



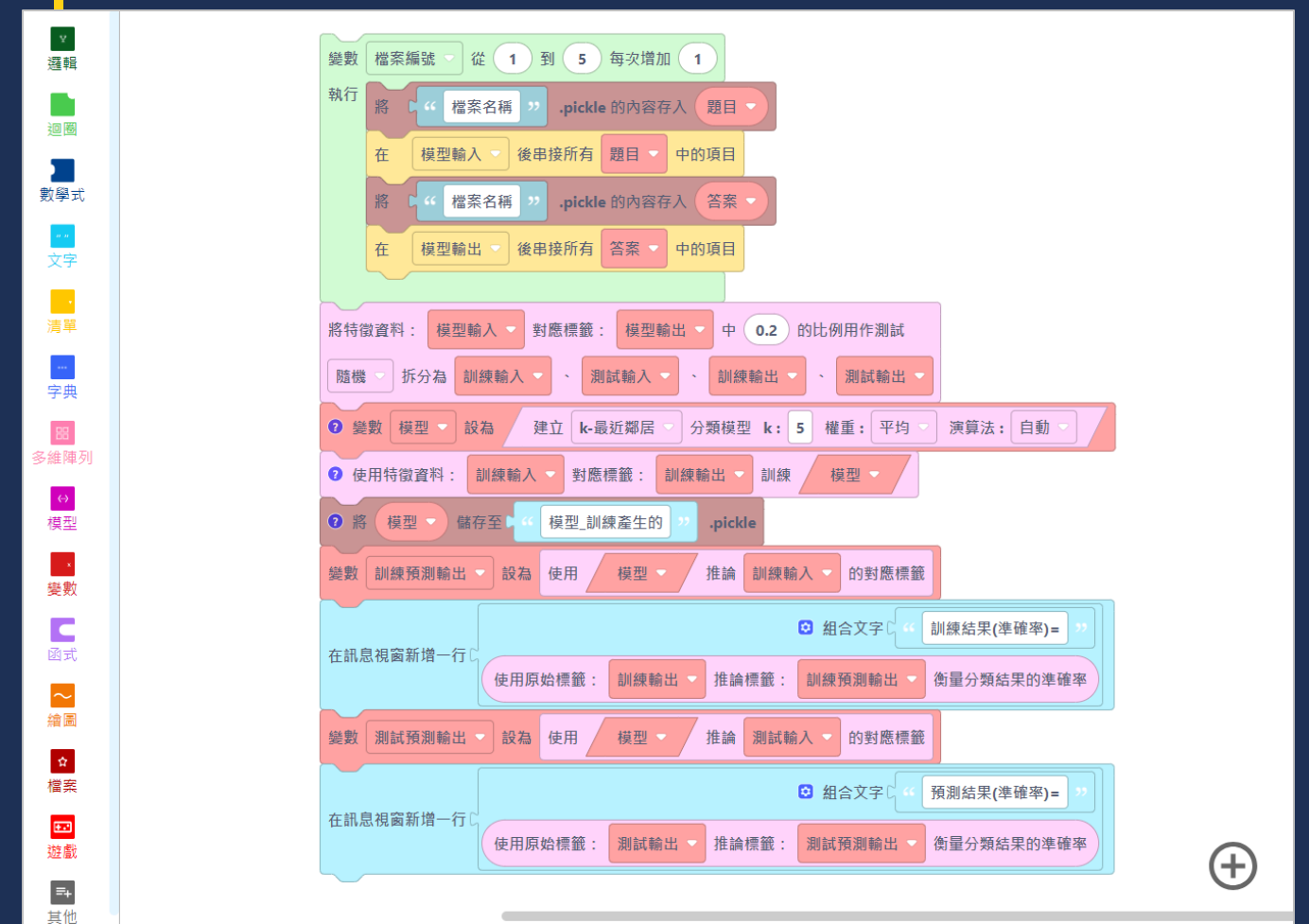
機器人虛實整合工具 PROS Twins & Blocks 產品介紹說明書



產品介紹

PROS Twins 是一套機器人模擬環境，我們使用 **Unity3D** 打造一個虛擬場景，並且自行設計**自走車與機械手臂**模型，讓使用者可以在虛擬環境中練習控制與了解操作原理。

