# Smart Unmanned Store

## YOLO AI Abnormal Behavior Detection & Alert App


**Team A**

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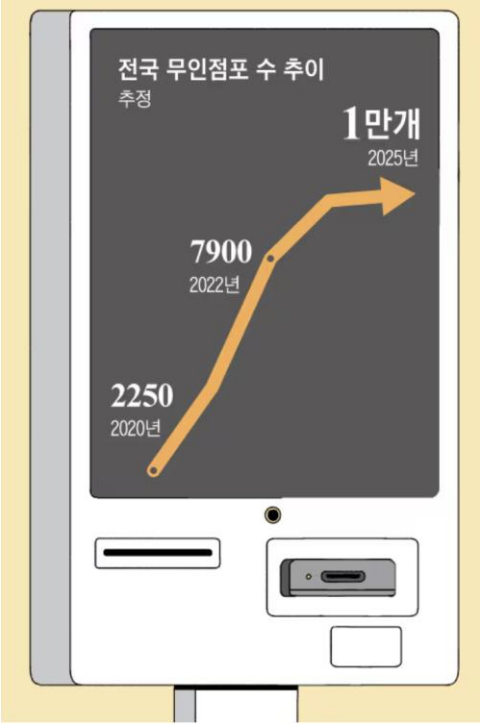
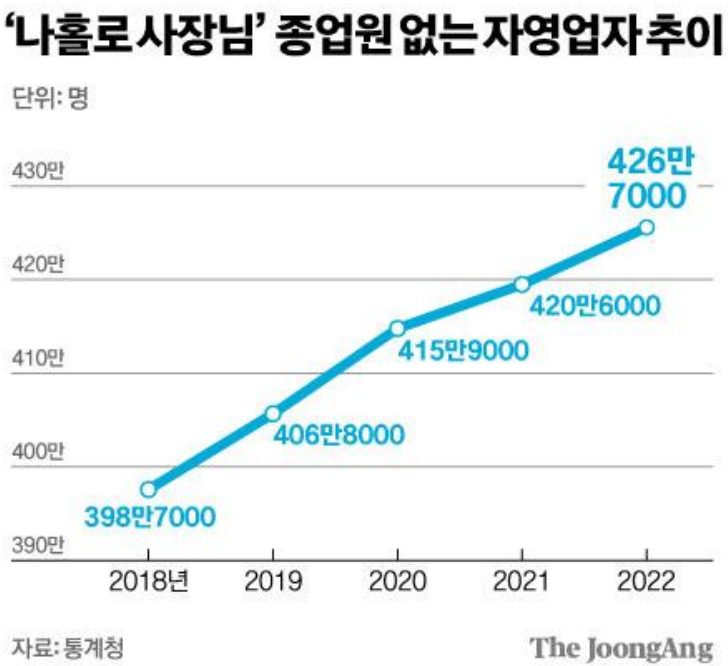
# I. Introduction

