Topic 1 UGOT's Preliminary Exploration

In the distant future, human communities on Earth will enter an era of highly advanced technologies. In this era, humans have conquered every corner of the earth. Large cities are filled with skyscrapers, busy traffic, and advanced technological facilities. However, Earth can no longer satisfy humans' desire for exploration.

One day, a group of scientists and engineers gathered together and devised an ambitious plan: the Flying Plan. They envisioned expanding human exploration to the edge of space to uncover the mysteries of the universe.

UGOT joined the Flying Plan as a robotic assistant for space exploration, aiding researchers in exploring the Moon and Mars, as well as base maintenance.

I. Super UGOT

Technical engineers will work closely with UGOT, which has AI capabilities. They must be familiar with the different forms of UGOT, its various functions, basic methods of operation, and have an understanding of AI technologies.

Figure 1.1 UGOT Transforming Car

In order to test the display function of UGOT and ensure that researchers can read the information sent by UGOT in a timely manner, certain tasks need to be completed.

1. Learn about the key modules of the UGOT Transforming Car and complete the assembly.

2. Test the display function of UGOT using uPython programming software.

II. Happy Learning

i. Background Knowledge

1. What is artificial intelligence?

Artificial intelligence refers to the capability of a machine to imitate human intelligence through artificial means, enabling it to perceive, think, and make decisions like a human being.

UGOT can perform the functions of face recognition, sound localisation, voice conversation, laser obstacle avoidance, single-track and double-track patrol, object handling, etc. It can provide feedback in a manner similar to human intelligence and is therefore classified as an

intelligent robot.

2. What is Python?

Python is one of the most popular and widely used AI programming languages. It provides developers with a comprehensive set of tools and frameworks to build and train machine learning models, such as NumPy, Pandas, and TensorFlow, with easy-to-understand syntax.

Origin: Created by Guido van Rossum in the Netherlands in 1989, Python 0.9.0 was released in 1991.

Development: Python 1.0 was released in 1994, followed by a series of 2.x versions. Python has become increasingly popular among users and developers over time. The community has developed a variety of useful third-party libraries and tools.

Status quo: Python is currently used in a variety of fields, including web development, data analysis, artificial intelligence, scientific computing, and automation. Python has a large and active community. Community members have committed to developing numerous third-party libraries and tools that expand the capabilities and applications of Python.

3. Key modules of UGOT Transforming Car

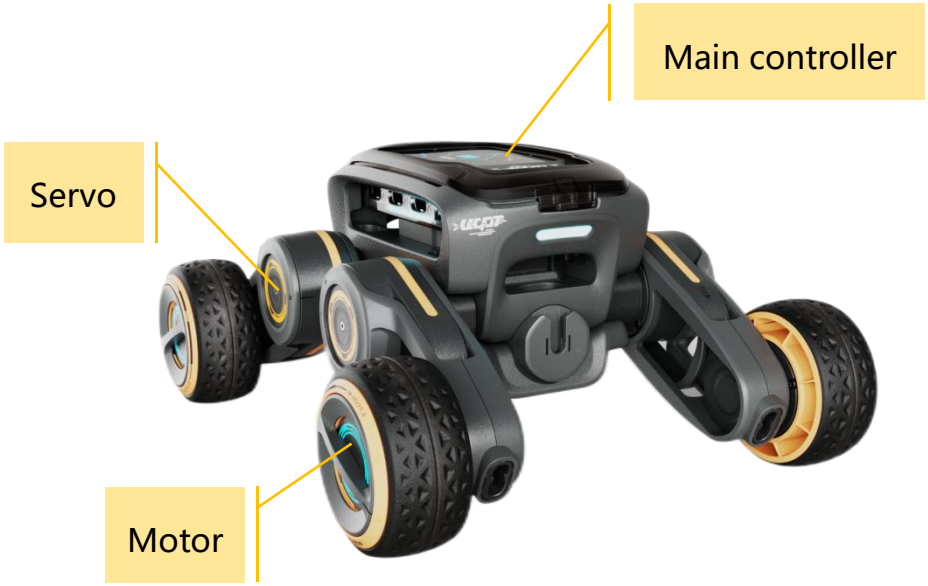

Figure 1.2 Key modules of UGOT Transforming Car

ID	Name	Function	Analogy
1	Main controller	Stores and executes the control program to complete the control of UGOT	Human brain
2	Motor	Drives the rotation of the wheels	Human joint
3	Servo	Drives the rotor arm to a specific angle	Human joint

4. Building a UGOT Transforming Car

To build the UGOT Transforming Car, refer to the 3D building video or manual.

