PRINTEPS:
A User-centered Platform to Develop AI & Intelligent Robot Apps

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(a platform for PRactical INTElligent aPPlicationS)

Background and Goals

- **Hot AI Applications**
  - Alpha GO, Watson, ...
  - Specific AI may go over Humans
  - but has no harmonious interaction with them.

- **Goals:** *We should move*
  - From Specific AI to Unified Interactive AI (no AGI)
  - From Specific AI Apps to Platform for many AI Apps
  - From Engineers to End Users
Unified AI & Intelligent Robot Applications

AI for End Users in Many Task-Domains

- Machine Learning
- Speech Dialog
- Knowledge Based Reasoning
- Image Sensing
- Manipulation & Mobility

Robot Tea House
TA Robot
Assembly Robot
for Robot Tea House

Workflow
- Tea House

Business Process
- Greeting at Cafe Entrance
- Guiding to Seat
- Taking Order
- Serving Drink

Software Module
- Finding Speech Capable Robots
- Age Recognition
- Speech Synthesis
- Speech Recognition
- Building Robot Model
- Building Customer Model
- Building Cafe Model
- Movement

Knowledge
- Rule Base
- Process Ontologies
- Domain Ontologies
- Japanese Wikipedia Ontology

Data
- LOD
- Dialogue Log
- Gesture Database
- Environmental Map
## PRINTEPS Software Modules

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Workflow for Robot Tea House

START

Customer reception at the entrance → Guidance to tables

Order taking → Drink Preparation → Serving

Checkout → Seeing off customers → END
[+] Customer reception at the entrance
[-] Greeting to the customer
    Customer detection
    Move Robot
    Confirmation of the number of customers
In case of full occupancy: ask the customer if they can wait
    Treatment of a customer with an umbrella
    Treatment of a customer with luggage
In case of full occupancy: tell the customer to wait in the queue
If the waiting time is likely prolonged, give the menu to the waiting customer
Guidance to tables
Order taking
Food preparation
Serving
Checkout
Expression of gratitude towards customers
Order taking
Food preparation
Serving
Checkout
Expression of gratitude towards customers

Edit name
- ID
  8c1b5fce-4005-8cd4-900e-b36590dd01e
- Name
  Customer reception at the entrance
- Description
ROOT/ Customer reception at the entrance

- Greeting to the customer
- In case of full occupancy: ask the customer if they can wait
- Treatment of a customer with luggage
- Confirmation of the number of customers
- Treatment of a customer with an umbrella
- In case of full occupancy: tell the customer to wait in the queue
- If the waiting time is likely prolonged, give the menu to the waiting customer
- Guidance to tables
- Order taking
- Food preparation
- Serving
- Checkout
- Expression of gratitude towards customers

In case of full occupancy: ask the customer if they can wait
Treatment of a customer with luggage
Confirmation of the number of customers
Treatment of a customer with an umbrella
Move Robot
Greeting to the customer
In case of full occupancy: tell the customer to wait in the queue
Customer detection
If the waiting time is likely prolonged, give the menu to the waiting customer

Edit name
- ID: 89613b55-597d-c079-2e01-104e7c47dc8c
- Name: Greeting to the customer
- Description
- Category
Customer reception at the entrance

Customer detection
Move Robot
Confirmation of the number of customers
In case of full occupancy: ask the customer if they can wait
Treatment of a customer with an umbrella
Treatment of a customer with luggage
In case of full occupancy: tell the customer to wait in the queue
If the waiting time is likely prolonged, give the menu to the waiting customer
Guidance to tables
Order taking
Food preparation
Serving
Checkout
Expression of gratitude towards customers
System Configuration for Robot Tea House

Image Sensing
- Windows
  - Sensing at entrance
  - Sensing at table

ROS
- Photo of people
- Age and sex estimation
- Entrance information
- Entry detection
- Table information
- Detection of a visitor exiting
- Event detection

Multiple Knowledge
- Ontology
  - Rule Base

Stream Reasoning
- Robot speech
- Robot moving

Movement
- Speech Dialog
Robot Tea House (2min)
TA Robot with 6th Graders in Primary School To Study Global Warming (1 min)
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