

Empowering Independent Navigation for the Visually Impaired

# INTELLIGENT GUIDING ROBOT SYSTEM



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**And:**

Cool Robot

# MEET KWEK BIN



Technology analyst at SG Enable

Advocate for assistive technologies

Enthusiastic learner

Most capable blind person equipped  
with best technologies

# UNEXPECTED CHALLENGES



The food court

Can't order

Don't want trouble others

Can't hold food and cane

Can't find place to sit

Don't want to hit others with the cane

.....

"Can't really come here without sighted colleague,  
It's easier just eat at office."

**small issues \* many = BIG CONSTRAINT**

# INDEPENDENC

Robots can help more than you think



# Current solutions

Guiding robots, but no AI.

AI, but no robots.

AI+Guiding Robot, but not there yet...



# OUR PROJECT

# GUIDE DOG BUT ROBOT



## Intelligent Navigation Assistant

Deployed on guiding robot, with social awareness, tailored for BVI users

## Natural Language Communication

Allowing users to communicate, give commands, and interact with the robot

## Reasoning and Task Planning Backbone

Task planning, reasoning, perception, and real time code generation

## Modular Accessibility Features

Reading text, describing environment, finding objects, take me to somewhere



I want to go to  
to sushi store.

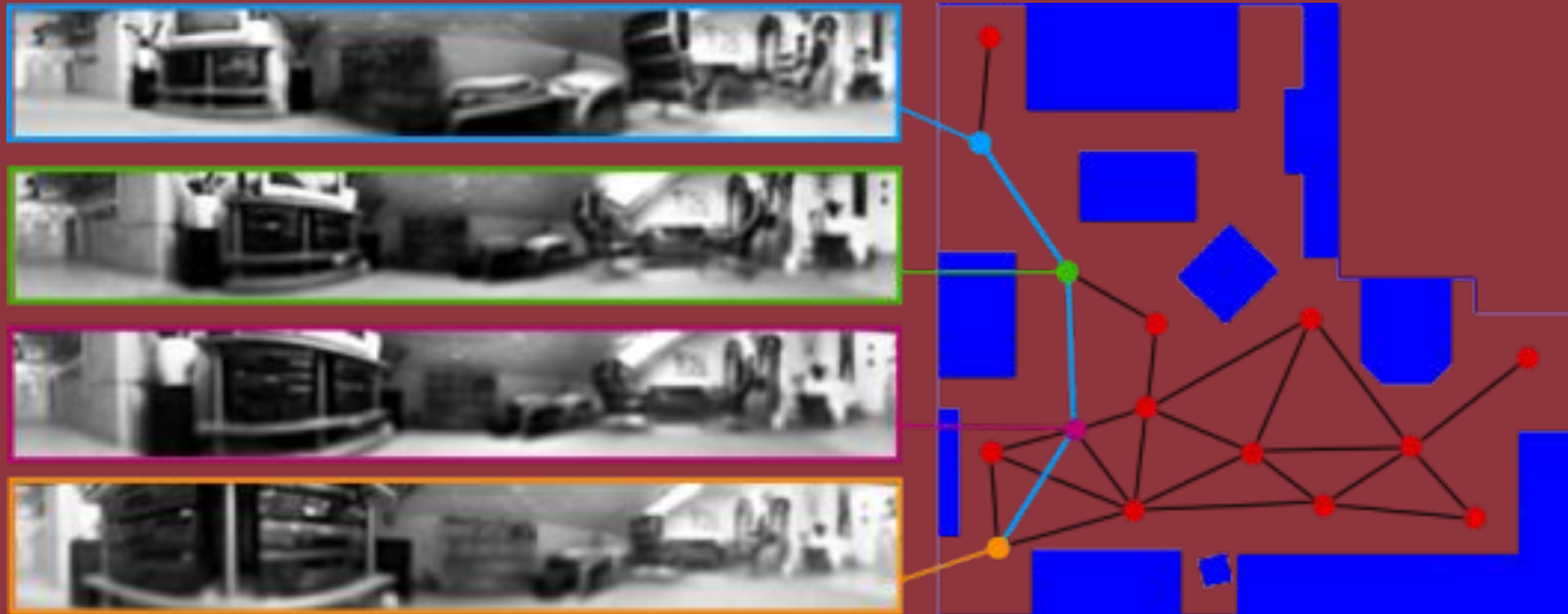
OK, let's go  
to sushi store.



```
"speak_to_user":  
  "OK, let's go to to sushi store",  
  ,  
  "speak_to_public": ".  
  "quest_tree_augment:  
    "(add_child('go to sushi store",  
      "fix user hungry);set,current_  
      task('fno to sushi store')]  
  "action_cude:  
    go_to('sushi store')  
    speak_to_user('We have arrived  
    at the sushi store, you can  
    order now)  
    switch_node('avoid')  
  }
```

