

# Smart Unmanned Store

## YOLO AI Abnormal Behavior Detection & Alert App

### Team A

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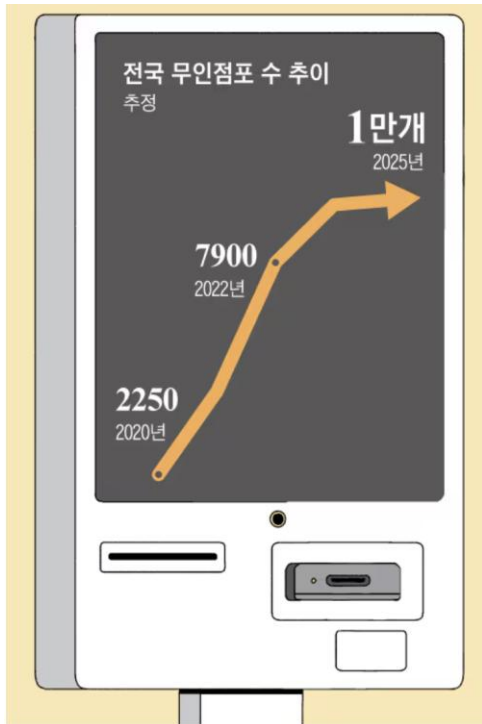
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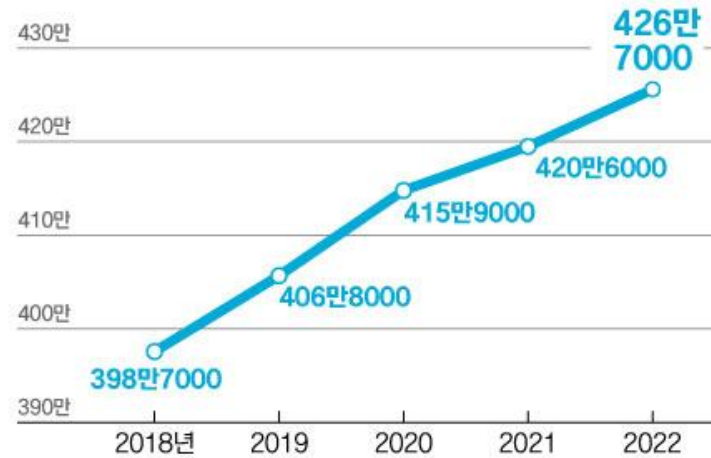
# I. Introduction

# Background



## ‘나홀로사장님’ 종업원 없는 자영업자 추이

단위: 명



자료: 통계청

The JoongAng

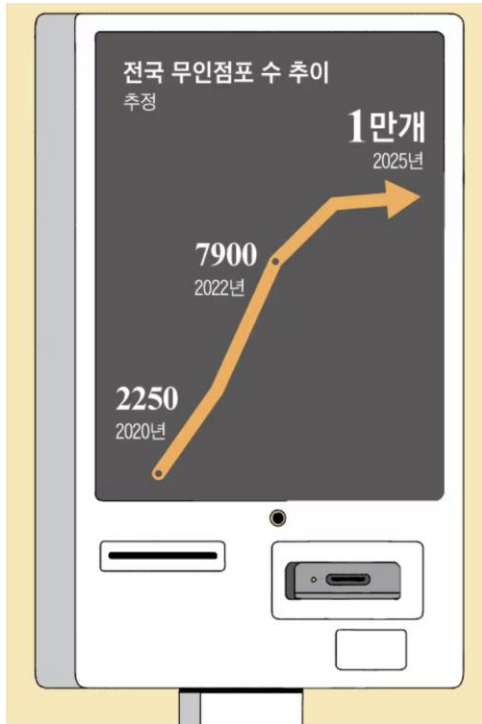
## Increasing Unmanned stores

- April 2025, unmanned stores exceeded 10,000

## Main Reasons for the surge:

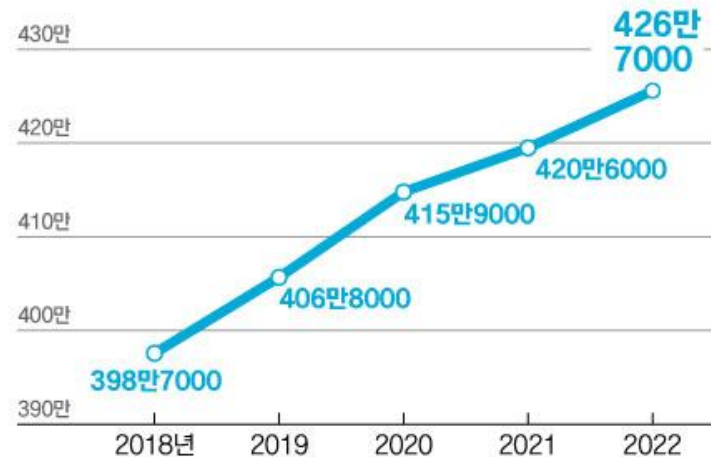
- Reduce labor costs
- Reduce initial investment costs