# Background



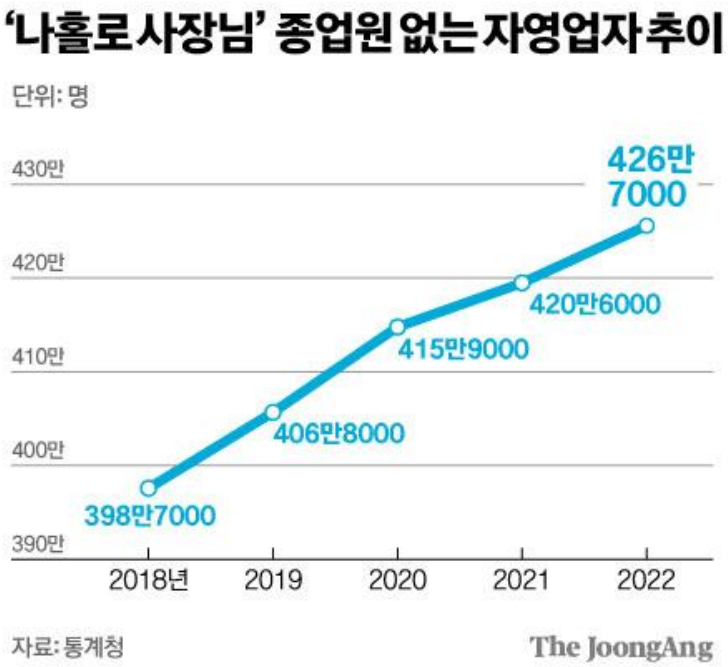

**Increasing Unmanned stores**

- April 2025, unmanned stores exceeded 10,000

**Main Reasons for the surge:**

- Reduce labor costs
- Reduce initial investment costs

# Background


**Increasing Unmanned stores**

- April 2025, unmanned stores exceeded 10,000

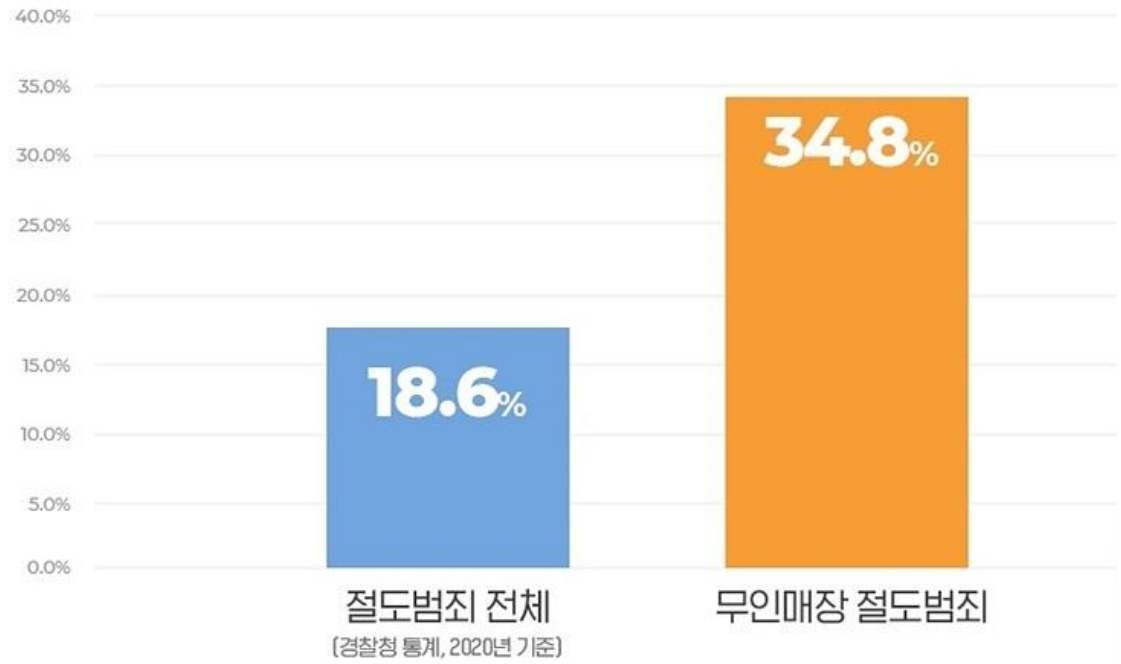
**Main Reasons for the surge:**

- 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

**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

**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





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

# YOLO Design

## Train Dataset

# YOLO Design

## Train Dataset

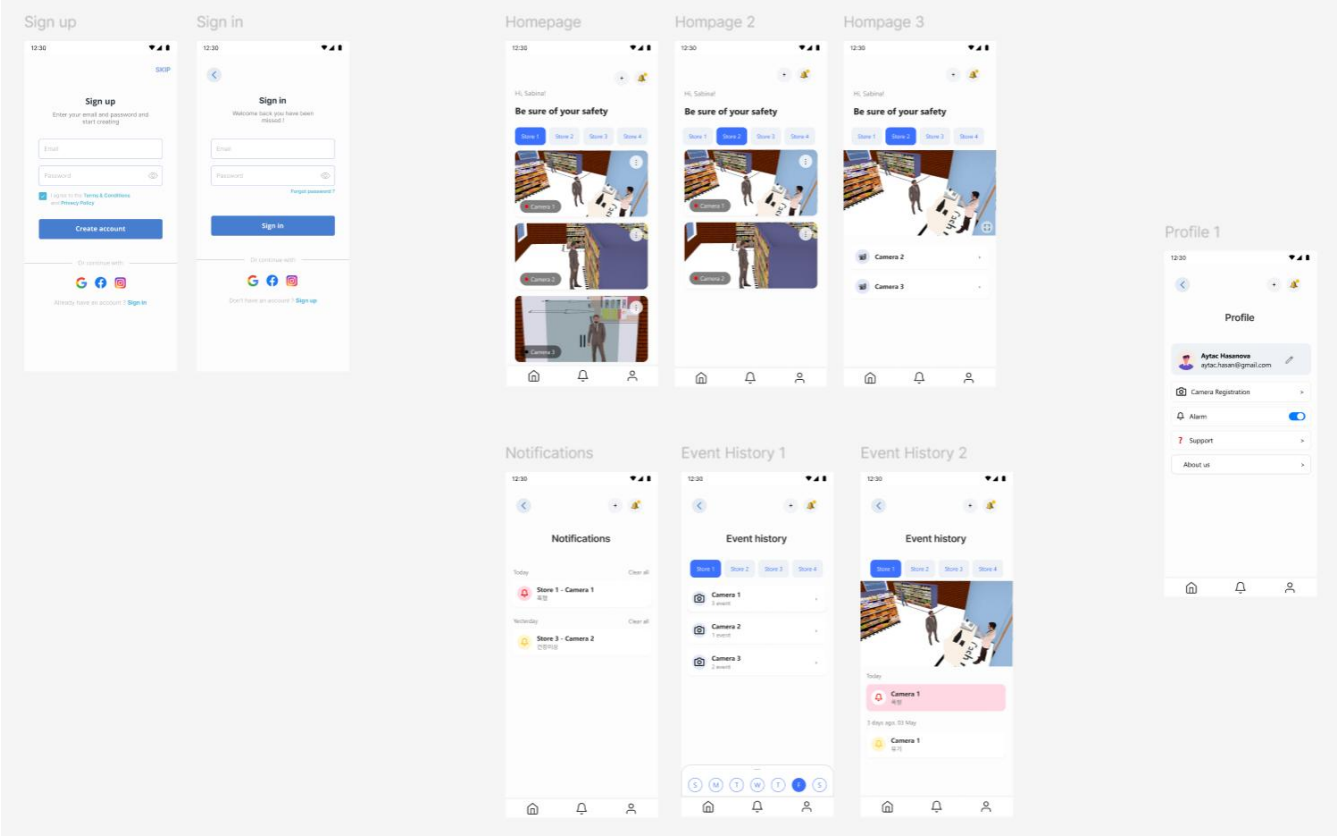
| Dataset | Contents |
| --- | --- |
| Indoor (convenience store, store) purchasing behavior data | training data for normal store activity patterns |
| Indoor (convenience store, store) human abnormal behavior data | Trained to detect in store abnormal behavior using the Yolo model |

# YOLO Design

## Model

# Application Design

## UX/UI Design



# Application Design

## Database

| user | |
|---|---|
| PK | id |
| | email |
| | username |
| | password_hash |

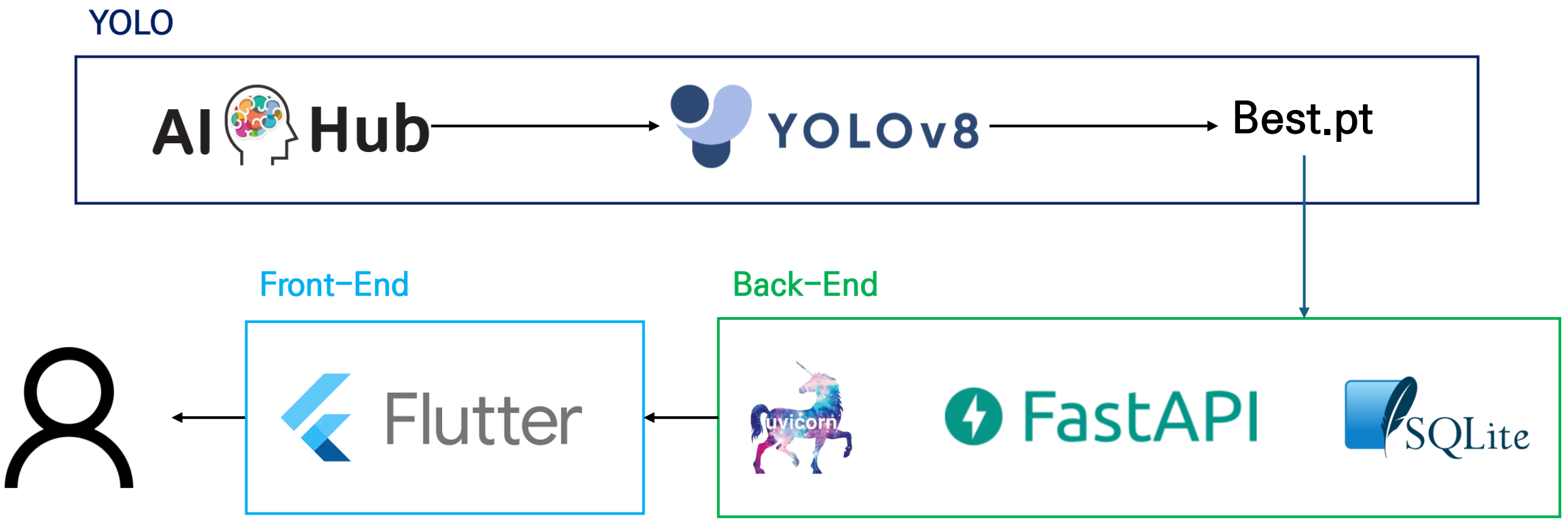
| store | |
|---|---|
| PK | id |
| | user_id |
| | name |
| | location |

| camera | |
|---|---|
| PK | id |
| | user_id |
| | store_id |
| | name |
| | video_url |
| | image_url |

| event_type | |
|---|---|
| PK | id |
| | type |
| | risk_level |

| events | |
|---|---|
| PK | id |
| | user_id |
| | store_id |
| | camera_id |
| | event_type_id |
| | event_time |
| | video_url |

