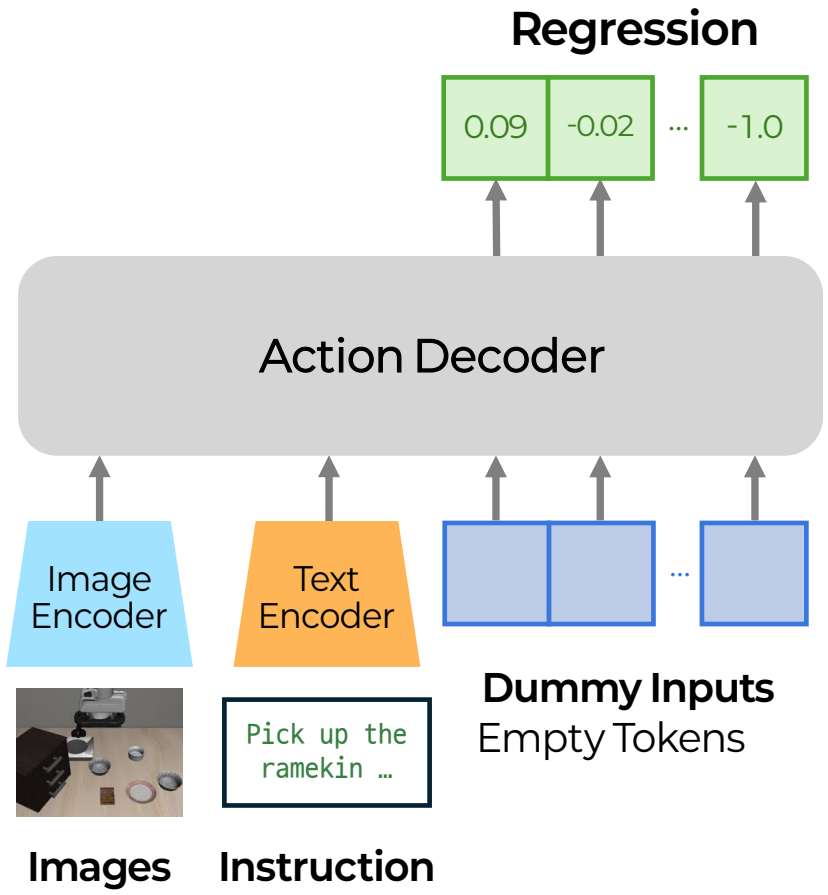
Language-based motion primitives bring:

👍 Generalization, Transferability, and Compositionality

👎 Precision and Dexterity

How can CLIP-RT address higher-precision tasks?

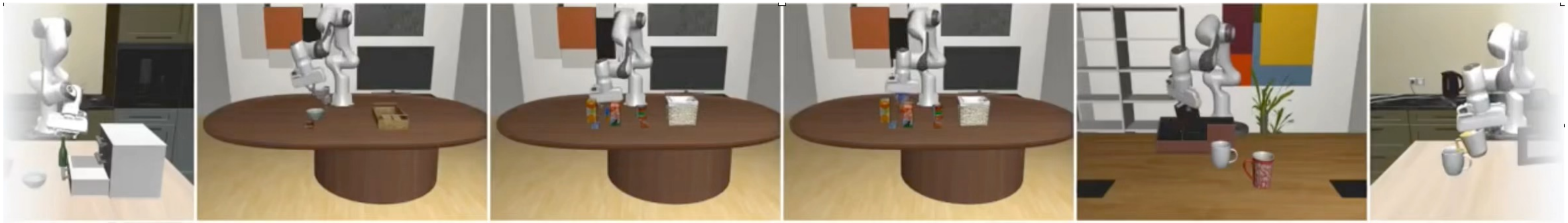
CLIP-RT as Encoders



LIBERO Evaluations

Achieved a 93.1% avg. success rate with 163Hz inference throughput

Model	Size	Inference Efficiency		LIBERO Task Success Rates				
		Throughput↑ (Hz)	Latency↓ (Sec)	Spatial↑ (%)	Object↑ (%)	Goal↑ (%)	Long↑ (%)	Average↑ (%)
Octo [38]	93M	-	-	78.9	85.7	84.6	51.1	75.1
DP (scratch) [10]	157M	-	-	78.3	92.5	68.3	50.5	72.4
Dita [21]	334M	-	-	84.2	96.3	85.4	63.8	82.4
OpenVLA [29]	7.5B	4.2	0.240	84.7	88.4	79.2	53.7	76.5
OpenVLA-OFT [30]	7.7B	109.7	0.073	**96.2**	98.3	**96.2**	**90.7**	**95.3**
CLIP-RT+ (ours)	1.3B	**163.8**	**0.049**	95.2	**99.2**	94.2	83.8	93.1



THANK YOU

Summary

Proposed a CLIP-RT that learns language-based motions

Training	Contrastive objective
Inference	Similarity-based decision making
Real-world eval.	Improved generalization and task transfer
Abstraction-precision trade-off	Proposed CLIP-RT+ : CLIP-RT as Encoders
LIBERO eval	CLIP-RT+ achieved strong performance

KIRINO

An Interactive Chatbot System for User Persona

🏆 Undergraduate Excellence Paper Award

Ganghun Kim *, Hyunjae Kim *, Geon Choi *, **Kyuhwan Shim***, and Myoung-Wan Koo†

Korean Computer Congress 2024
서강융합기술경진대회 2024

KIRINO
KCC2024

KIRINO : An Interactive Chatbot System for User Persona

Ganghun Kim *, Hyunjae Kim *, Geon Choi *, **Kyuhwan Shim***, and Myoung-Wan Koo†

Korean Computer Congress 2024, 서강융합기술경진대회 2024
🏆 Undergraduate Excellence Paper Award