# Background



## ‘나홀로사장님’ 종업원 없는 자영업자 추이

단위: 명



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The JoongAng

### Increasing Unmanned stores

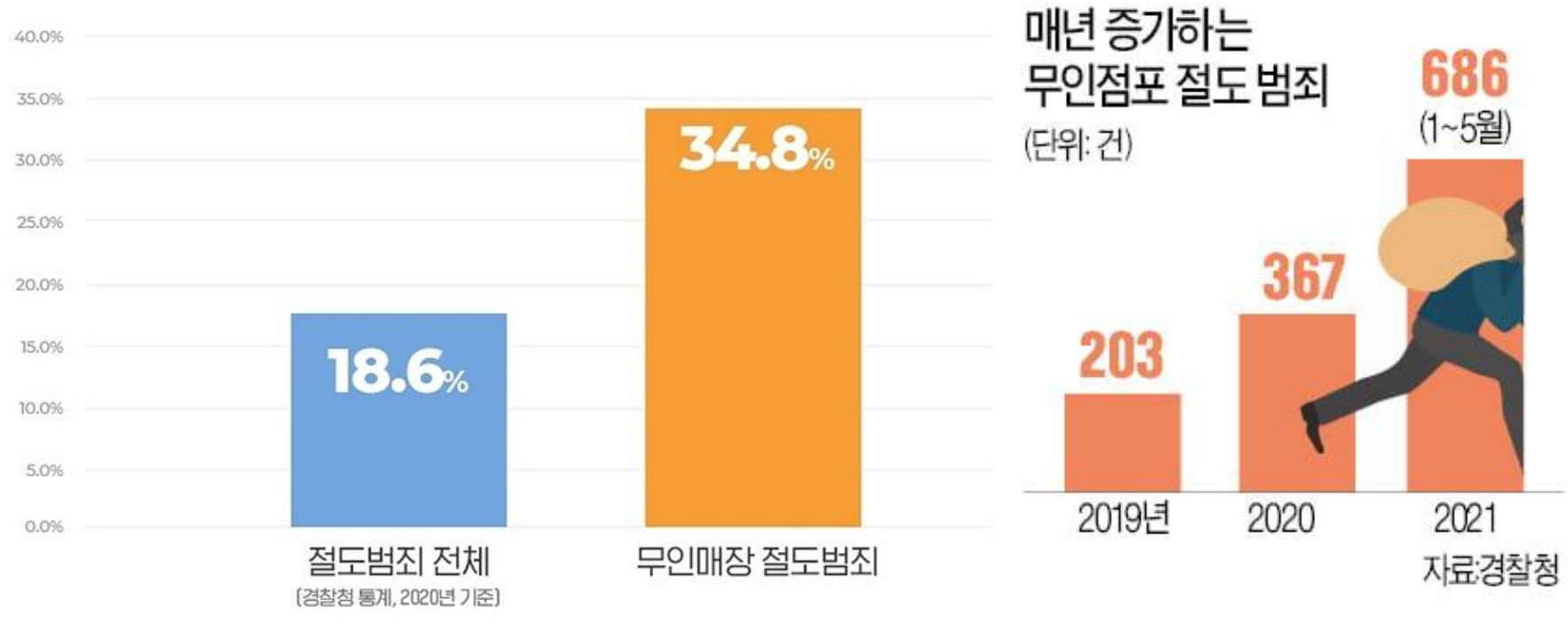
- April 2025, unmanned stores exceeded 10,000

### Main Reasons for the surge:

- Reduce labor costs
- Reduce initial investment costs

However, due to the lack of permanent staff,  
**serious side effects occur** and **exposure to crime occurs**

# Problem Definition



CCTV installed in unmanned stores is not effective in preventing crime, and **the crime rate is increasing every year.**

# How to solve Problem

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## **1. Abnormal Behavior Detection and Notification**

- Continuous monitoring is not possible
- Instant notification when abnormal behavior is detected

## **2. Automatically save evidence**

- Viewing only sections with detected abnormal behavior

## **3. Increased remote management efficiency**

- Remote management without needing to be physically present at the store

# Expected Effects

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## **1. Crime prevention and damage minimization**

- crime prevention and immediate response through real-time notifications

## **2. Improve operational efficiency**

- identify risk situations without 24 hour store monitoring

## **3. Creating a safe store environment**

- preventing major accidents with notifications to create a safe environment

## **4. Contribute to solving social problems**

- providing practical solutions to crimes related to unmanned stores



## II. Main Body

# Development Tools

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- **UX/UI:** Figma
- **Front:** Flutter
- **Backend:** Python, Fast API, Unicorn
- **Database:** SQLite
- **YOLO:** Python, YOLO v8
- **Collaboration Tools:** Github, Notion

# YOLO Design

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**Train Dataset**



# YOLO Design

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## Train Dataset

Dataset	Contents
Indoor (convenience store, store) purchasing behavior data	training data for normal store activity patterns
Indoor (convenience store, store) human abnormal behavior data	Trained to detect in store abnormal behavior using the Yolo model

# YOLO Design

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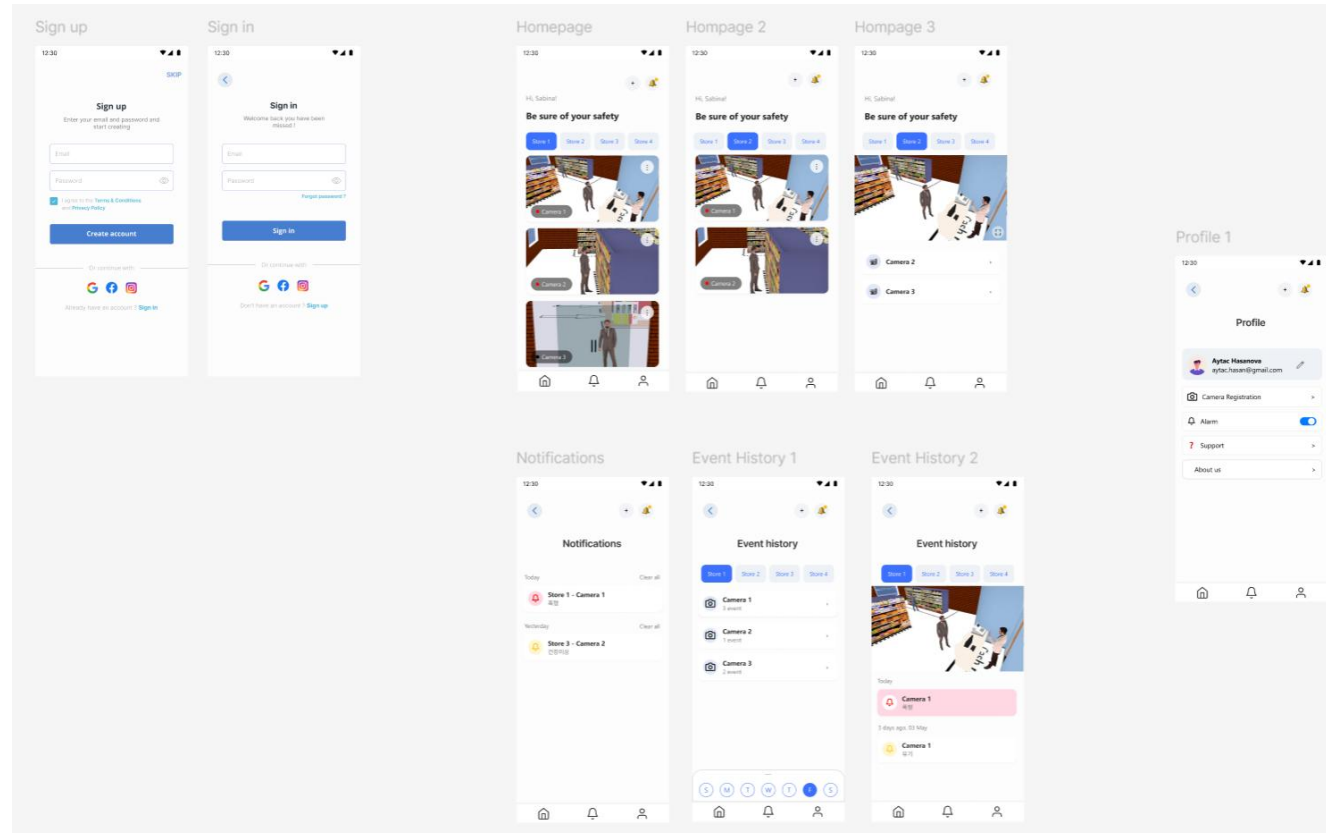
## Model