PROS Blocks 是一套積木式機器人AI開發工具，不僅可以使用**程式積木**訓練AI，還可以與實體裝置或是 **PROS Twins** 環境連動控制機器人。



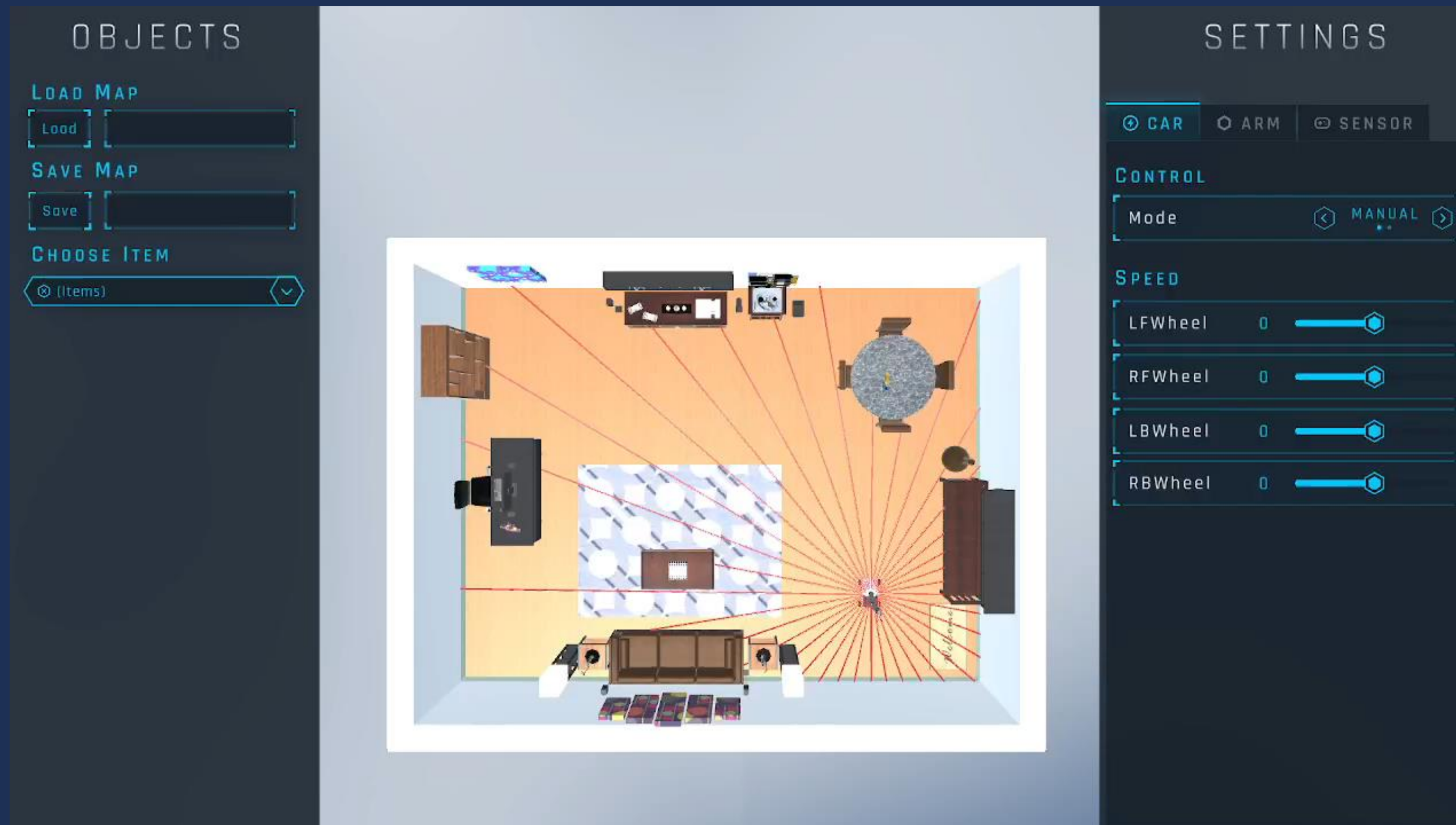
PROS Twins 介紹(1/6)

- 在虛擬場景控制自走車與手臂



PROS Twins 介紹(2/6)