# Environment Setup



# III. Conclusion

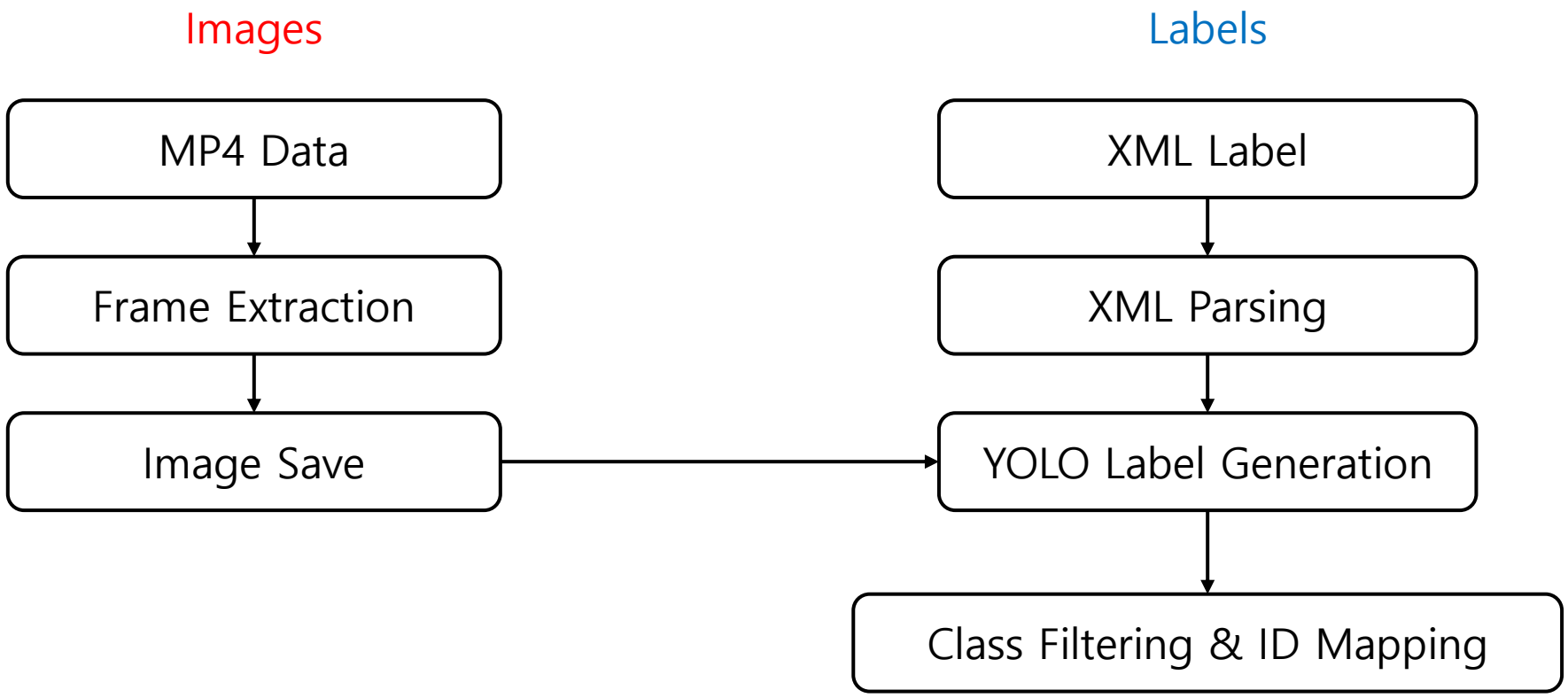
# YOLO Model

## Train Data

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

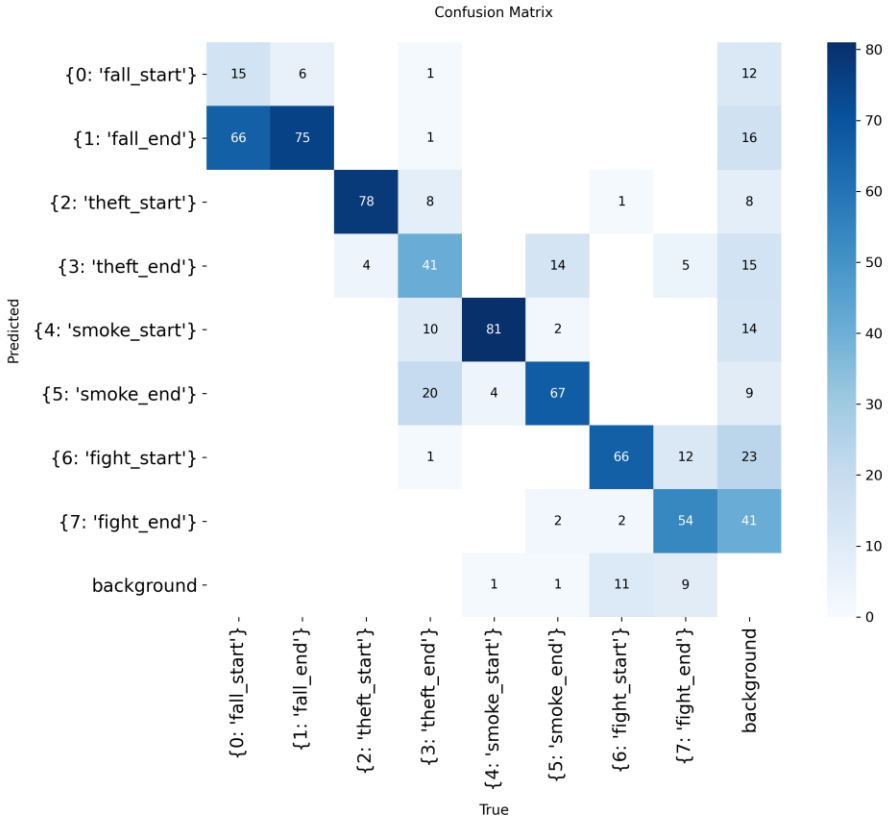