유저 페르소나를 위한 인터랙티브 챗봇 시스템

https://underthelights.github.io/kirino_page/

활용 방안 및 기대효과

활용 방안

맞춤형 답변 생성
페르소나 학습 후 사용자 특성에 맞춘 답변 생성

특수 상황에서의 활용성
운전 중, 운동 중처럼 손을 자유로이 쓰지 못하더라도 사용가능

기대 효과

사용자 만족도 향상
맞춤형 대화 제공

유저 신뢰도 구축
간편함에 기반한 장기적/ 지속적 서비스 이용유도

시장 경쟁력 확보
페르소나를 반영해 대화를 생성하는 새로운 패러다임

프로젝트 소개 및 활용

발제 배경 답장을 마음대로 하지 못하는 상황 발생
→ 유저의 페르소나를 반영하여 자연스럽게 답변할 수 있도록 챗봇 시스템을 개선하자

50.81%
워치 유저 수
19년 대비 24년 유저

워치에서 알림만 확인하는 유저 비율
자체 설문조사 결과 (N=102)

프로젝트 소개

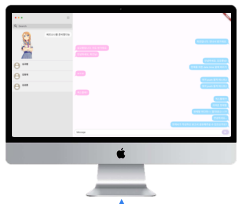
스마트 워치에서 사용자의 페르소나와 말투를 기반으로 자연스러운 메시지 답변을 생성하는 소프트웨어

프로젝트 목표

1. 더 나은 UX (User Experience) 제공
   - 운전, 회의, 운동 중에도 답장 가능
   - 공연장, 음식점, 술집 등 시끄러운 공간에서도 답장 가능
   - 키보드 타이핑 없이, 모바일 기기가 없어도 답장 가능
2. 올바르고 자연스러운 답변 생성
   - 사용자의 페르소나와 말투를 기반으로 답변 생성
   - 여러 채팅방의 정보를 바탕으로 올바른 답변 생성

작품 설명 및 결과물

프로젝트 FLOW



Point
대화를 반영한 페르소나 생성

메시지 알림 수신 | 답변 생성 요청 | 답변 전송여부 결정

기존 메신저 어플과 호환

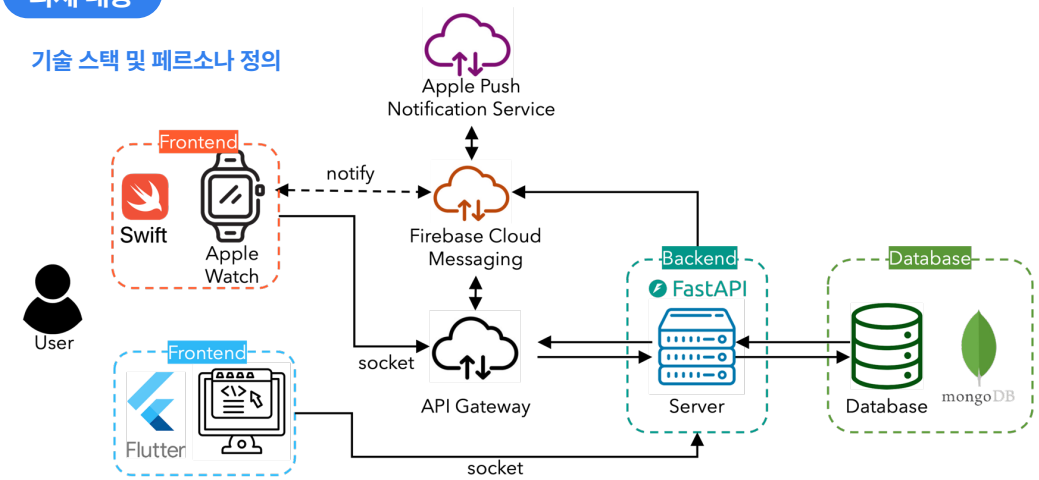
Point
사용자와 대화하며 페르소나 업데이트

Point
페르소나를 반영해 답변이 잘 생성됨

KIRINO
KCC2024

과제 내용

기술 스택 및 페르소나 정의



Example

페르소나 없는 경우

오늘 저녁에 삼겹살 어때?

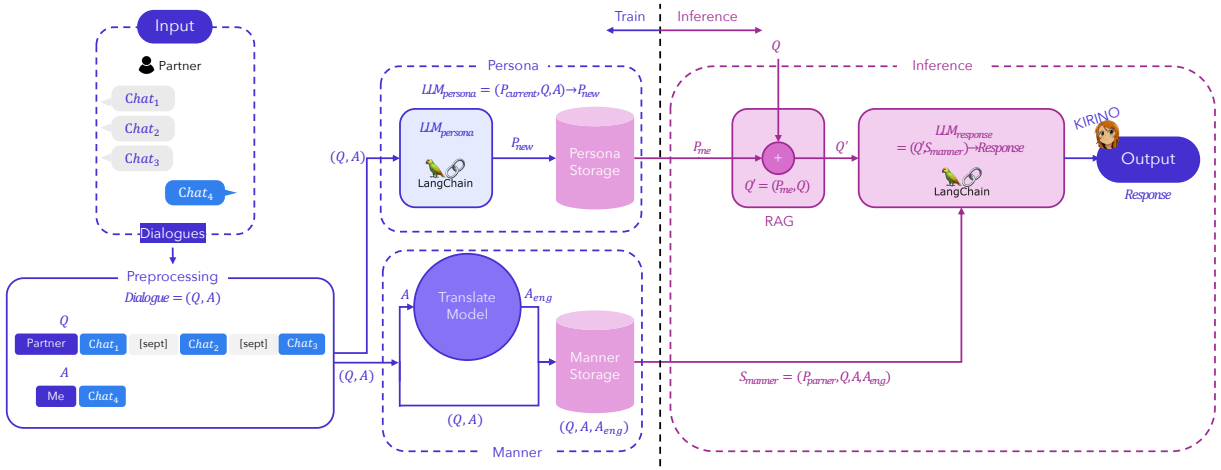
좋아! 안 그래도 삼겹살 너무 먹고 싶었어

페르소나 있는 경우

오늘 저녁에 삼겹살 어때?

나 어제 삼겹살 먹었는데 다른 메뉴는 어때?