Figure 1.3 Schematic diagram of UGOT Transforming Car

5. Establishing network connection of UGOT Transforming Car

Step 1: Press and hold the power switch at the bottom of the UGOT Transforming Car to turn it on. 	Step 2: Wait for the main controller display screen to open, select the UGOT Transforming Car model, and click **OK**. 

Step 3: Click **Settings** and select the Wi-Fi network to connect to. 	Step 4: A successful Wi-Fi connection confirms that the UGOT Transforming Car is connected to the network. 

ii. Coding Knowledge

1. print statement

The print statement is mainly used to print out numbers, strings, etc. The printed text can include not only Chinese or English characters, but also special symbols. When printing text, it is necessary to enclose the text content in quotation marks.

The quotation marks can be single quotation marks (' '), double quotation marks (" "), or triple quotation marks (''' ''').

In Python, a string (str) refers to text enclosed in a pair of quotation marks. Strings are the most commonly used data type in Python.

Data is the basis of all programs and is categorised into immutable and mutable data types based on whether the data type is mutable or not.

2. Code to import ugot functions from the UGOT module

We can use 'from ugot import ugot' to implement the import of ugot functions in the UGOT module.

3. Code to import UGOT

We can use 'got = ugot.UGOT()' to import UGOT and assign it to got.

4. Code to connect UGOT

We can connect to the UGOT using the IP address. We use the code 'got.initialize(device_ip)' where the parameter device_ip is of str type. Fill in the IP address of the device as a string to connect to UGOT.

5. Code to enable the main controller display to show the background colour

We can use the 'screen_display_background(color)screen_display_background(colour)' method to enable the main controller display to show the background colour. The details are as follows:

Method: screen_display_background(color)

Function: Main controller display shows the background colour

Parameters:

color: colour, int type, value range: [0-8]

0: Black; 1: White; 2: Purple; 3: Red; 4: Orange; 5: Yellow; 6: Green;

7: Cyan; 8: Blue

6. Code to enable the main controller display to print ext

We can use the 'screen_print_text(text, color)' method to enable the main controller display to print text. The details are as follows:

Method: screen_print_text(text, color)

Function: Main controller display prints text

Parameters:

text: str type, text content to be printed

color: colour, int type, value range: [0-8]

0: Black; 1: White; 2: Purple; 3: Red; 4: Orange; 5: Yellow; 6: Green;

7: Cyan; 8: Blue

7. Code to enable the main controller display to print text and feed lines

We can use the 'screen_print_text_newline(text, color)' method to enable the main controller display to print text and feed lines. The details are as follows:

Method: screen_print_text_newline(text, color)

Function: Main controller display prints text and feeds lines

Parameters:

text: str type, text content to be printed

color: colour, int type, value range: [0-8]

0: Black; 1: White; 2: Purple; 3: Red; 4: Orange; 5: Yellow; 6: Green;

7: Cyan; 8: Blue

8. Code to enable the main controller display to print text and feed lines

'got.screen_clear()' clears the contents and background colour of the main controller display.

9. Code to import the time module

'import time' imports the time module.

import: used to import module. Format: 'import module name', such as: import turtle and import random.

10. Code to keep the current state

'time.sleep(t)' keeps the current state until the given number of seconds.

t: duration in seconds, int type/float type

III. Creative Factory

With the knowledge that we have gained, let's explore the world of UGOT and Python through uPython programming software!

Programming

1. Task 1:

Task overview: Learn about the uPython programming software and program to display text in the uPython output area.

```
1  print(12345)
2  print(12+13)
3  print(99-23)
4  print(12*12)
5  print(12/3)
```

```
print('Hello, I am UGOT.')
print('What can I do for you? ')
```

```
print('''Hello,
I am UGOT.
What can I do for you? ''')
```

Figure 1.4 Demo program for Task 1

2. Task 2:

Task overview: Call the UGOT module to display text on the main

controller display.

```python
from ugot import ugot              #Import the ugot function from the UGOT module
import time                        ## Import time
got=ugot.UGOT()                    #Import UGOT
got.initialize("192.168.1.119")    #Connect UGOT to the IP address

got.screen_display_background(0)                        #The main control display is black
got.screen_print_text_newline("Hello, I am UGOT.",1)      #Print white text and line feed on the main control display
got.screen_print_text_newline("What can I do for you?",1)
time.sleep(1)                                           #Keep the current state for 1 second
got.screen_clear()                                      #Clear the main control display
```