# YOLO Model

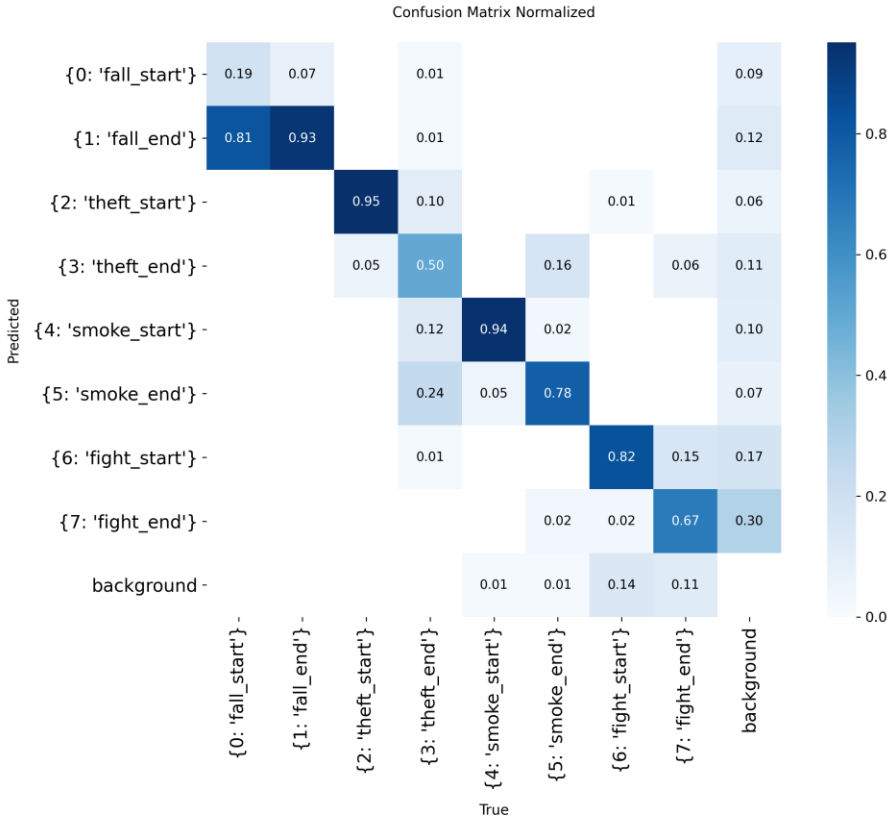
## Data Preprocessing



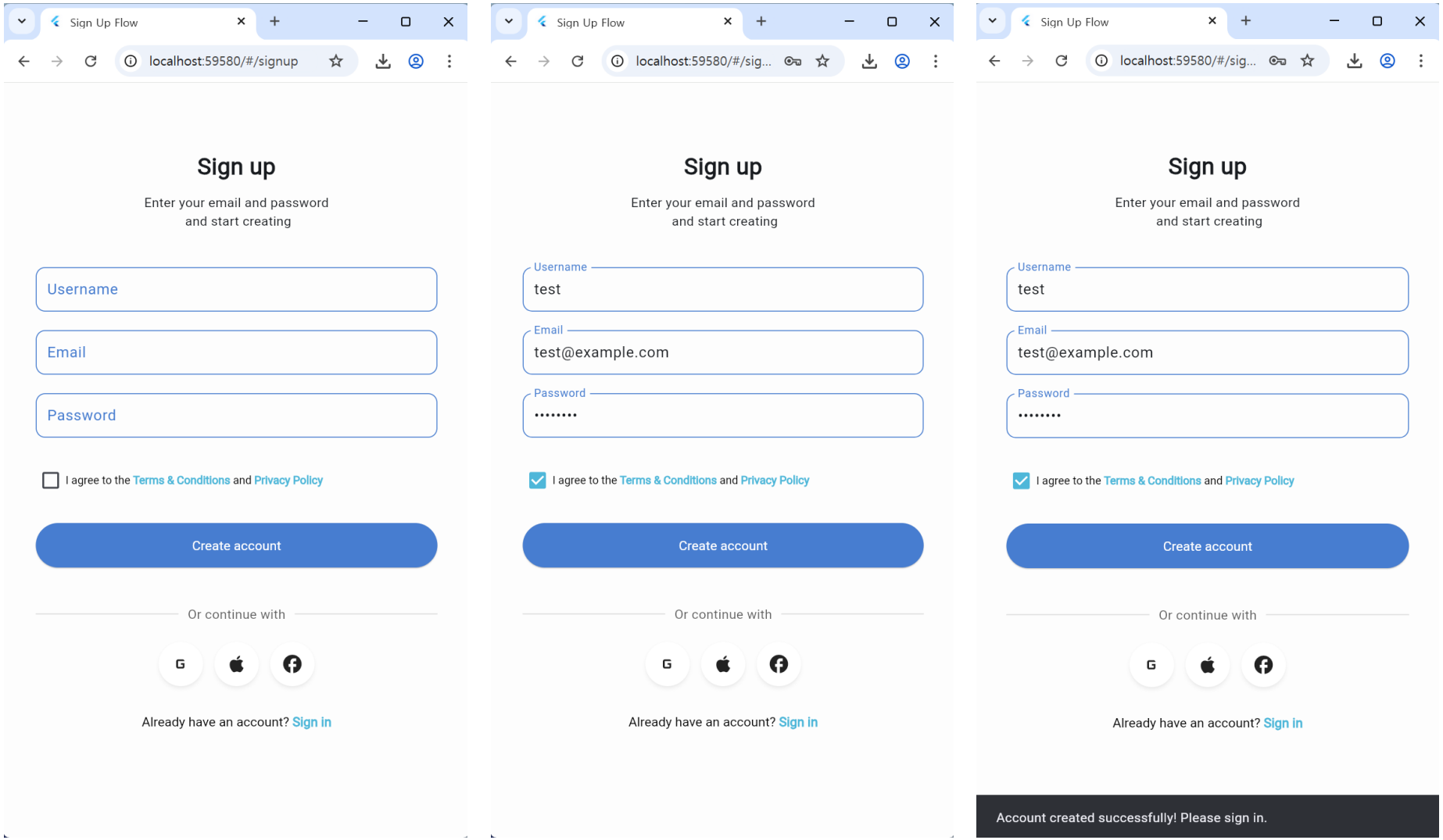
# YOLO Model

## Model Performance

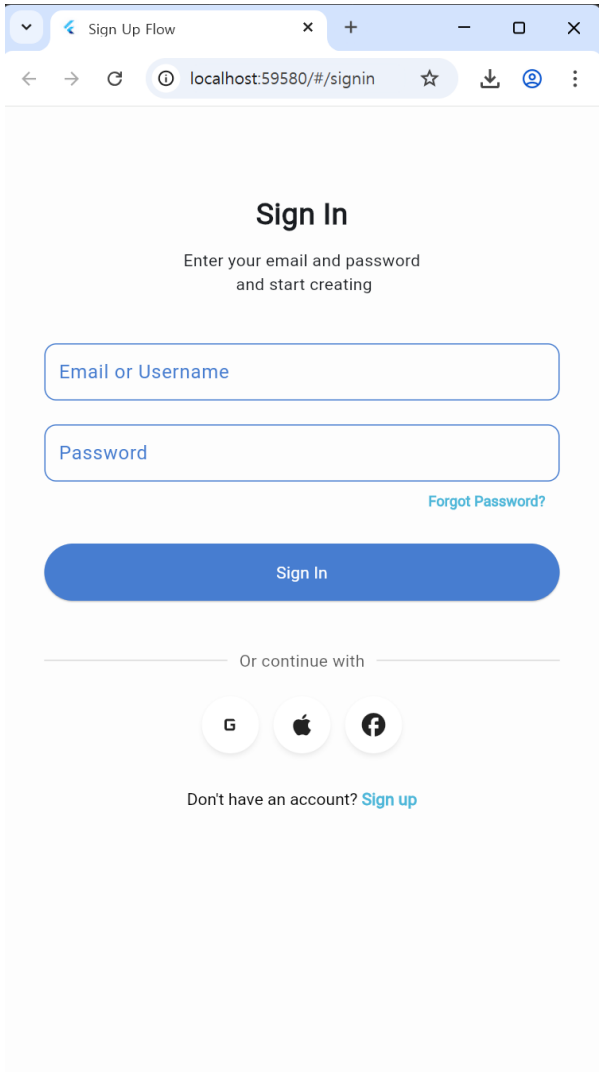


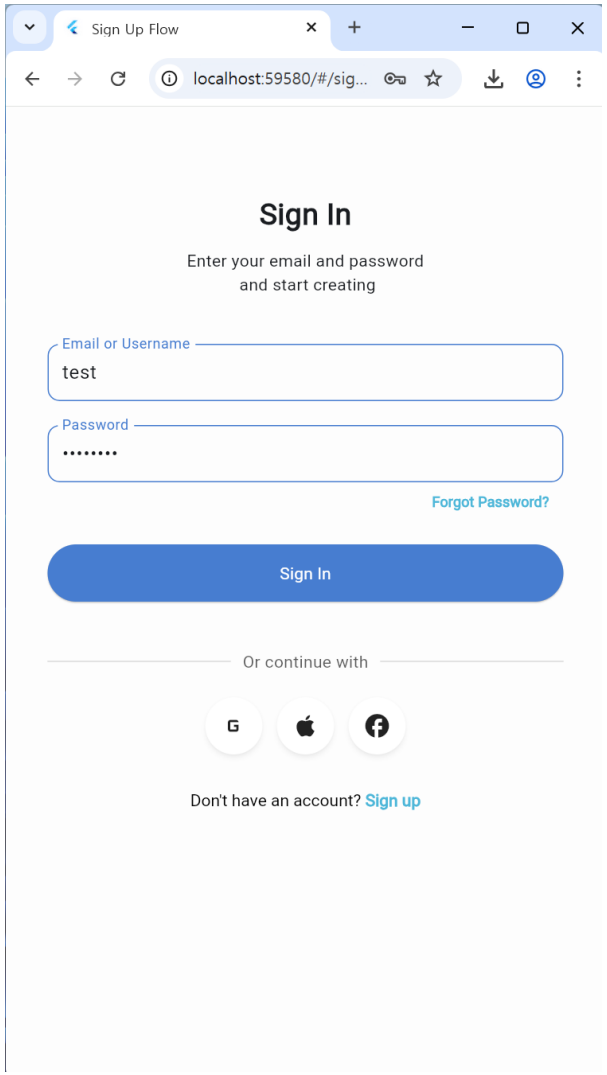