RAG Architecture



페르소나 정의 및 추론

대화 내용 Q,A 를 반영한
새로운 페르소나 P_{new}를 생성&저장
상대와의 관계, 성격, 관심사, 일정 등

지속적으로 페르소나를 갱신
→ 보다 개인화된 응답 제공

사용자 말투 추론

$LLM_{response}$ 답변 생성 시 RAG 형태
→ 사용자의 적절한 응답 말투 추론에 활용

$LLM_{response}$에 의한 사용자 응답 생성

상대방의 질문 Q에 대한 응답을 생성할 때,
$LLM_{response}$가 내 페르소나 P_{me}와 말투 S_{manner}를 가져옴

→ 적절한 사용자 말투로 답변 생성

BI
BIOINTELLIGENCE

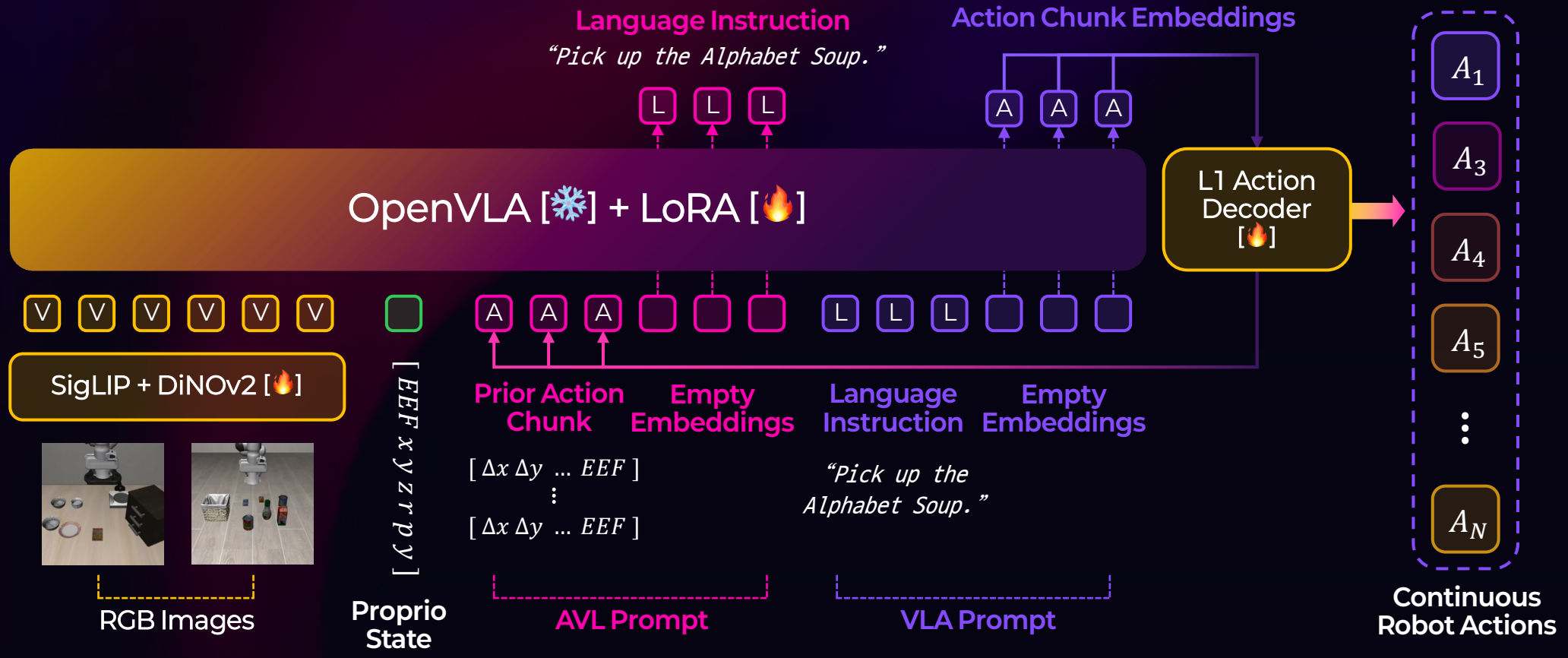
Leveraging Language Representations for Vision-Language-Action Model Fine-Tuning

Theo Taeyeong Kim*, Jaemoon Park*, Kyuhwan Shim*

RESEARCH
Leveraging Language Representations for
Vision-Language-Action Model Fine-Tuning

VLAVLA Framework

AV-L 보조 학습과 프롬프팅 강화로 OpenVLA 모델을 fine-tuning하여,
LIBERO 시뮬레이션 벤치마크에서 뛰어난 성능을 보였다.



RESEARCH
Leveraging Language Representations for
Vision-Language-Action Model Fine-Tuning

AV-L 보조 학습

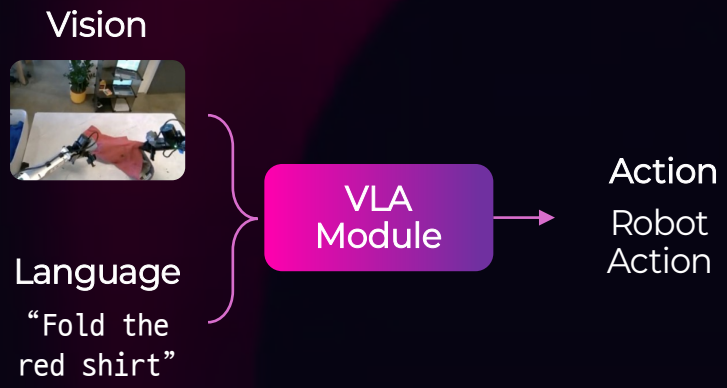
기존 VLA(Vision-Language-Action) 모델의 학습 방향성을 바꾼 보조 학습을 추가로 설계하여,
모델의 언어 표현 학습 능력을 향상시켜 자연어 명령의 이해도를 높인다

$$\mathcal{L}_{VLAVLA} = \mathcal{L}_{VLA} + \lambda \mathcal{L}_{AVL}$$

$\mathcal{L}_{VLA} \propto p(A|V,L)$

VL-A module (기본)

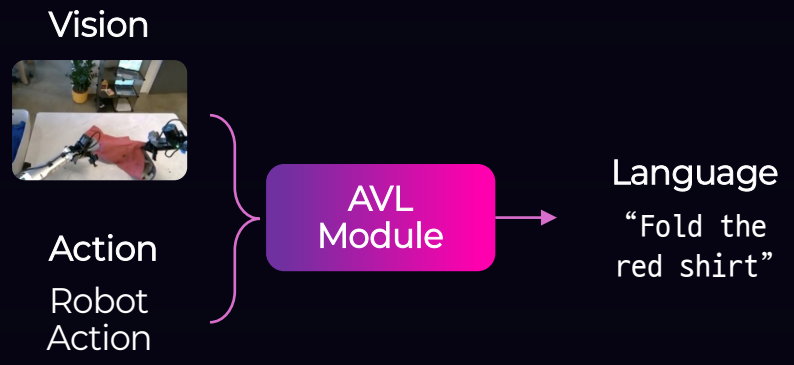
Vision, Language 데이터로부터 로봇의 Action을 추론



$\mathcal{L}_{AVL} \propto p(L|A,V)$

AV-L module (추가)