# Application Design

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## UX/UI Design



# Application Design

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## Database

user	
PK	<u>id</u>
	email
	username
	password_hash

store	
PK	<u>id</u>
	user_id
	name
	location

camera	
PK	<u>id</u>
	user_id
	store_id
	name
	video_url
	image_url

event_type	
PK	<u>id</u>
	type
	risk_level

events	
PK	<u>id</u>
	user_id
	store_id
	camera_id
	event_type_id
	event_time
	video_url

# Environment Setup

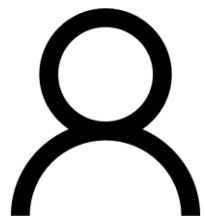
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YOLO



Front-End

Back-End



Flutter



FastAPI



SQLite



# III. Conclusion

# YOLO Model

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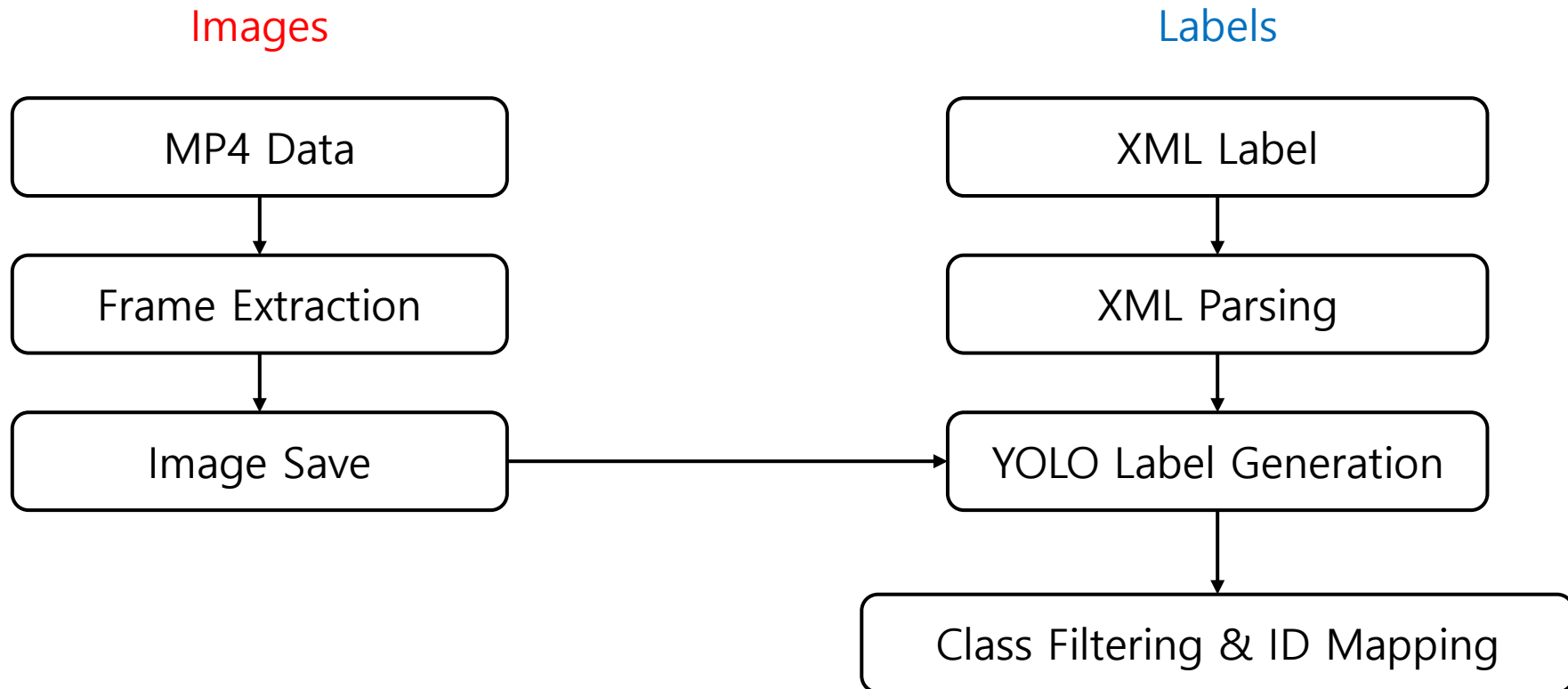
## Train Data

Dataset	Classes	size
Indoor (convenience store, store) purchasing behavior data	Fall, Smoking, Theft, Fight	Train: 5,322 Val: 658
Indoor (convenience store, store) human abnormal behavior data	Moving, Selecting, Purchasing	Train: 35,119 Val: 4,267