- 可使用虛擬光達感測器



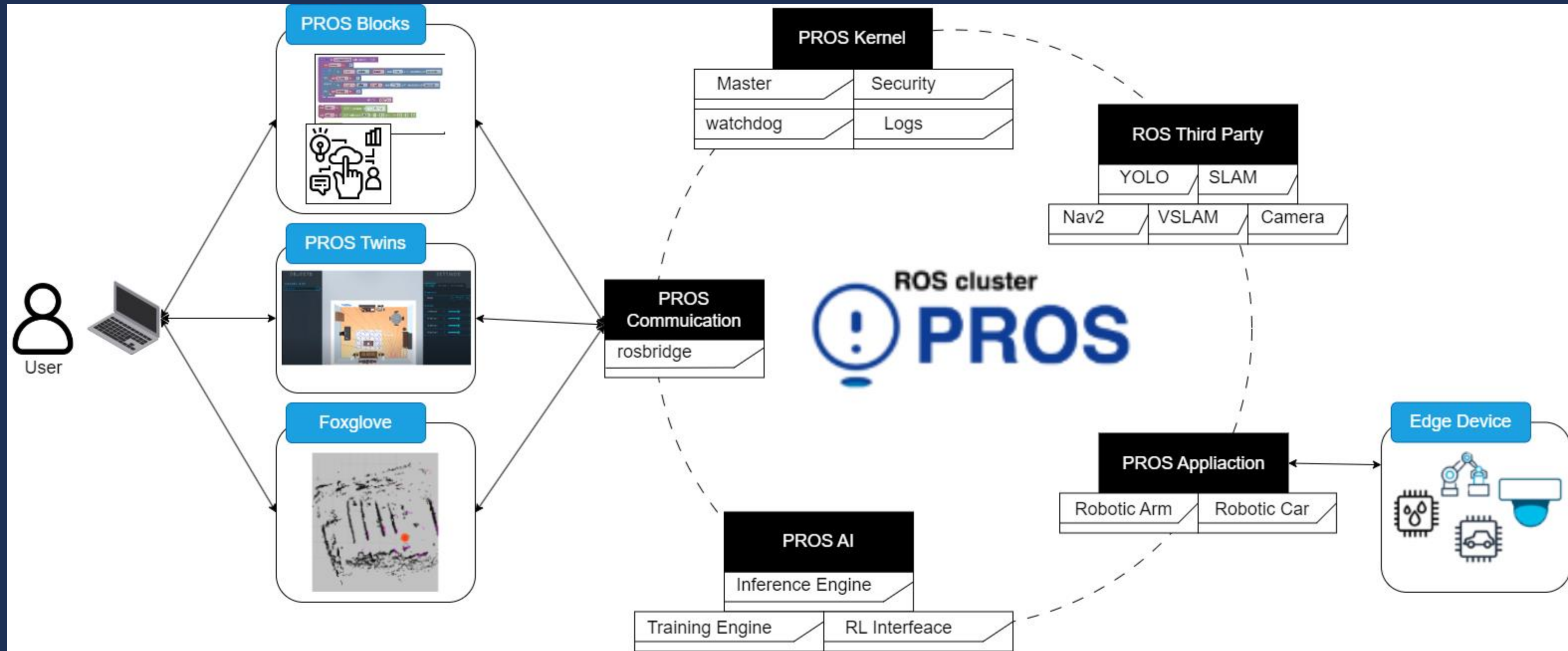
PROS Twins 介紹(3/6)