Vision, Action 데이터로부터 Language 명령어를 추론



RESEARCH
Leveraging Language Representations for
Vision-Language-Action Model Fine-Tuning

프롬프팅 강화 기존 OpenVLA 및 OpenVLA-OFT 모델에서 사용하던 프롬프트 속 추론 과정과 작업 묘사를 강화하여,
자연어 명령어에 대한 모델의 일반화 능력 및 추론 능력을 향상시킨다.

Human Agent

<Prior Action Chunk>

What language instruction would the robot have been following?

Robot Agent

Pick up the book and place in in ze back compartment of the caddy.

(a)

Pick up the book and place in in the back compartment of the caddy.
First, pick up the black book.
If you finished that, place the book in the back compartment of the brown caddy.
What action should you take now?

Robot Agent

<Next Action Chunk Embedding>

(b)

RESEARCH
Leveraging Language Representations for
Vision-Language-Action Model Fine-Tuning

LIBERO 시뮬레이션 벤치마크

VLAVLA는 LIBERO 시뮬레이션 벤치마크 중 많은 작업에서 OpenVLA-OFT보다 더 뛰어난 작업 성공률(%)을 보였다.

Model	LIBERO-Object	LIBERO-Spatial	LIBERO-Goal	LIBERO-10	LIBERO-90
OpenVLA-OFT	98.4	97.6	97.9	94.5	90.2*
VLAVLA (old)	99.6	95.0	98.2	96.6	-
VLAVLA	-	-	-	**96.8**	**92.0**

*LIBERO-90의 성능은 OpenVLA-OFT 논문에서 제공하지 않아, 직접 모델을 재현하여 측정

CONTEST ACHIEVEMENTS

Robocup 2024 Robocup@Home
Team TIDYBOY from Seoul National University, Pusan National University
Top 3

GANGSEO BIGDATA CONTEST 2023
Team NUNETTINE from Sogang University
Grand Prize (Top 1, Mayor's Award)

BIGCONTEST 2022 INNOVATION LEAUGE
Team DAVENGERS from Sogang University
Grand Prize (Top 2, NIA President Award)

LG Aimers Top 30, Offline Hackerthon
Samsung AI Challenge 2023 Top 30, Invitation to the Talent pool

Robocup2024
Robocup@Home
Robocup Federation

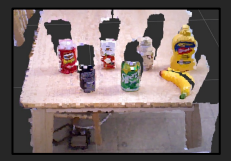
Team TIDYBOY
Seoul National University
Pusan National University

🏆 Top 3
@Home DSPL League

Object Detection and Recognition

Our team made an algorithm that detects objects in a 3D box shape based on RGB-D images. 3D object detection, which combines RGB and depth images, is more robust for HSR to grip objects safely.

HSR detects objects with YOLOv10



Color pointcloud

Clustering & 3D Bounding Box

YOLOv10 based 3D object recognition

Manipulation

We implement diverse manipulation motions based on the environment and object properties to perform tasks.

Human Attribute Extraction

Human attribute extraction is based on CLIP and Air-Clothing Detection tool, which extracts color, pattern, and length of sleeves of both top and bottom. Also, gender and age.

Air-Clothing-MA based clothing info extraction

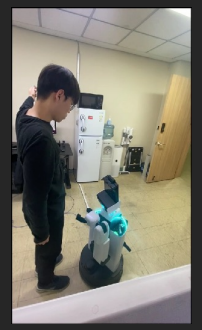
SLAM & Navigation

Dynamic Obstacle Ahead

Static Map

Dynamic Map

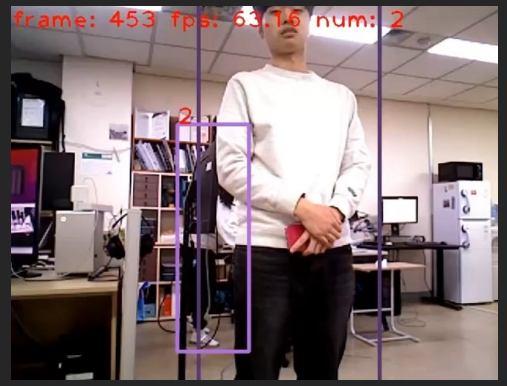
Dynamic Obstacle Segmentation



Safety Pause

Our navigation module provides dynamic obstacle segmentation function. It compares the dynamic map with the prior static map to segment actual dynamic obstacles such as nearby human. It can pause and restart the navigation until nearby dynamic obstacle is gone.

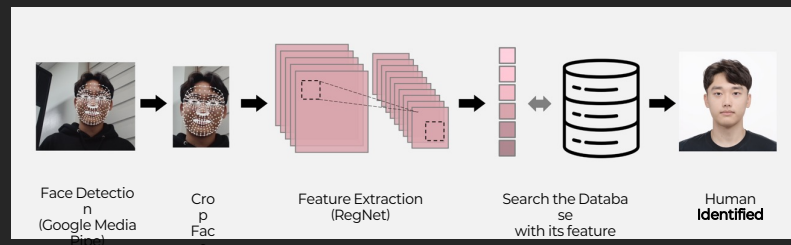
Human Tracking



ByteTrack based
Human re-identification

We developed a **human re-identification system** for HSRB which is based on ByteTrack[1] and fine-tuned for our platform. Robot navigates by measuring the distance to a designated human target.

Facial Recognition



RegNet based
face feature extraction

The algorithm detects and crops the face from the input image. Next, it extracts facial features using the RegNet model. These extracted features are then compared to the database for a match. Once a match is found, the system accurately identifies the person in front of the robot.