# YOLO Model

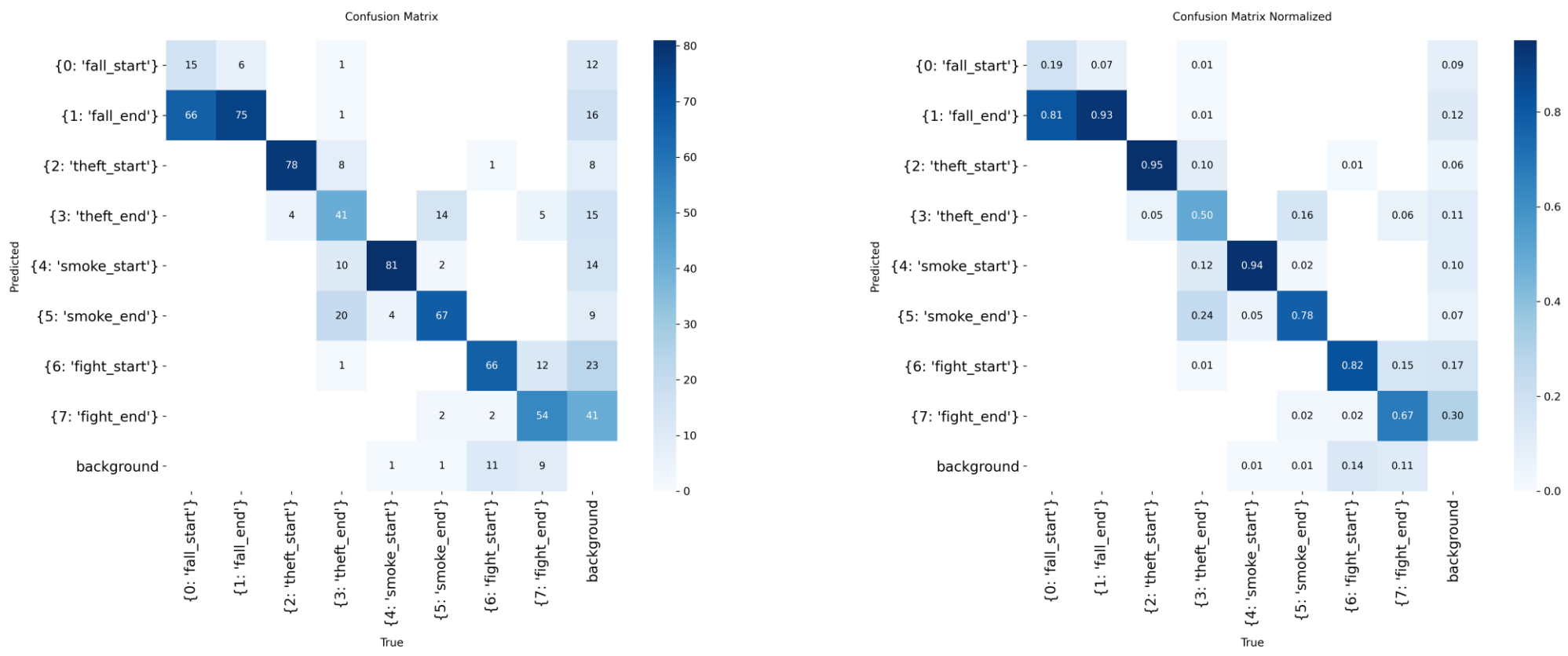
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## Data Preprocessing



# YOLO Model

## Model Performance



# Application – Sign Up

Sign Up Flow

localhost:59580/#/signup

Sign up

Enter your email and password and start creating

Username

Email

Password

☐ I agree to the [Terms & Conditions](#) and [Privacy Policy](#)

Create account

Or continue with

G

A

F

Already have an account? [Sign in](#)

Sign Up Flow

localhost:59580/#/sig...

Sign up

Enter your email and password and start creating

Username

Email

Password

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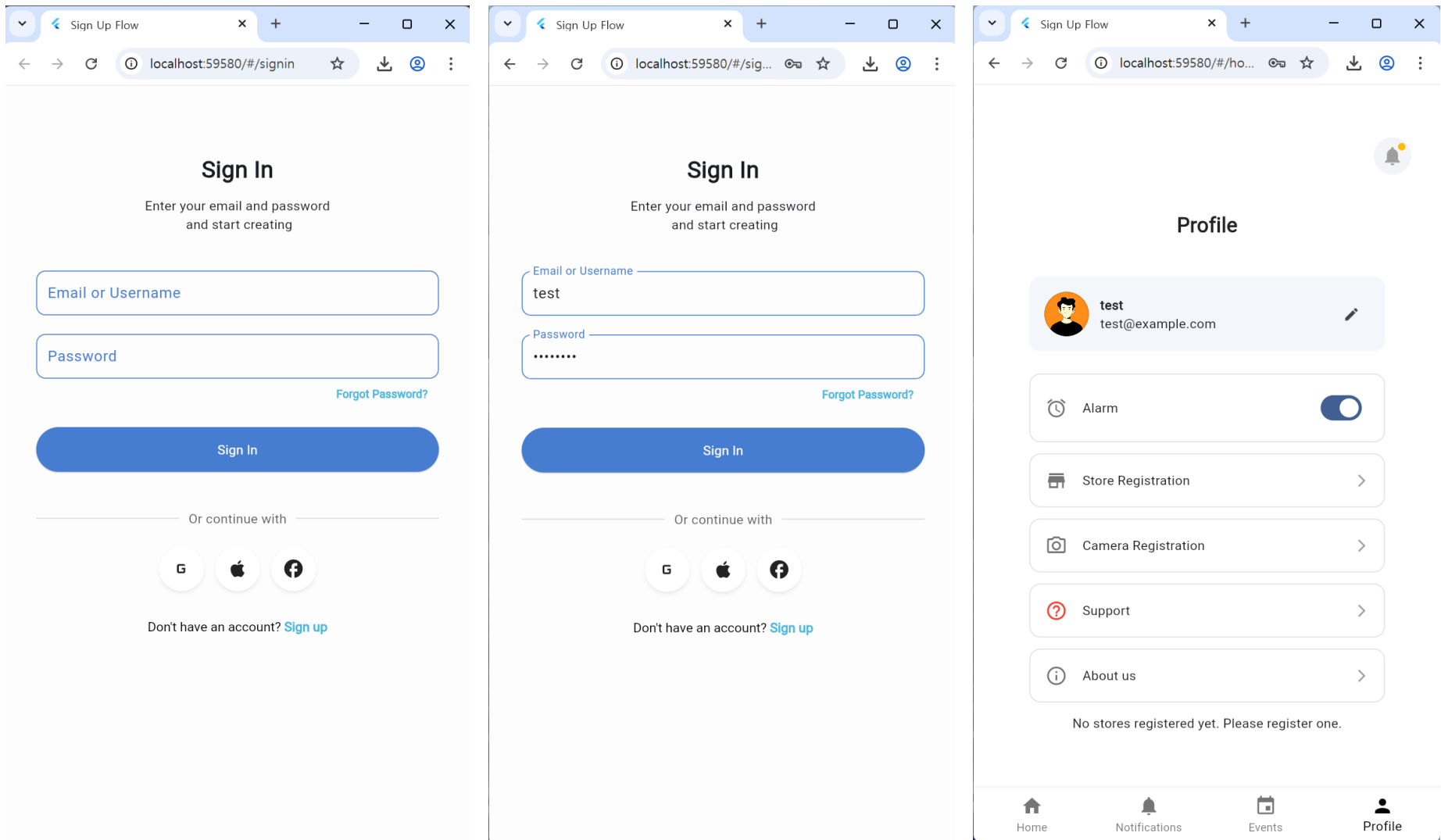
A