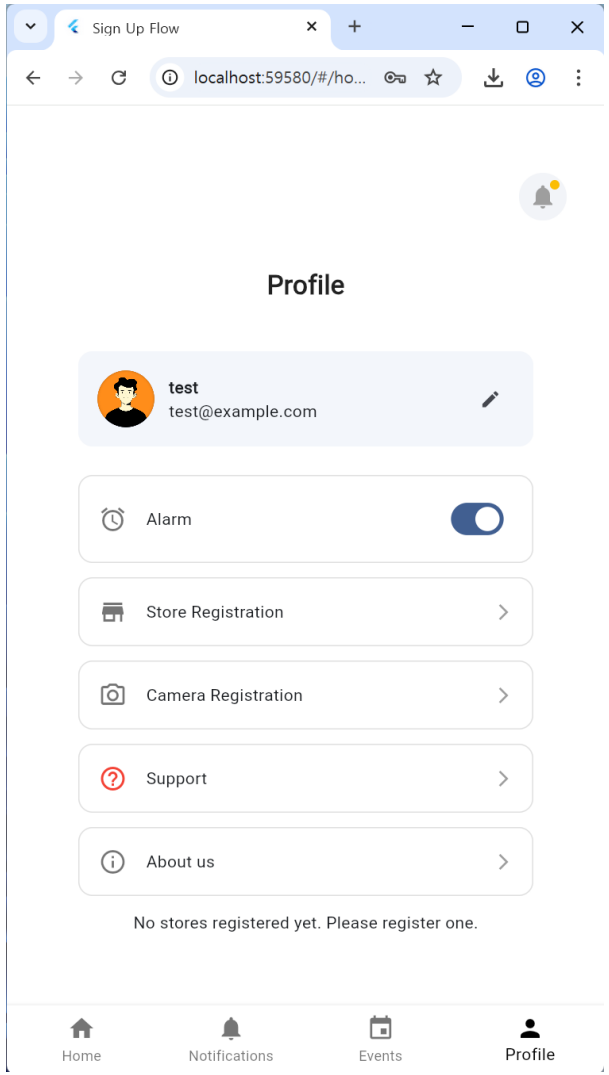
# Application – Sign Up



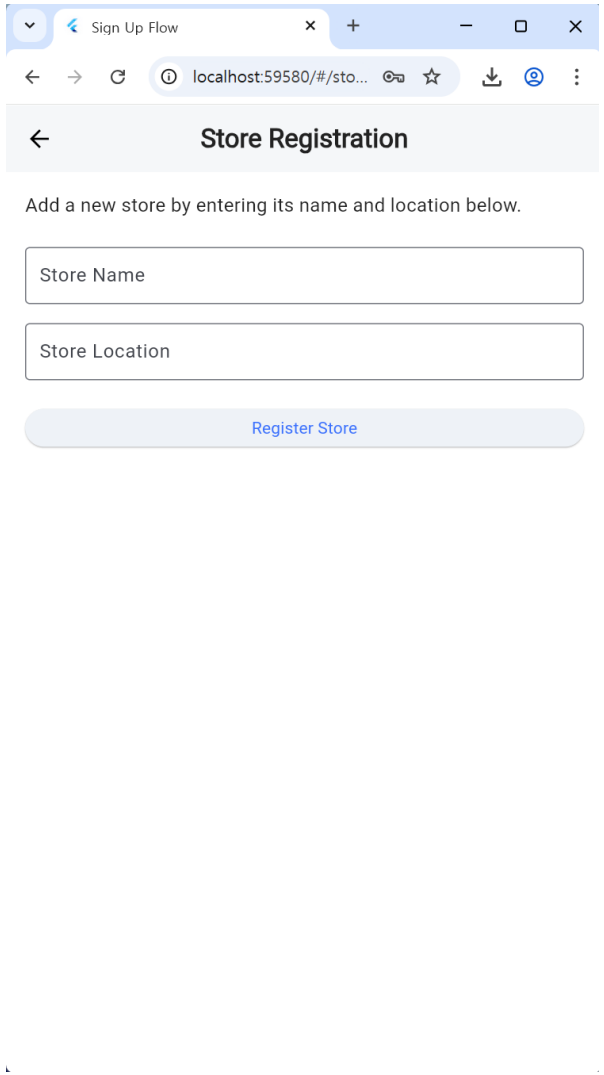
# Application – Sign In, Profile

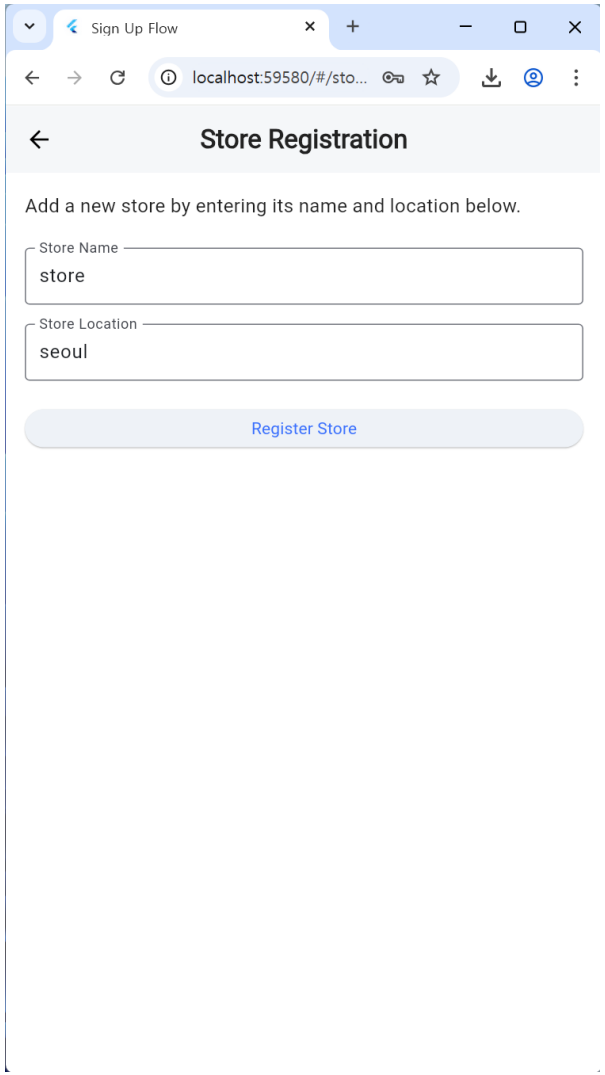


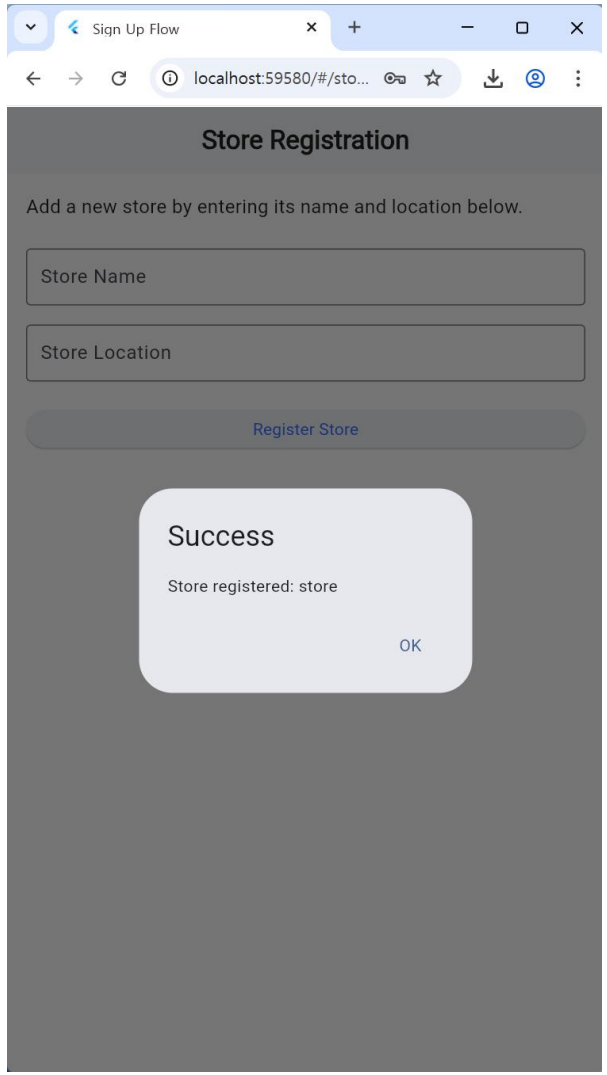



