

Vision-guided Navigation Assistance

Motivation

Offering users who are blind or visually impaired convenient tools to navigate towards objects of interest

Requirements

- As a user, I shall be guided towards doors while visually impaired.
- As a user, I shall be redirected towards doors that are no longer in my field of vision.
- As a user, I shall be informed when there are multiple doors along their descriptions.

Multi-Door

- Recognize all solid doors
- Differentiate every door
- Notify the user of options
- No door limit

Handle Detection

- Associate handles to doors
- Notify user which direction to reach out
- 90% Success Rate

Color Detection

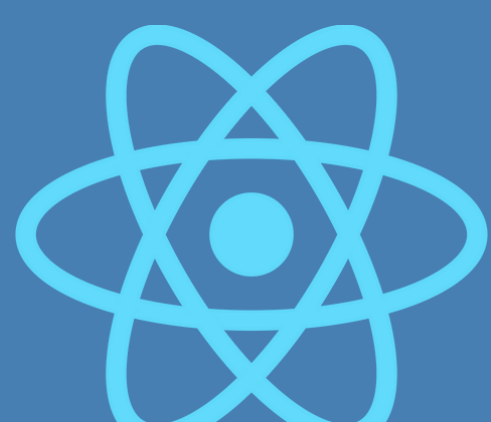
- Object of interest isolation
- Dominant pixel extraction
- RGB Euclidian spatial distance calculation
- Detects 12 different colors

Deployment

- Standalone container, average 2GB of VRAM
- Deployed on Shared Reality Lab server



Docker



React Native



PyTorch



Flask



Ari Arabian



Ilyes Gasmi



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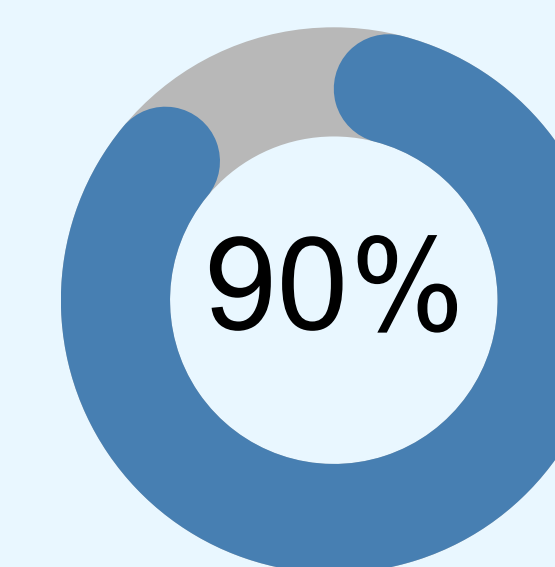
Group: 05