Figure 1.5 Demo program for Task 2

IV. Knowledge Summary

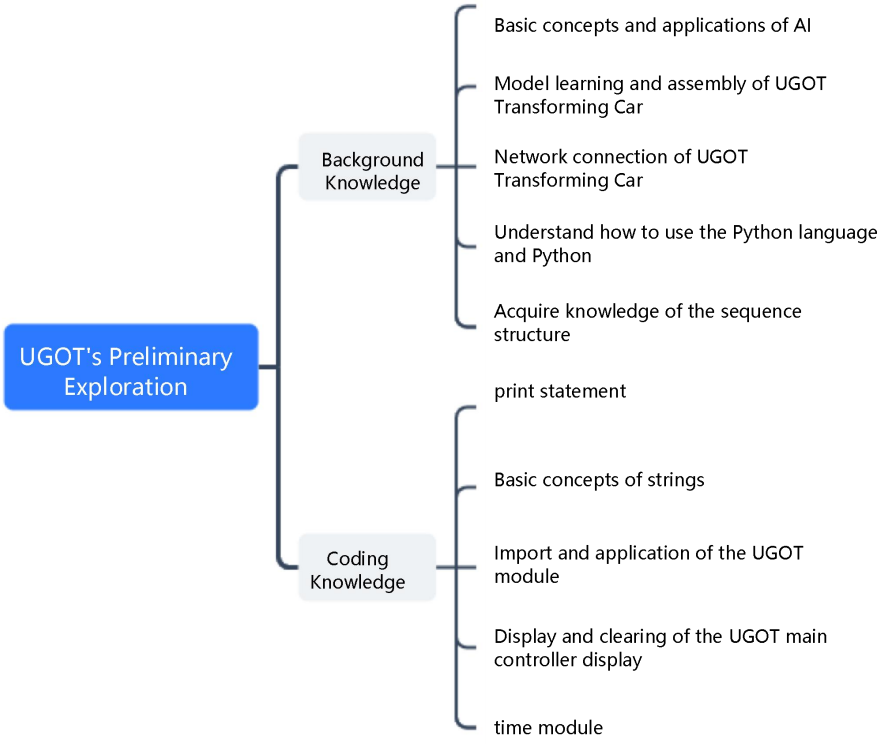

Figure 1.6 Knowledge summary

V. Extension

i. Practice & Innovation

Complete the following extension task:

Try to modify the text content and the parameters of the time function, observe the changes in the output result, and simulate the testing phase.

```
from ugot import ugot              #Import the ugot function from the UGOT module
import time                        ## Import time
got=ugot.UGOT()                    #Import UGOT
got.initialize("192.168.1.119")    #Connect UGOT to the IP address


got.screen_display_background(0)                        #The main control display is black
got.screen_print_text_newline("Hello, I am UGOT.",1)      #Print white text and line feed on the main control display
got.screen_print_text_newline("What can I do for you?",1)
time.sleep(1)                                           #Keep the current state for 1 second
got.screen_clear()                                      #Clear the main control display
time.sleep(1)
got.screen_print_text_newline("Start detecting",3)              #Print red text and line feed on the main control display
time.sleep(1)
got.screen_print_text_newline("Detecting, please wait...",3)
time.sleep(3)
got.screen_print_text_newline("Detection completed",3)
time.sleep(1)
got.screen_clear()

```

Figure 1.7 Demo program for extension task

ii. Additional Knowledge

Common programming languages used in AI

R: R is a programing language designed for solving numerical and statistical problems. When first released, R was not widely used, but recent advances in data science, machine learning, and artificial intelligence have made it a popular choice. Data science, AI and machine learning require a large number of numerical functions and libraries, for which R's tool library is useful.

C++: C++ is a high-performance programming language due to its

ability to transfer messages at the hardware level. It is used for time-sensitive AI and machine learning projects. It works well with statistical AI methods (which are components of neural networks).

C++ provides an advantage in terms of runtime and performance. You can safely use C++ templates and use them for API generalisation.

Java: Java is a programming language widely used in the information technology industry, including artificial intelligence and machine learning. Java VM technology allows for the creation of a single application version that runs seamlessly on Java-enabled machines.

Java provides excellent support for large projects, which is essential in AI and machine learning. It is easy to visualise, simple to debug, and provides a pleasant user interaction experience. You can easily find help online thanks to the large online Java community.

JavaScript: JavaScript is a popular programming language used for developing online programs and interactive web applications. It has also gained popularity in the fields of machine learning and AI.