F

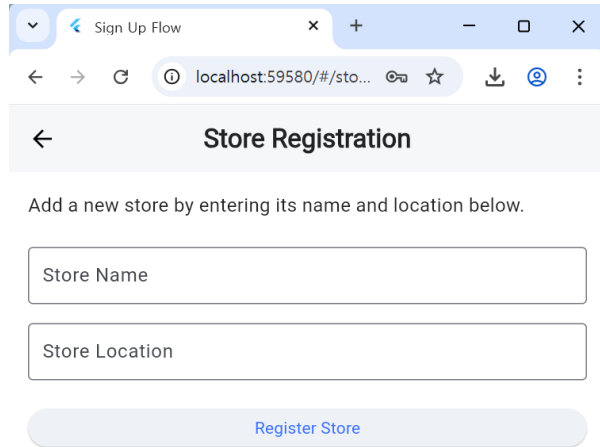
Already have an account? [Sign in](#)

Account created successfully! Please sign in.

# Application – Sign In, Profile



# Application – Store Registration



Sign Up Flow

localhost:59580/#/sto...

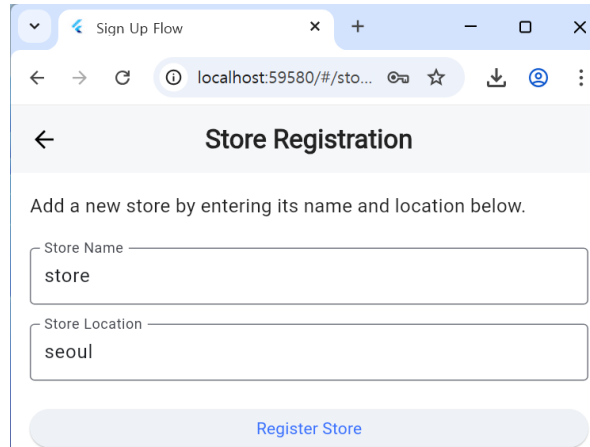
## Store Registration

Add a new store by entering its name and location below.

Store Name

Store Location

Register Store



Sign Up Flow

localhost:59580/#/sto...

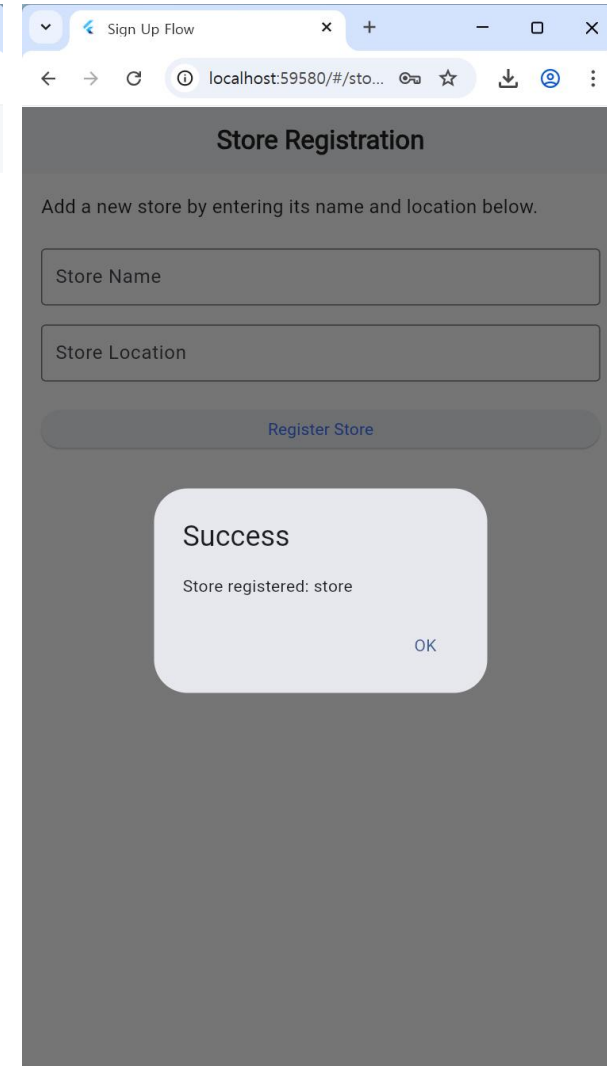
## Store Registration

Add a new store by entering its name and location below.

Store Name  
store

Store Location  
seoul

Register Store



Sign Up Flow

localhost:59580/#/sto...

## Store Registration

Add a new store by entering its name and location below.

Store Name

Store Location

Register Store

### Success

Store registered: store

OK

# Application – Camera Registration

The image displays three sequential browser screenshots of a web application titled "Camera Registration". Each screenshot shows a browser window with the address bar at "localhost:59580/#/camera...".