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Door Tracking

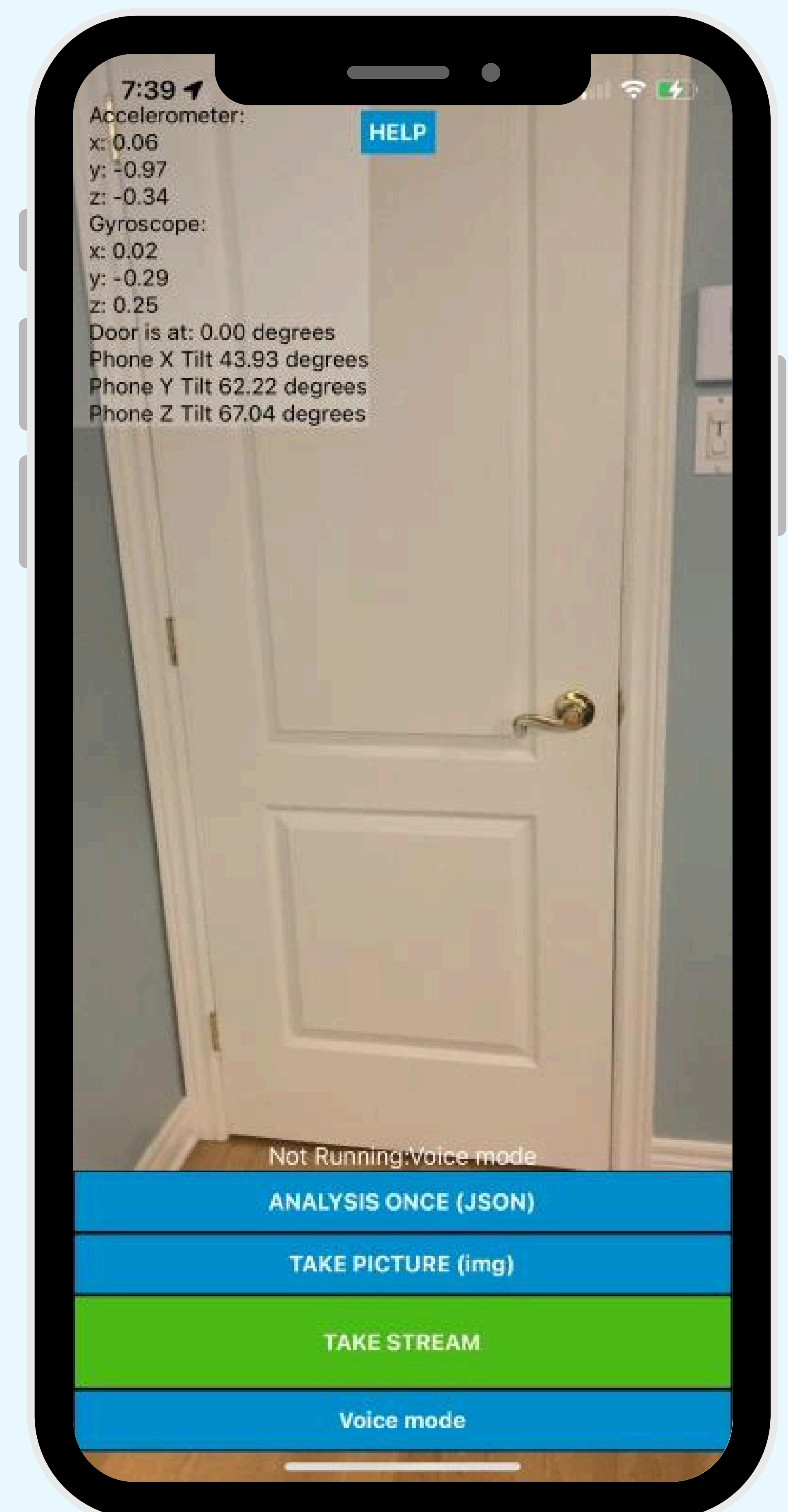
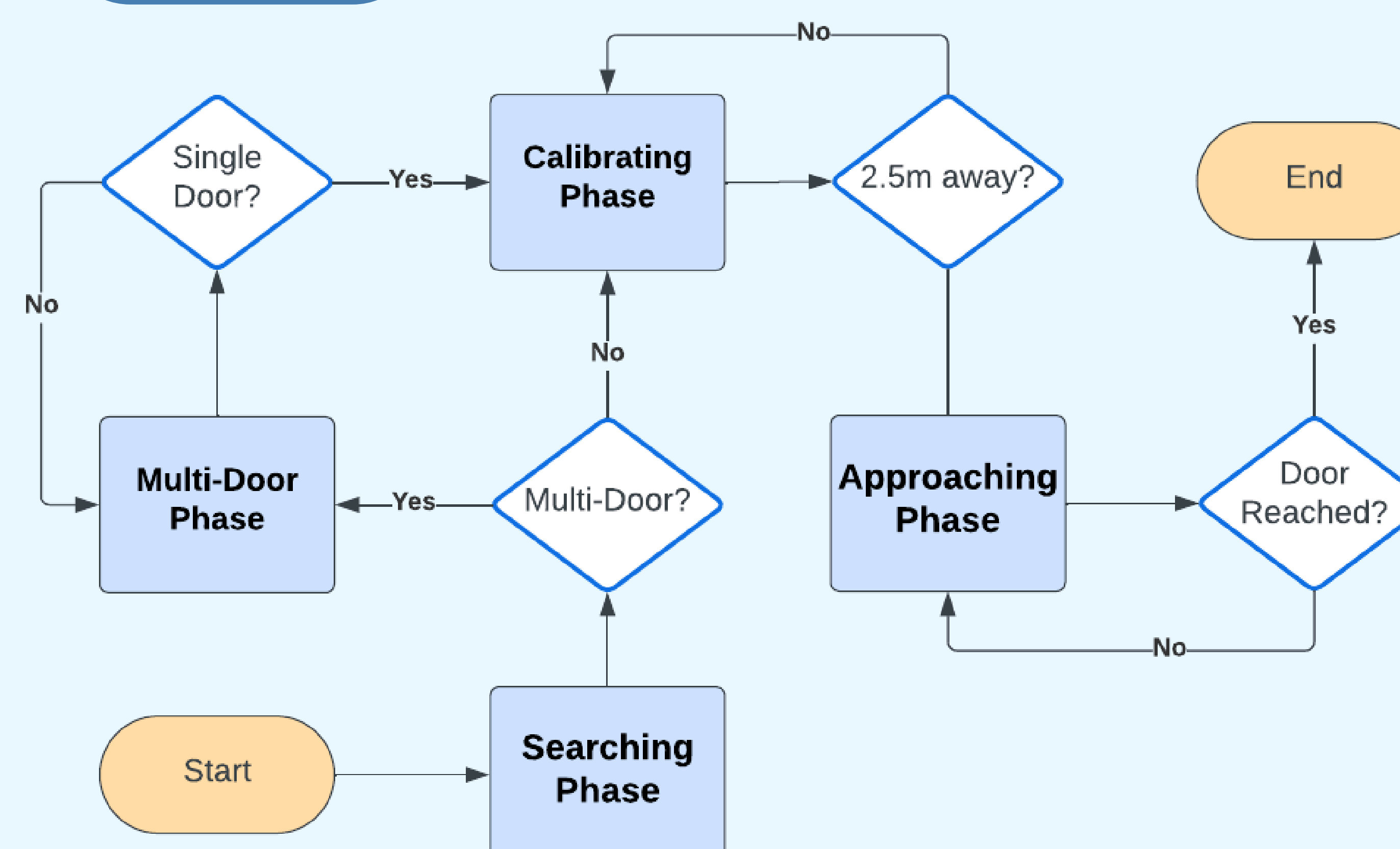
- Locate lost doors
- Give approximate angle of the lost door
- 90% within 30° of door location



Testing

- Integration testing
- Functional testing
- Non-functional testing (0.319s average latency)

Flow



Challenges & Constraints

- Data reliability + filtering
- Deprecating models and legacy software
- Accommodating for older devices

Conclusions

- Importance of testing the integration of features
- Learned new technologies
- The usefulness of features is important