# EXAMPLE OF AN INTERACTION

# ONGOING WORK

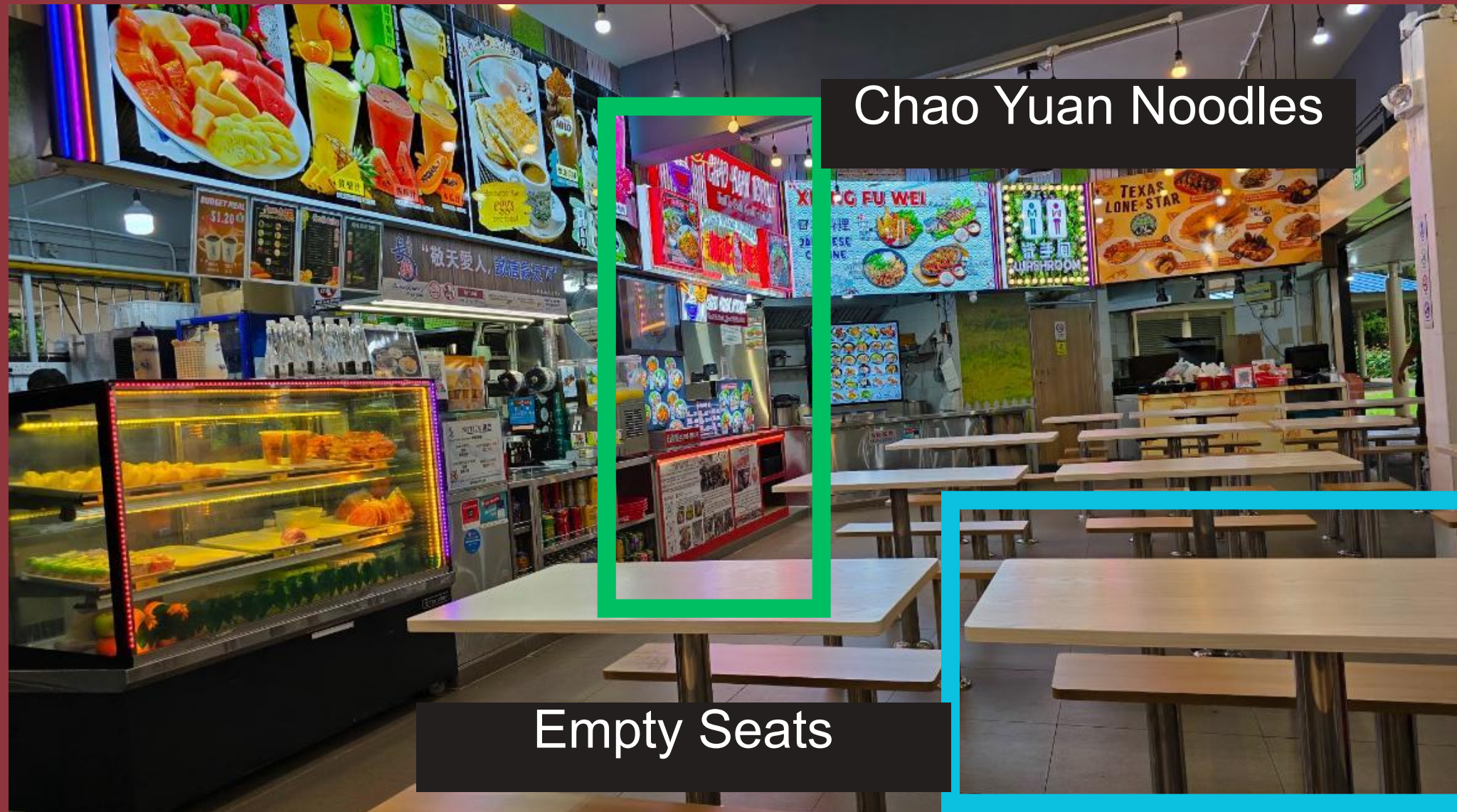


Topological mapping



Door passing

# PERCEPTION AND ACTION



```
{  
  "action_code":  
    "load_variables()  
    environment_note="  
    environment_note=describe_environment('front')\n\n    speak_to_user(environment_note)  
    text=read_text("restaurant logo, menu")  
    speak_to_user(text)  
}
```

"You are standing in front of a food stall called Chao Yuan Noodle. The stall has bright red signage with large image...."

"From top to bottom, left to right:  
Fishball Noodle – \$5.00, Minced Meat Noodle – \$5.00, Meatball Noodle – \$5.00, Laksa – \$5.50...."

A photograph of a covered walkway, possibly a transit station or a public area. In the foreground, a man with a black backpack and a white shirt is walking away from the camera. In the middle ground, an elderly man wearing a blue face mask and a white shirt is walking towards the camera, using a white cane. To the right, there is a green wall covered in ivy and a red fire hydrant. A sign on a pole to the right says "GIVE WAY". In the background, there are shops and buildings. The text "A WORLD WHERE NO ONE IS LEFT BEHIND" is overlaid in large white letters across the center of the image.

**A WORLD WHERE NO  
ONE IS LEFT BEHIND**