- 可使用虛擬相機進行影像辨識



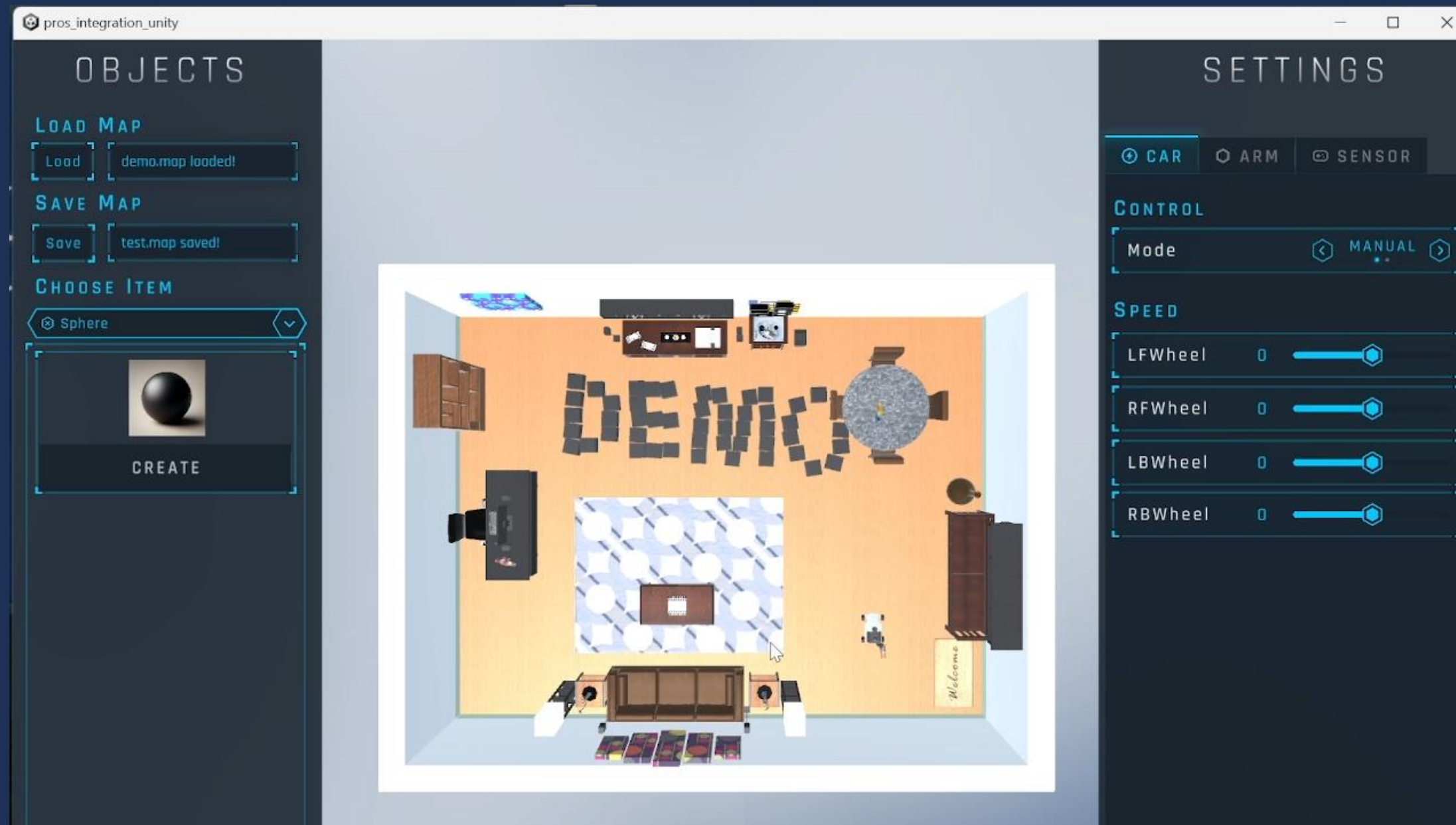
PROS Twins 介紹(4/6)