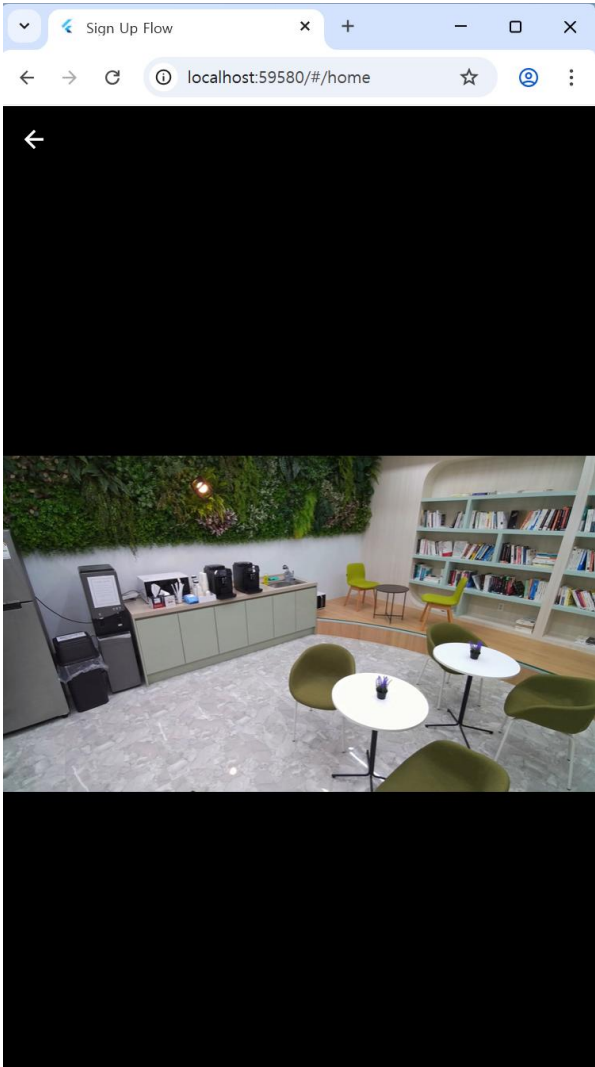
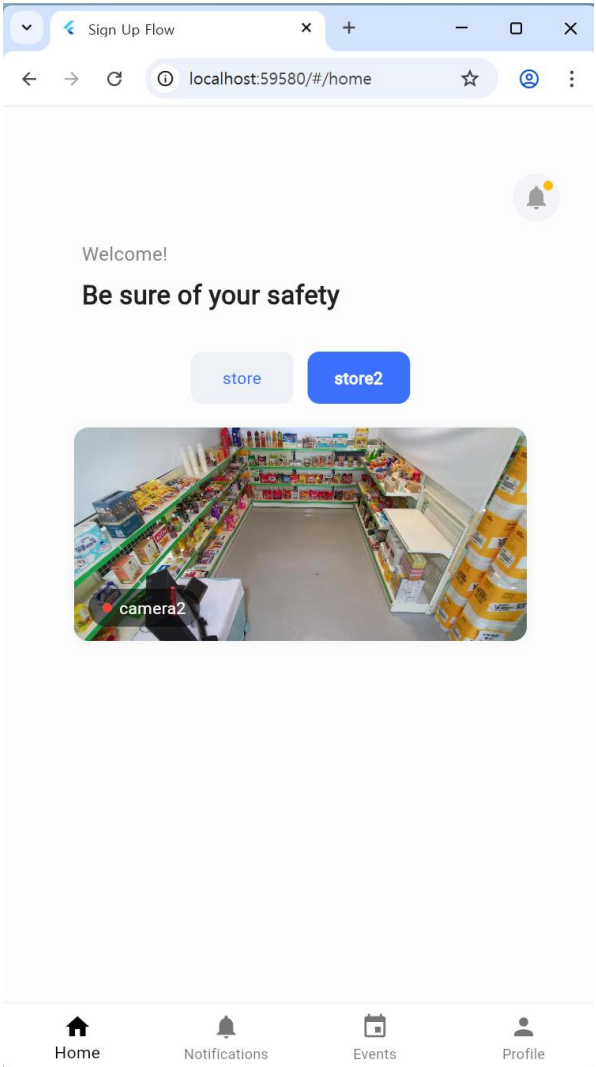
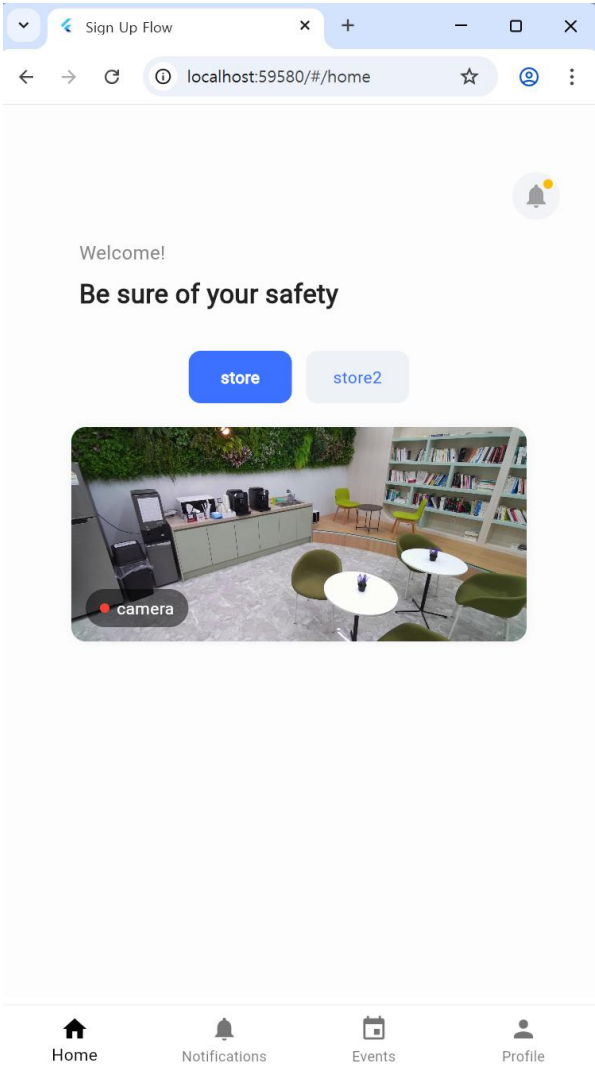
**First Screenshot (Initial Form):** The page has a back arrow and the title "Camera Registration". It contains three input fields: "Select Store" (a dropdown menu with "store" selected), "Camera Name" (an empty text box), and "Camera URL" (an empty text box). At the bottom is a blue button labeled "Register Camera".

**Second Screenshot (Filled Form):** The form is now filled with data: "store" in the dropdown, "camera" in the "Camera Name" field, and "./test\_data/theft" in the "Camera URL" field. The "Register Camera" button remains at the bottom.