Autolabel with YOLOv10

autolabel_ultimate.py 1 | aug.py 1 | bbox_snu.py 3 | 11000.png

Robocup2024 > Tools > autolabel_v10 > autolabel_ultimate.py > parse_args

labeled_image_path 3의 ?

```python
import cv2
import os
import shutil
import random
from ultralytics import YOLOv10
import argparse
from pathlib import Path

def parse_args():
    parser = argparse.ArgumentParser()
    parser.add_argument('--weights', type=str, default='weight/v10m_240704_2.pt', help='model.pt pat
    parser.add_argument('--source', type=str, default='../BoundingBox_Tool/Images/Test', help='sourc
    parser.add_argument('--img-size', type=int, default=640, help='inference size (pixels)')
    parser.add_argument('--conf-thres', type=float, default=0.25, help='object confidence threshold'
    parser.add_argument('--iou-thres', type=float, default=0.45, help='IOU threshold for NMS')
    parser.add_argument('--device', default='', help='cuda device, i.e. 0 or 0,1,2,3 or cpu')
    parser.add_argument('--label', default='../BoundingBox_Tool/Images/Test/Labeled', help='save res
    parser.add_argument('--name', default='exp', help='save results to project/name')
```

4 > Tools > BoundingBox_Tool > Images > Test > Labeled > labeled_img > 11000.png

Robocup2024 > Tools > BoundingBox_Tool > classnames.txt

```
pink_milk
blue_milk
coke
banana
apple
carrot
strawberry
sweet potato
lemon
cheezit
strawberry_jello
chocolate_jello
sugar
mustard
spam
tomato_soup
fork
plate
knife
bowl
```

문제 6 | 출력 | 디버그 콘솔 | 터미널 | 포트 | 주석

zsh Robocup2024
zsh Robocup2024
zsh autolabel_v10

```
image 1/1 /Users/underthelights/Documents/workspace/ut2/Robocup2024/Tools/autolabel_v10/../BoundingBox_Tool/Images/Test/11002.png: 480x640 1 strawberry_jello, 1 chocolate_jello, 1 mustard, 1 spam, 1 tennis_ball, 469
.5ms
Speed: 1.8ms preprocess, 469.5ms inference, 1.2ms postprocess per image at shape (1, 3, 480, 640)
Labeled data saved to ../BoundingBox_Tool/Images/Test/Labeled/11002.txt
Labeled image saved to ../BoundingBox_Tool/Images/Test/Labeled/labeled_img/11002.png

image 1/1 /Users/underthelights/Documents/workspace/ut2/Robocup2024/Tools/autolabel_v10/../BoundingBox_Tool/Images/Test/11000.png: 480x640 1 lemon, 1 cheezit, 1 strawberry_jello, 1 chocolate_jello, 1 mustard, 1 spam
, 1 haribo, 1152.5ms
Speed: 1.4ms preprocess, 1152.5ms inference, 1.4ms postprocess per image at shape (1, 3, 480, 640)
Labeled data saved to ../BoundingBox_Tool/Images/Test/Labeled/11000.txt
Labeled image saved to ../BoundingBox_Tool/Images/Test/Labeled/labeled_img/11000.png

image 1/1 /Users/underthelights/Documents/workspace/ut2/Robocup2024/Tools/autolabel_v10/../BoundingBox_Tool/Images/Test/11001.png: 480x640 1 pink_milk, 1 cheezit, 1 chocolate_jello, 1 sugar, 1 tennis_ball, 536.6ms
Speed: 89.9ms preprocess, 536.6ms inference, 1.3ms postprocess per image at shape (1, 3, 480, 640)
Labeled data saved to ../BoundingBox_Tool/Images/Test/Labeled/11001.txt
Labeled image saved to ../BoundingBox_Tool/Images/Test/Labeled/labeled_img/11001.png

*** DONE! ***
(yolov10) → autolabel_v10 git:(bjkim) ✗
```

CONTESTS
BIGCONTEST 2022

Eco-Friendly JEJU Travel Route Recommender System

탄소 발자국 계산기 구축 & 제주도 여행 추천 시스템 개발

DAVENGERS

Jeonghyeon Ha, Kyunghoon Na, Kyungjoo Ko, Hannah Jung, Kyuhwan Shim

🏆 Grand Prize @ Innovation League

Insight
Code the Business

빅콘테스트 2022

신한카드, LG U+, Finda, CJ 올리브네트워크 등

Team DAVENGERS

Carbon Footprint Calculator | Data Processing | (3) Food

if the user's restaurant information exists in DB

(1) Carbon Emission of Restaurant

가맹점명 MCT_NM	메뉴리스트 menu_list
제주김만복동문시장점	만복이네 김밥, 통전복주먹밥, 숯불갈비주먹밥, 전복컵밥, 왕전복죽, 전복성게해물면,...
제주약수터올레시장점	4종 샘플러 (1040cc), 무료시음서비스, 제주 수제맥주 340cc 잔, 6종 ...

if the user's restaurant information doesn't exist in DB

Calculated carbon footprint by the **average of the menu of the restaurant**

Ex. Western Restaurant

Chicken: 0.5 kgCO2 / Pizza : 0.3 kgCO2
→ Average : (0.5+0.3)/2=0.4

Carbon Footprint of the **restaurant**
(per capita)

MCT_NM	carbon_avg
젠	3.80
가치	1.14

Calculation Logic

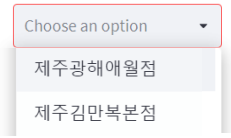
Q1. How many nights did you stay?
Min 1, Max 20

Food1

Food2

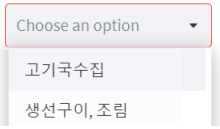
...

exists in DB — Q2. Which restaurant did you visit?



User selects the **restaurant**
→ Result based on **actual carbon emission**

doesn't exist in DB — Q2. What type of restaurant did you visit?