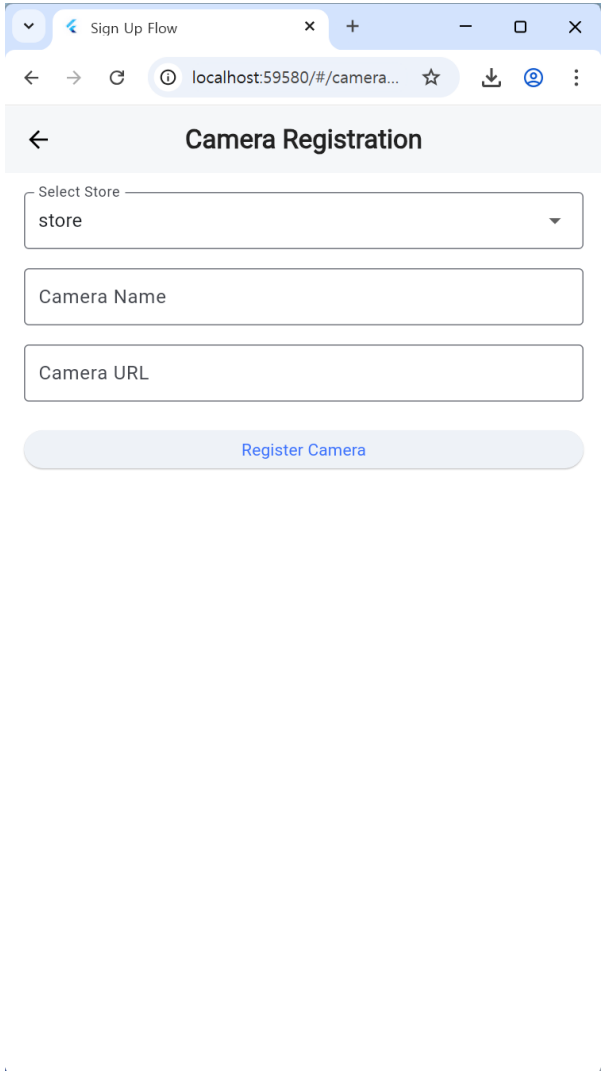
# Application – Store Registration

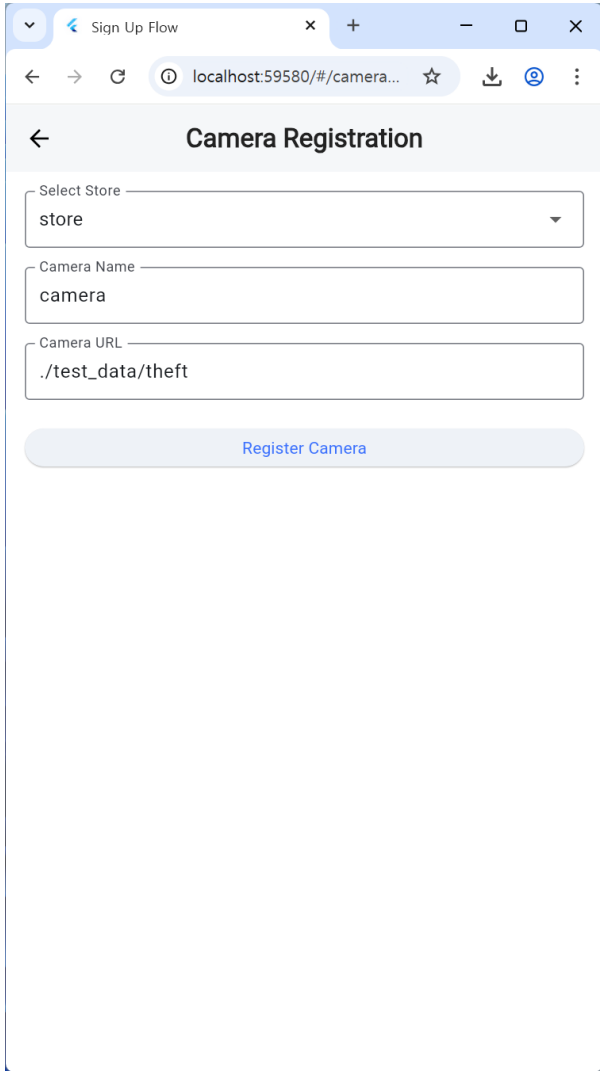


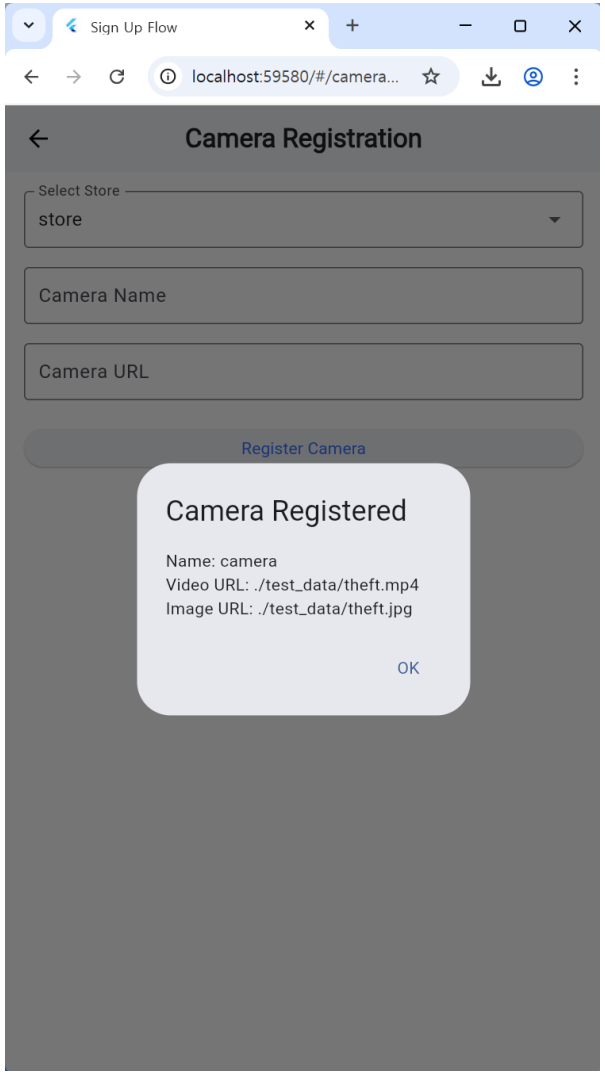



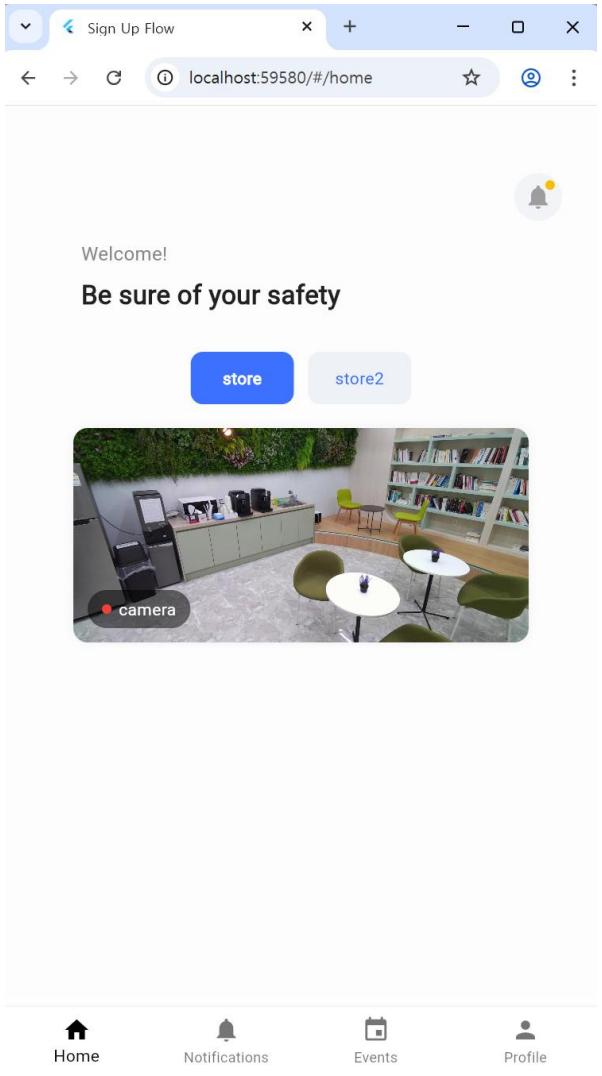