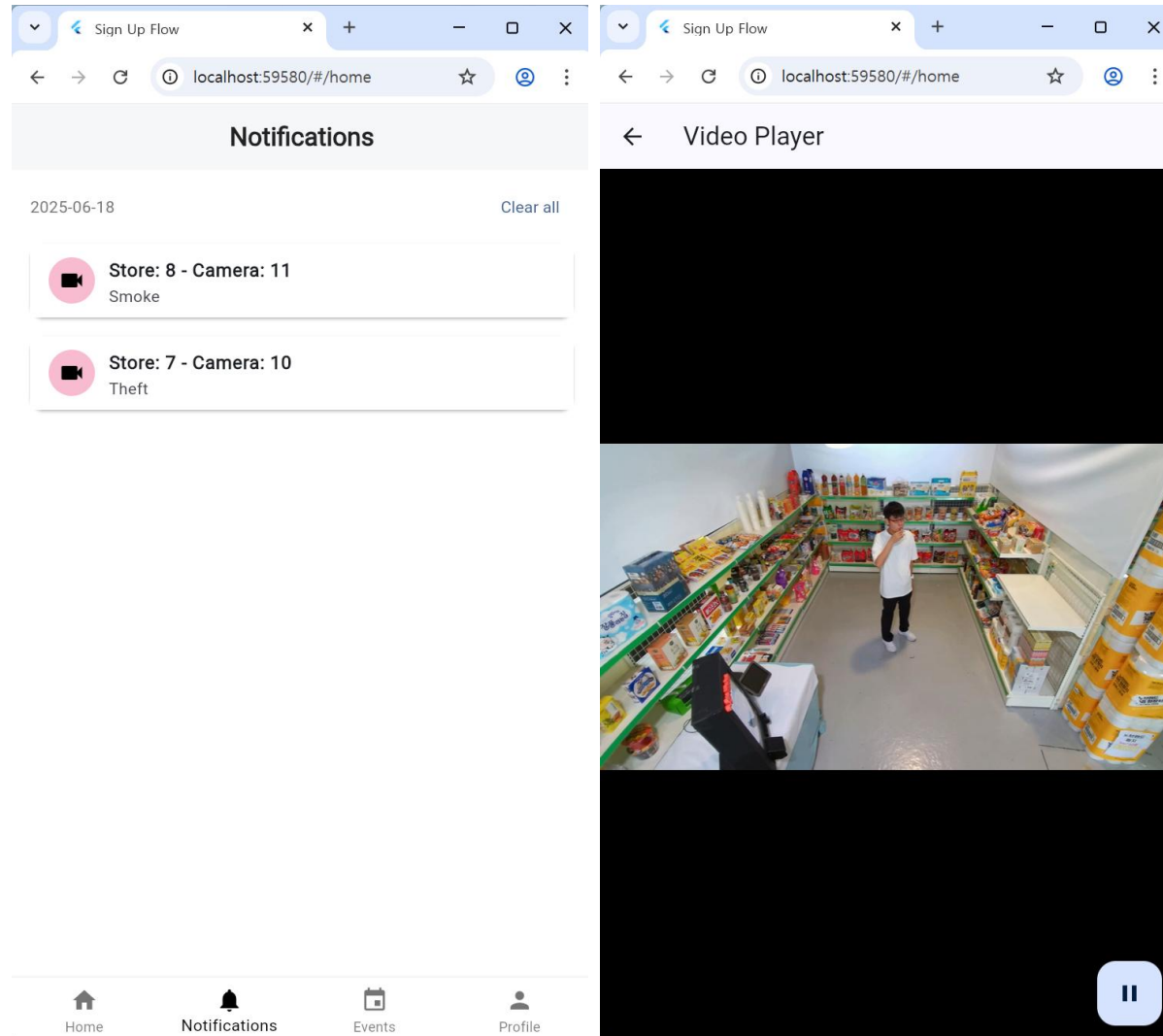
**Third Screenshot (Success Confirmation):** The form fields are dimmed, and a light blue modal box is centered on the screen. The modal has the title "Camera Registered" and displays the following information: "Name: camera", "Video URL: ./test\_data/theft.mp4", and "Image URL: ./test\_data/theft.jpg". An "OK" button is located at the bottom right of the modal.