User selects the **restaurant type**
→ Result based on **average carbon emission** per restaurant type

Carbon Footprint of that restaurant in Jeju Island is total [ ] kg/co2

CONTESTS
BIGCONTEST 2022

ECO JEJU TOUR Recommended Route Example

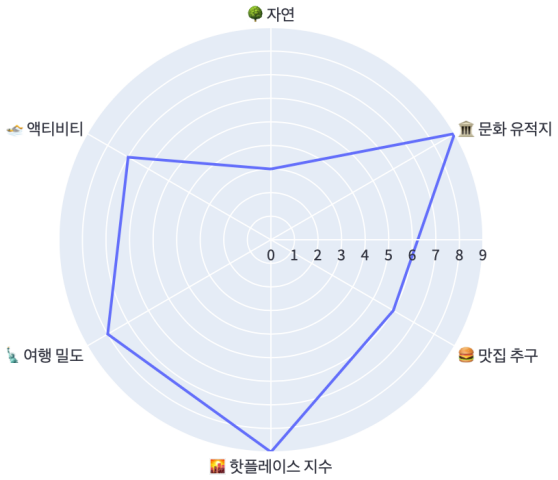
Persona

I'm okay with nature,
but I prefer History and Activities.

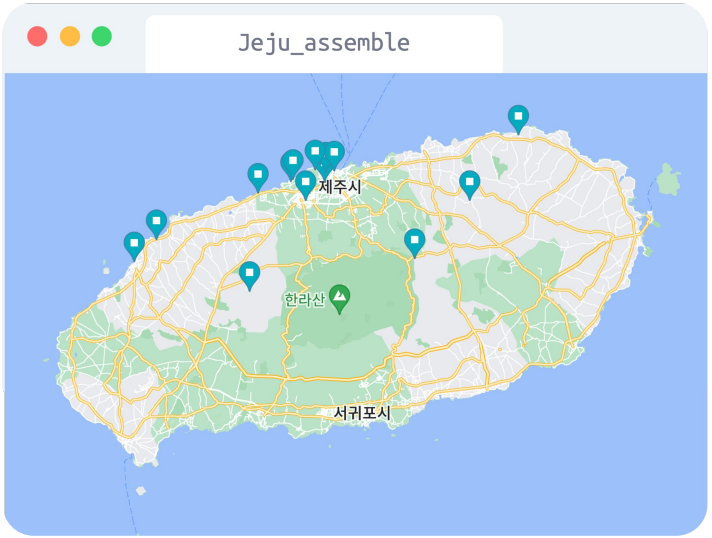
Plan on going around a lot
Any restaurant is fine
Love Popular Place

Q. Which part of Jeju Island are you going to travel to?
→ I want to travel to the Southern part of Jeju Island

Q. What transportation will you use?
→ Going to use Public Transportation



Recommended Route



Total Carbon Footprints

Traffic	5.96kgCO_2
Food	16.11kgCO_2
Tourism	0.113 kgCO_2
Accomodation	8.73kgCO_2
Airplane	112kgCO_2

= 142.913kgCO_2

Risk Rating Model Estimation for Small Business Owners with Credit Rating Model in Gangseo-gu

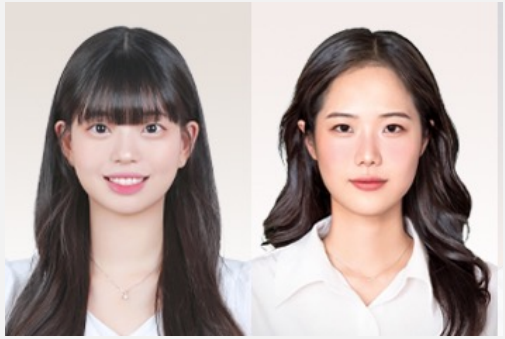
Gangseo Bigdata Contest

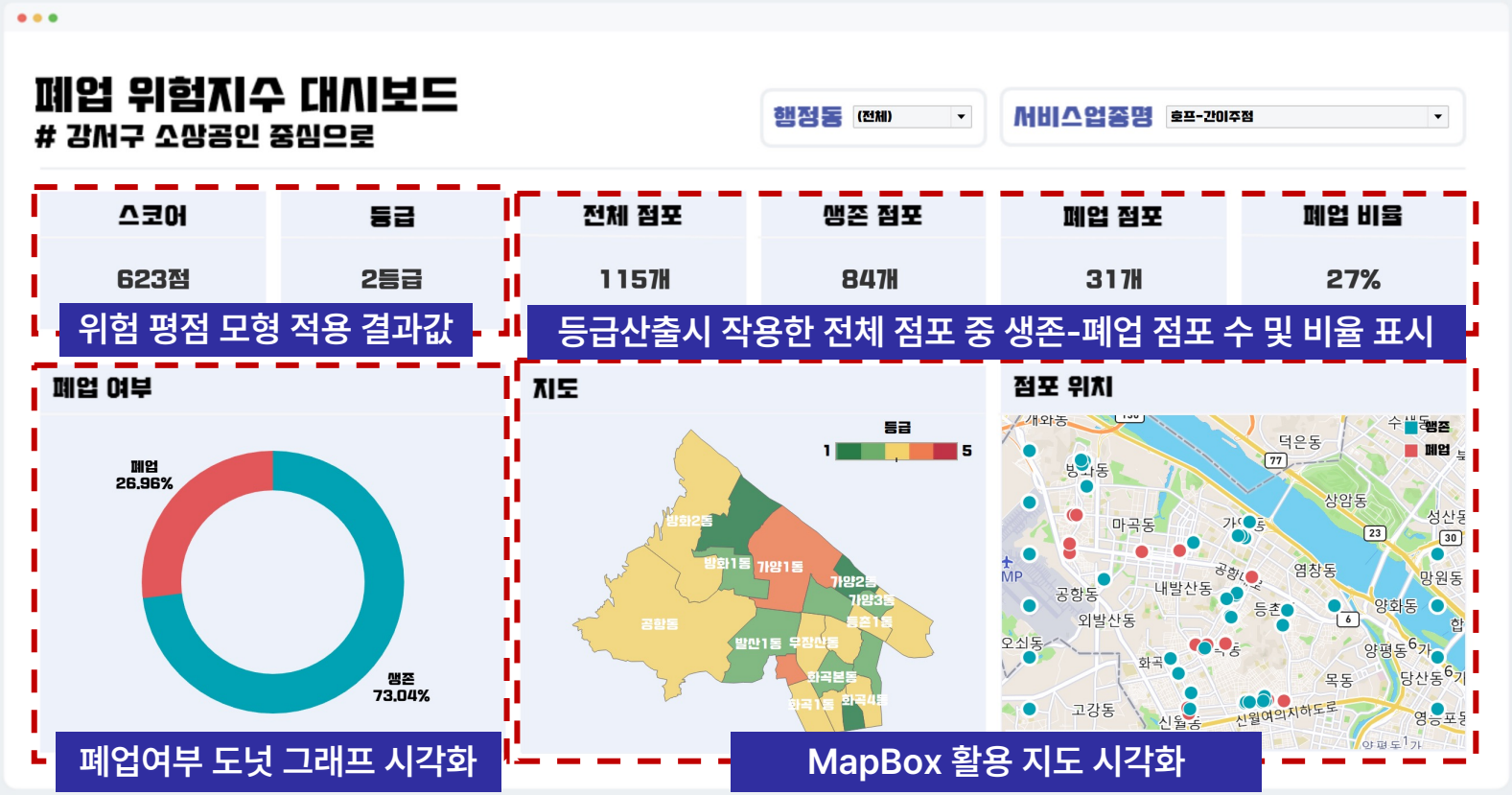
Team **NUNETTINE**
INSIGHT – Sogang University Data Science Study Group