# Application – Camera Registration

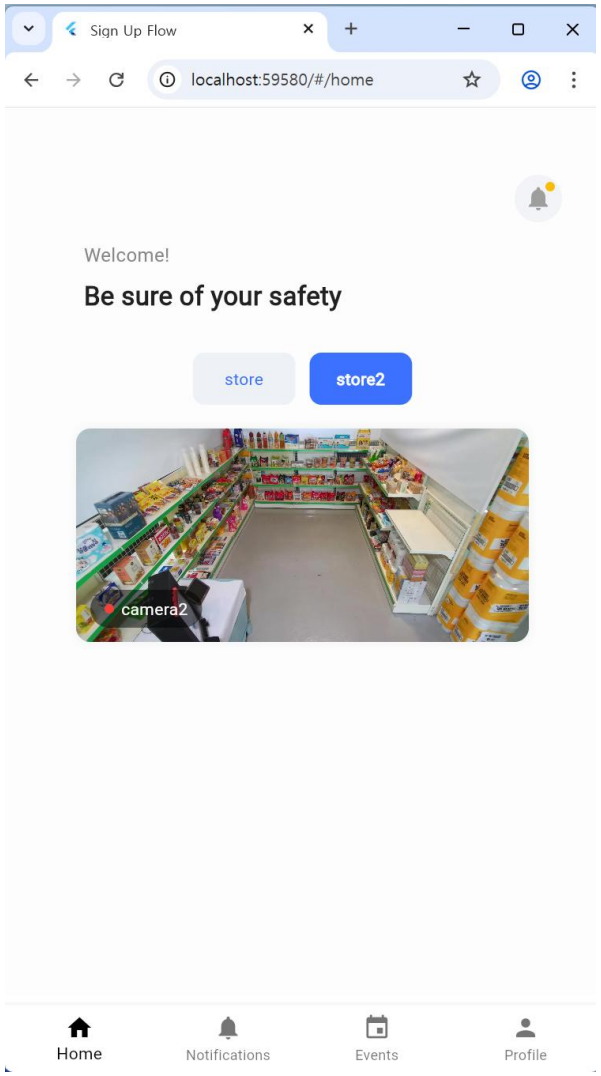


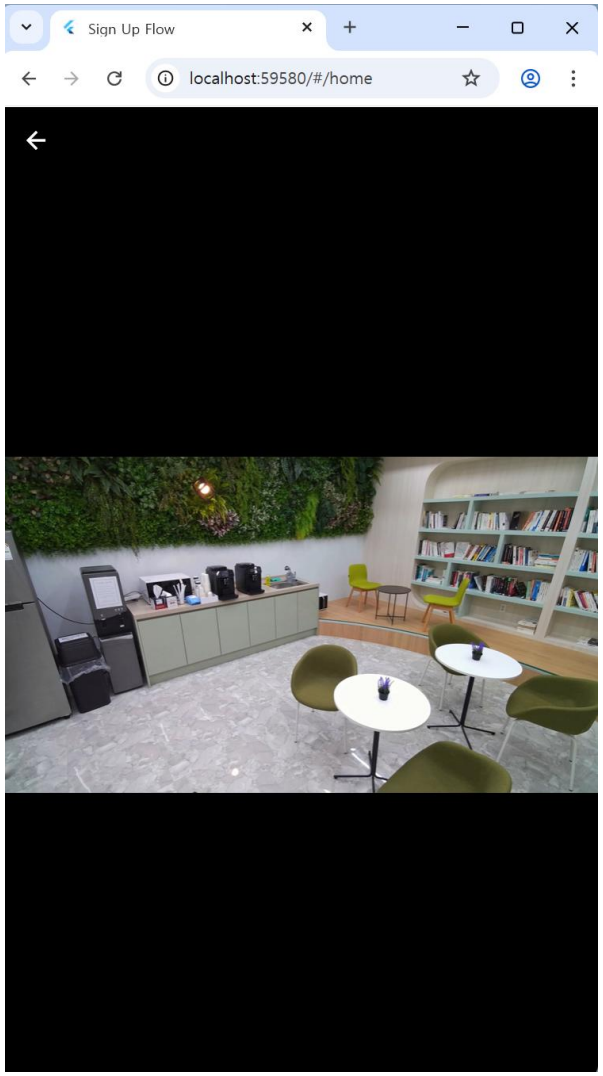



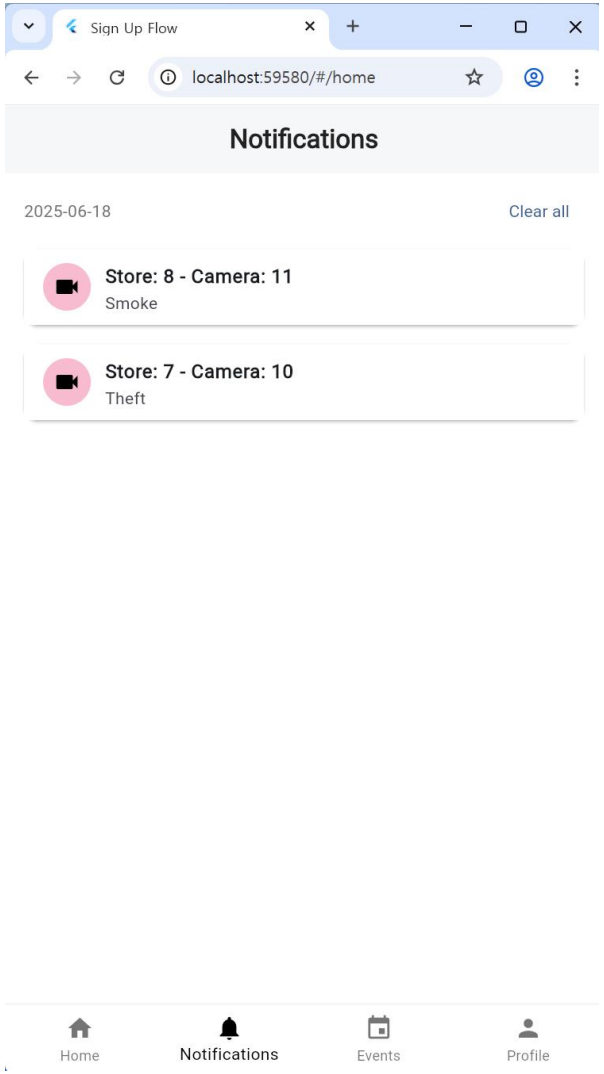
# Application - Home

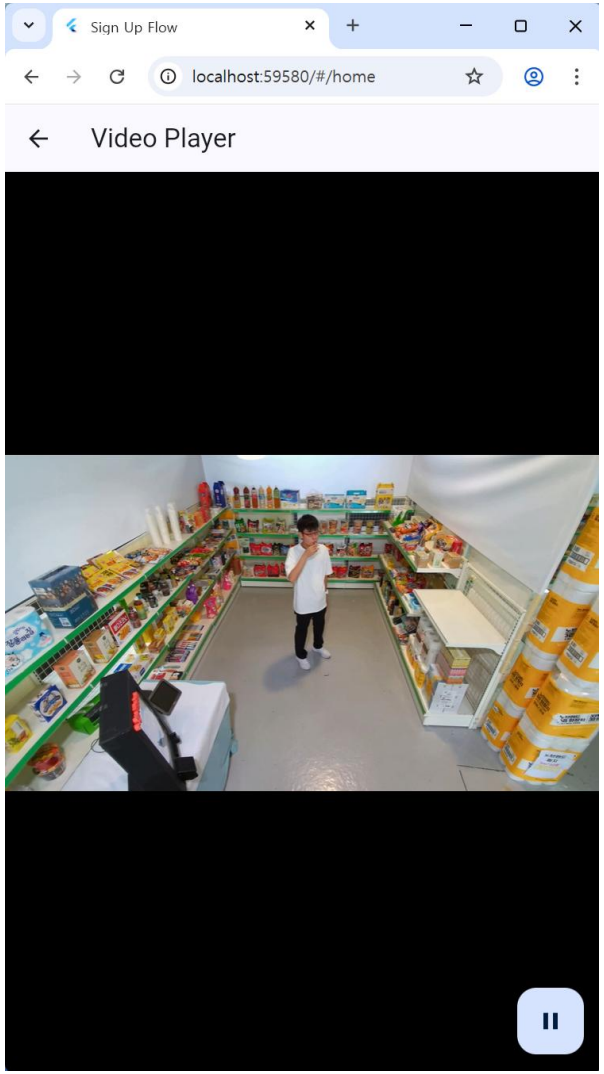


