

# Introduction

Project 2 focused on developing a Human-Robot Interaction (HRI) solution for hospitality services. Our team created "Tom," an AI assistant for theme park visitors that helps with navigation, emergency response, and access to information.

## Project Description

The project required us to:

- Observe and interview users to identify scenarios where a voice agent/chatbot could facilitate hospitality services
- Construct a Point of View (POV) and brainstorm ideas
- Create a working prototype of the conversation part of our HRI solution
- Compile a video demo and conduct usability testing
- Present our solution in class

## Empathize

We conducted interviews with people who had recently visited theme parks to understand their pain points:

- **Navigation challenges:** Difficulty finding attractions and facilities in large parks
- **Information access:** Trouble getting real-time information about shows, wait times, and services
- **Emergency concerns:** Anxiety about what to do in case of lost items, missing children, or medical emergencies
- **Crowd management:** Frustration with crowded areas and long wait times

Here are some interview insights:



*Interview with a recent theme park visitor*

## Ideation

After identifying key user needs, we brainstormed potential solutions:

We constructed our POV statement:

"Theme park visitors need a real-time, location-aware assistant that helps them navigate efficiently, responds to emergencies, and enhances their overall experience because large parks can be overwhelming, stressful, and difficult to navigate."

## Prototype Development

We developed "Tom," an AI assistant with the following key features:

### 1. Intelligent Navigation

- Location-aware directions
- Real-time crowd monitoring
- Alternative route suggestions

### 2. Emergency Management System

- Protocol for lost children
- Medical emergency response
- Lost item reporting

### 3. Information Access

- Attraction details
- Show schedules
- Facility information

We implemented the prototype using:

- Azure OpenAI for natural language understanding
- Speech-to-Text and Text-to-Speech for voice interaction
- Graph-based navigation system for pathfinding
- State management for tracking user context

## User Testing

We conducted usability testing with participants who were not part of our team:



*Screenshot from usability testing session*

Key feedback:

- Users particularly appreciated the emergency response protocols
- The shortest path feature and crowd level information were highly valued
- Navigation accuracy was praised
- Lost item reporting process was intuitive
- Some users noted that the AI responses didn't sound natural enough for voice output

## Learning and Execution Process

### Technical Implementation

We programmed the chatbot to handle various scenarios:

#### 1. Basic Information Queries

- Information about attractions, shows, and facilities

#### 2. Navigation Requests

- Directions between locations with consideration for crowd levels

#### 3. Emergency Scenarios

- Protocols for lost items, missing children, and medical emergencies

#### 4. Location Awareness

- Tracking user position to provide contextual assistance

### Use of AI

We used AI tools in several ways during this project:

- Generated test cases for our chatbot using ChatGPT
- Refined our prompt engineering for better responses
- Used Azure OpenAI API for the core natural language understanding
- [Link to AI tool usage documentation](#)

## Personal Contributions and Achievements

My primary contributions to this project included:

- Designing the emergency response protocols
- Implementing the navigation graph for efficient pathfinding
- Conducting 3 user interviews to gather initial requirements
- Creating test cases to verify different aspects of the chatbot
- Participating in the usability testing and documenting feedback

## Personal Reflection

Working on this HRI project taught me valuable lessons about designing conversational interfaces:

1. **Context matters:** The assistant needs to remember previous interactions to be truly helpful.
2. **Error handling is crucial:** Users don't always express themselves clearly, so robust error handling is essential.
3. **Voice vs. text:** What works well in text doesn't always sound natural when spoken, requiring different optimization strategies.
4. **Empathy in design:** Understanding user anxiety in emergency situations helped us design more compassionate responses.

I found the emergency protocol development particularly interesting, as it required balancing efficiency with empathy. The positive user feedback about this feature was especially rewarding, confirming that we had successfully addressed a real pain point for theme park visitors.

For future improvements, I would focus on making the AI responses sound more natural for voice output, which was the main criticism in our user testing.