🏆 Grand Prize (Top 1, Mayor's Award)

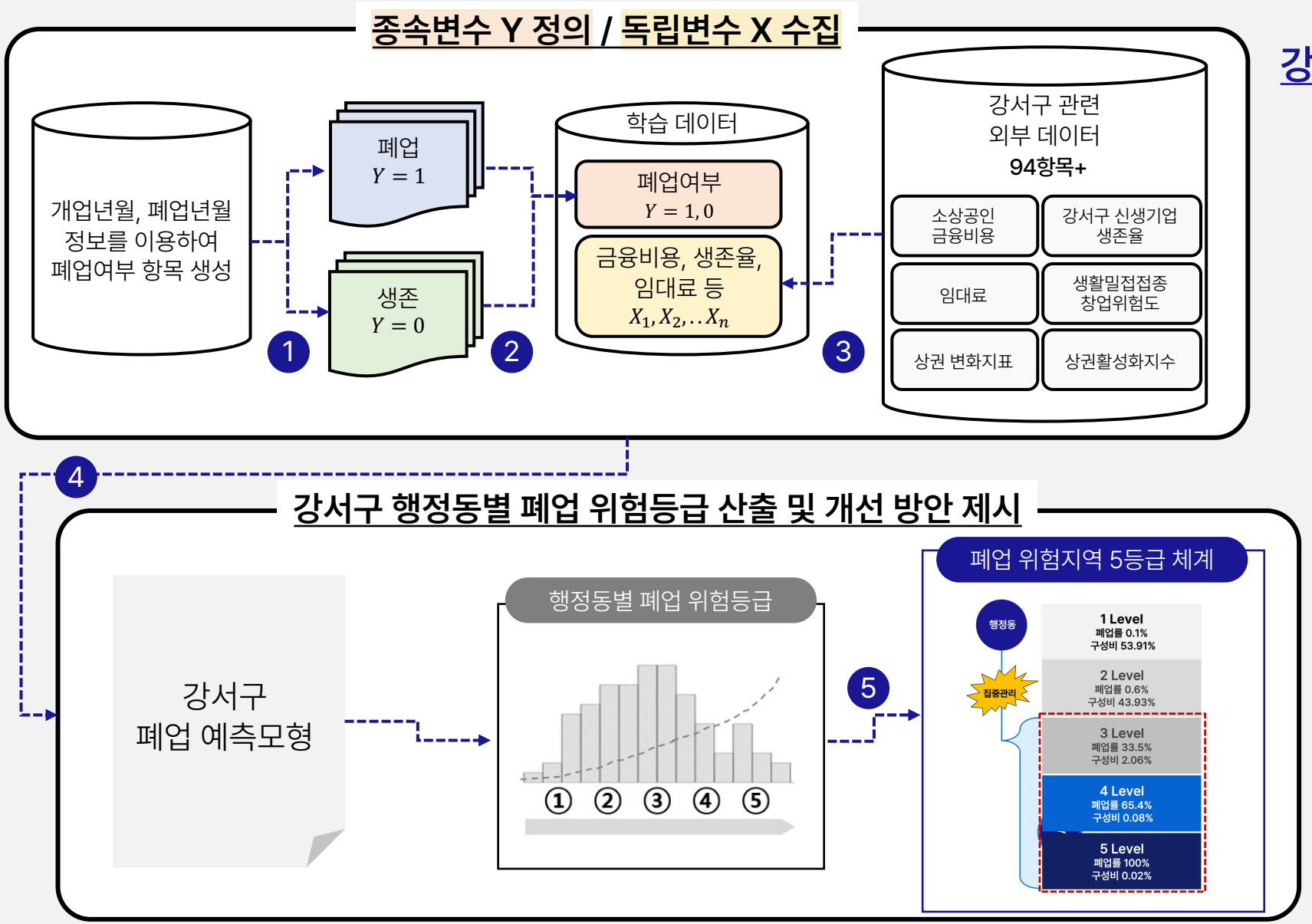
강서구 빅데이터 공모전
강서구청

Team 누네띠네
신용평가모형을 활용한 강서구 소상공인 폐업 위험
평점화 모형 개발 및 위험등급 산정





수행 개요



강서구 소상공인 폐업 위험 평점화 모형 제안을 위한 5단계 분석과정 요약

1. **폐업/생존 정의**
   폐업년월 정보가 있으면 폐업
   폐업년월 정보가 없으면 폐업
2. **폐업 점포 구분**
   점포별 개업, 폐업정보 이용
3. **데이터 수집**
   서울시 상권 관련 데이터 수집&매핑
4. **모형 구축**
   폐업 위험 평점모형 개발
   위험 등급 산출
5. **정책 제안**
   폐업 위험지역 개선 정책