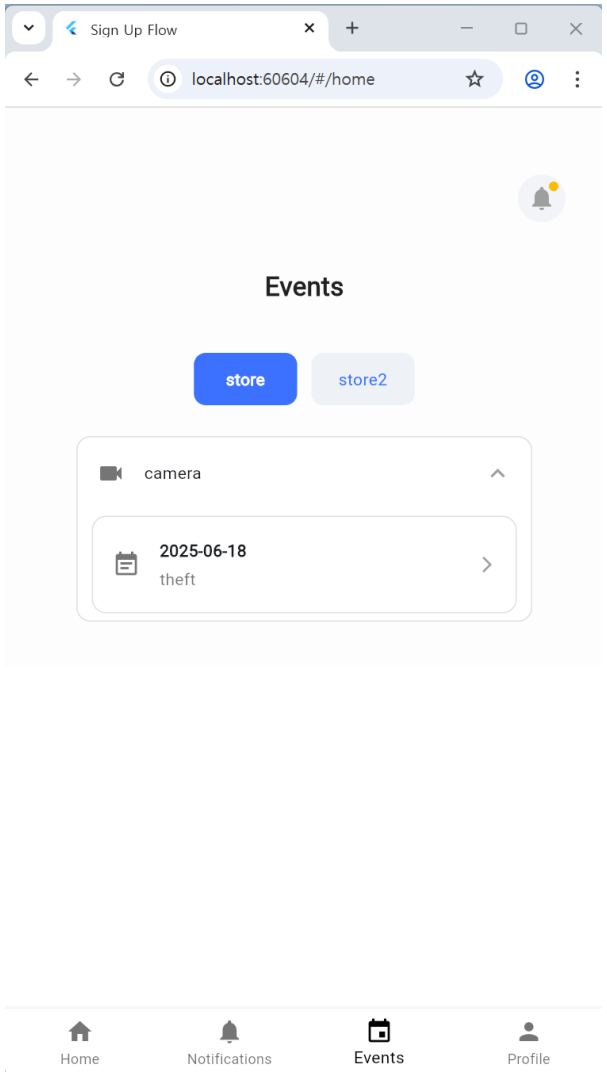



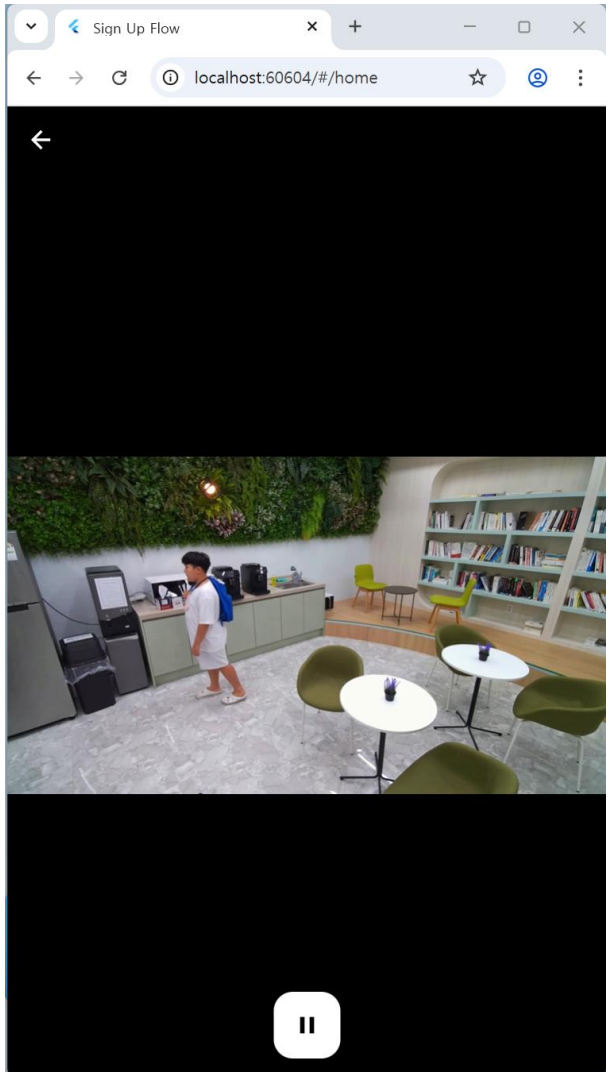
# Application - Notifications



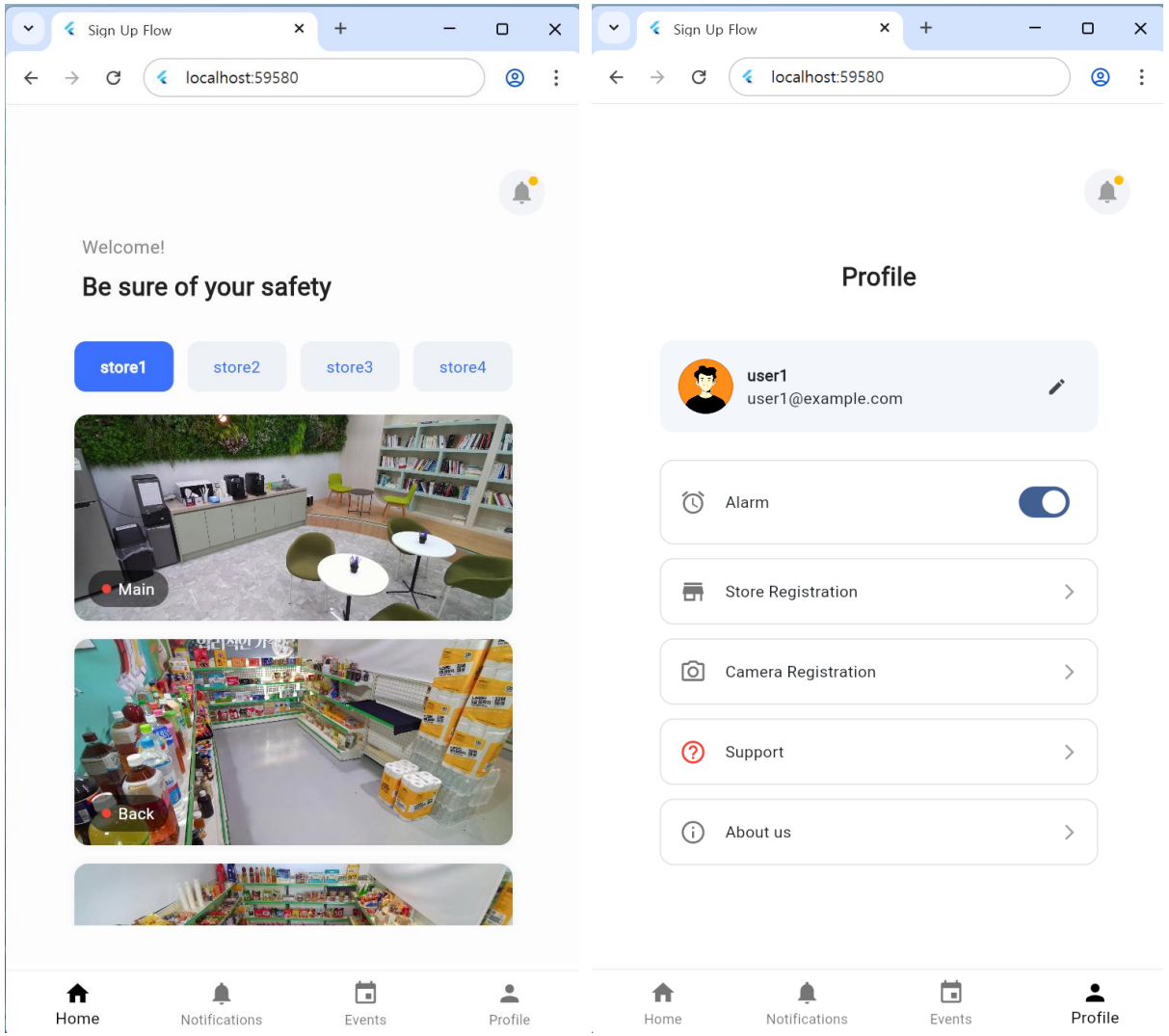



# Application - Events



# Application – Users



# Thank you