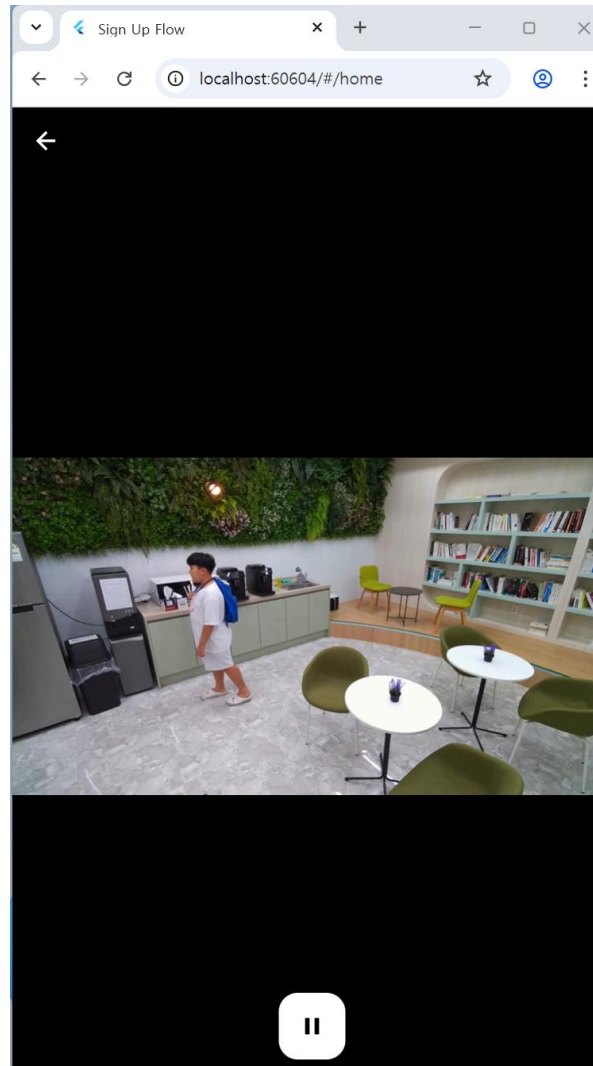
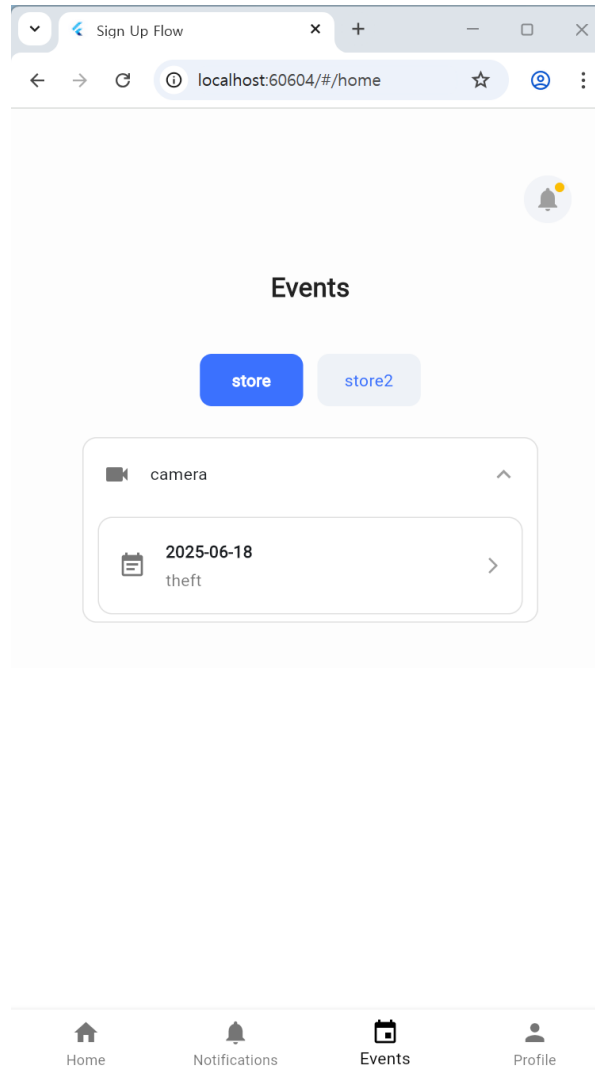
# Application - Home



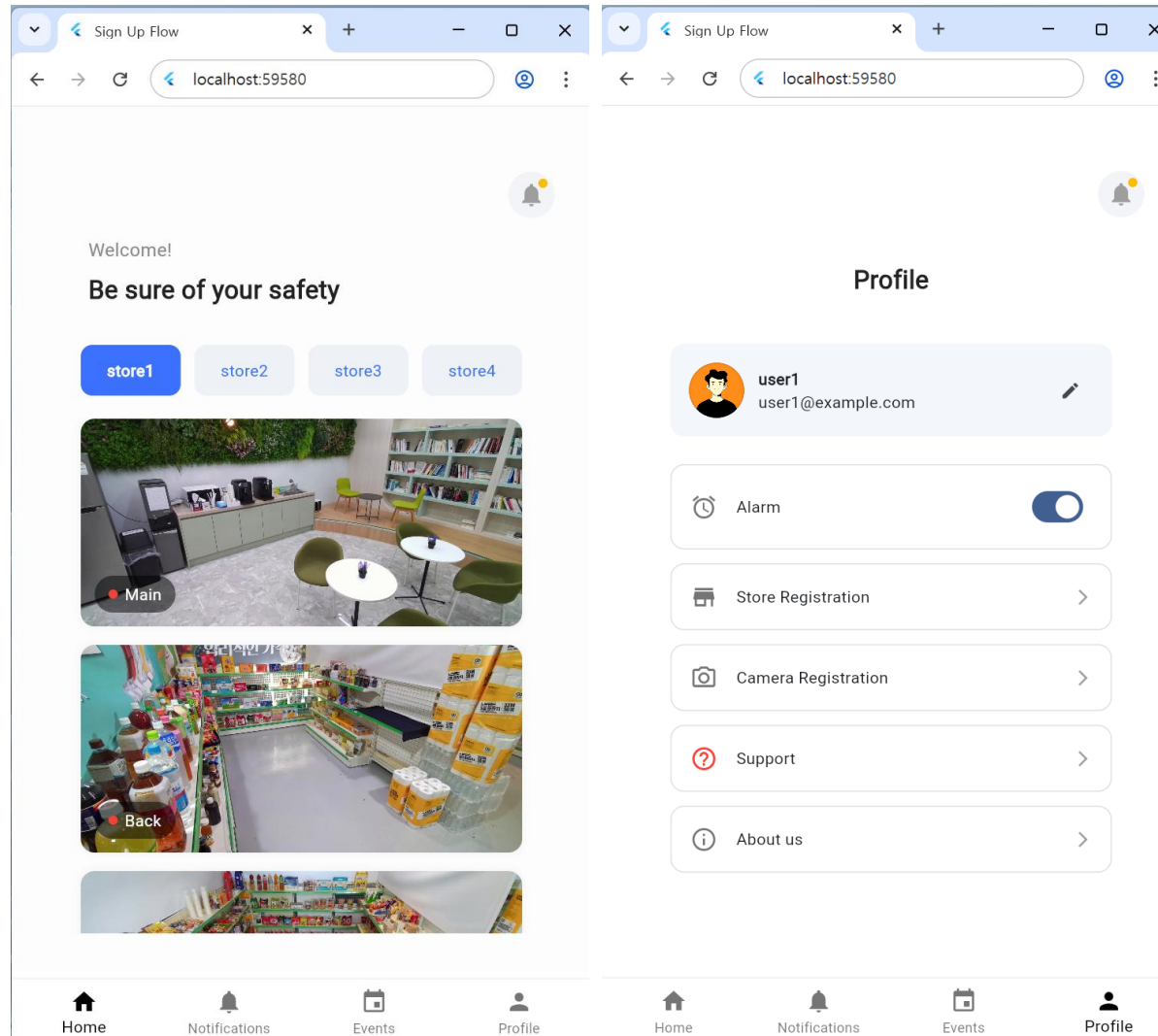
# Application - Notifications



# Application - Events



# Application – Users



**Thank you**