과제 수행 프로세스 5단계 요약

강서구 행정동 · 업종별 소상공인 폐업 위험 평점화 모형 & 5등급 체계 구축

1 강서구 소상공인 데이터

✓ **점포 폐업정보**
: 20~22년 개업년도

✓ 소상공인 금융비용,
유동인구, 관광활성화지수 등

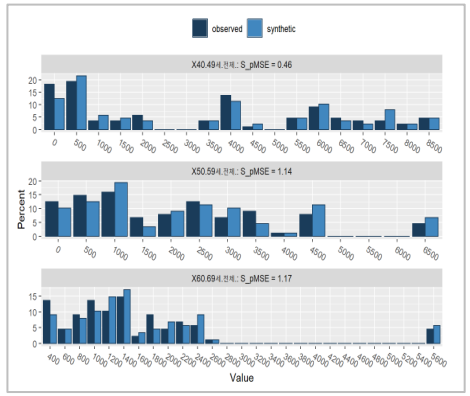
※ 폐업 위험지수 산출에 활용

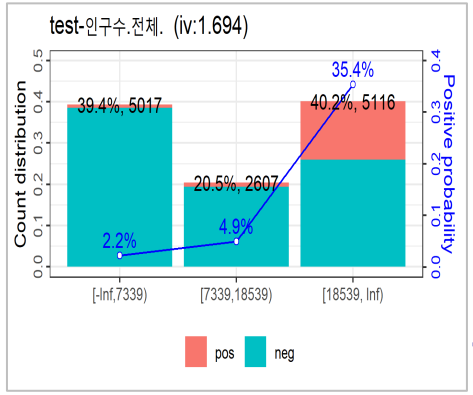
2 추가 변수 탐색

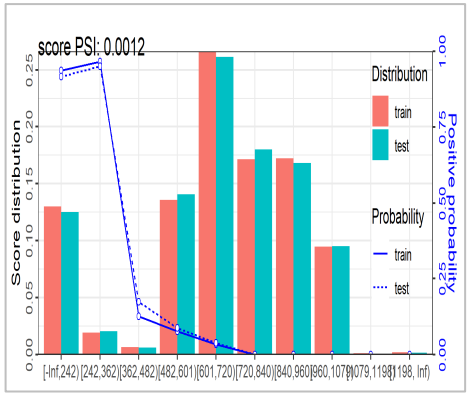
✓ **공공데이터 수집**

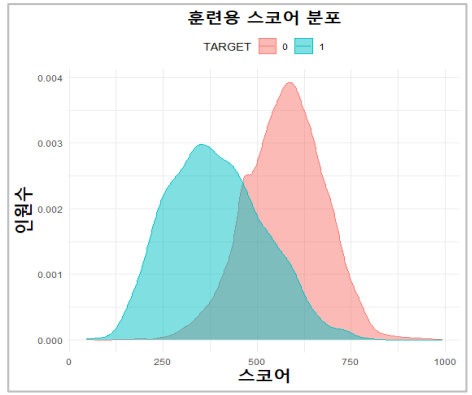
✓ **파생변수 생성 등**

3 폐업 위험평가 스코어카드 개발 (강서구)







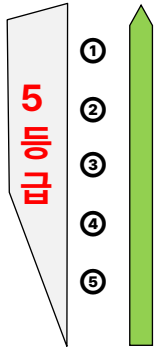


4 강서구 폐업 위험지역 예측모형

✓ **강서구 특화모형**

✓ 예측 확률에 따른
5등급 체계
(1~5)

※ 폐업위험률 파악 & 지역별 정책 결정

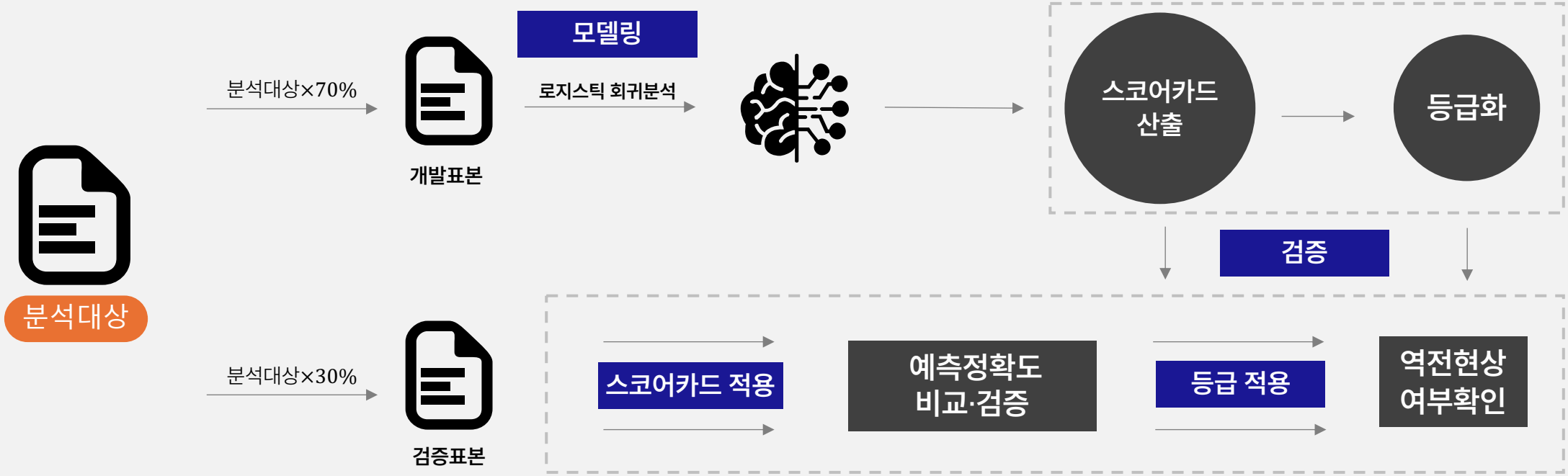


5 폐업 위험 5등급 계획

등급	건수	비위험지역	위험지역	폐업위험률
1등급	18,116	18,103	13	0.1%
2등급	14,764	14,678	86	0.6%
3등급	692	460	232	33.5%
4등급	26	9	17	65.4%
5등급	8	0	8	100.0%

강서구 지역별 폐업 위험 평점 모형 개발

- ✓ 개발표본을 스코어카드 모델링에 활용
- ✓ 검증표본에 스코어카드를 적용하여 성능검증 진행



구분	분석대상(강서구)			
	소계	폐업	생존	폐업률(%)
(A) 개발표본 (70%)	33,606	356	33,250	1.05%
(B) 검증표본 (30%)	14,403	153	14,250	1.06%
총계	48,009	509	47,500	1.07%