•PROS 機器人作業系統



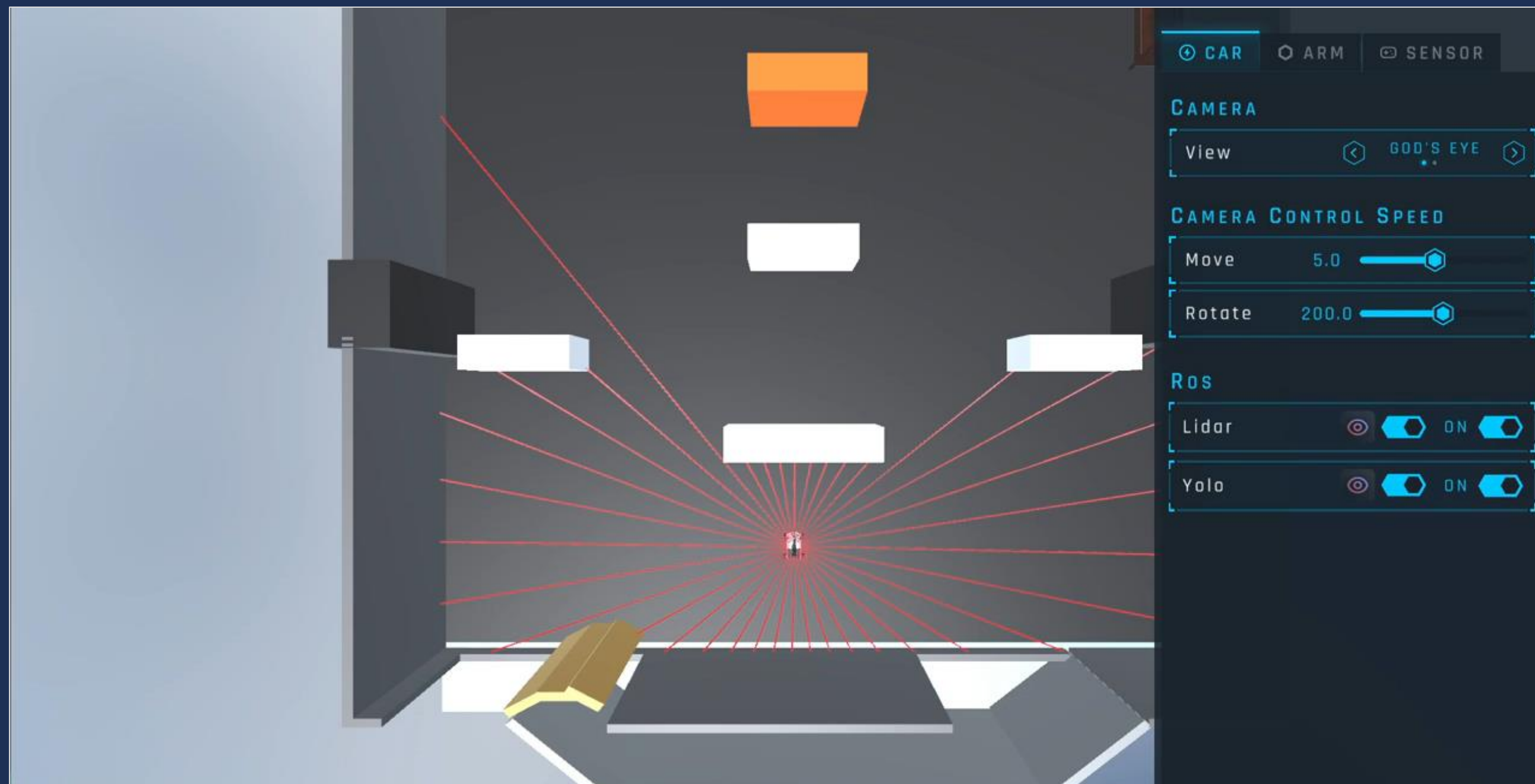
PROS Twins 介紹(5/6)

- 可自行設計場景匯入場景，增加多元性。



PROS Twins 介紹(6/6)

- 可使用外部開發的AI控制



PROS Blocks 介紹

- 包含基本的邏輯積木外，也包含機器人積木，AI積木，除了用來訓練AI與控制機器人，也可以銜接python

The image displays the PROS Blocks interface, which allows users to create Python code using a block-based logic system. On the left, a sidebar contains various tool categories: 邏輯 (Logic), 迴圈 (Loops), 數學式 (Math), 文字 (Text), 清單 (List), 字典 (Dictionary), 多維陣列 (Multidimensional Array), 模型 (Model), 變數 (Variables), 函式 (Functions), 繪圖 (Drawing), 檔案 (Files), 遊戲 (Games), and 其他 (Other).

The main workspace is divided into two sections. The top section shows a block-based logic flow for training and testing a model. It starts with a loop for file numbers from 1 to 5. The logic includes: 1. Saving the filename and question to a .pickle file. 2. Saving the filename and answer to another .pickle file. 3. Training a k-Nearest Neighbors model with a k value of 5 and an average weighting method. 4. Testing the model with a 0.2 ratio of the training data. 5. Displaying the training accuracy in the message window.

The bottom section shows a Python code editor with the following code:

```
150     _E5_88_9D_E5_A7_8B_E5_8C_96_E6_94_B6_E9_9B_86_E6_B5_87_E6_96_99_E6_AE_6A_E6_95_B6()
151     def update(self, scene_info, keyboard=[], *args, **kwargs):
152         global _E6_AA_94_E6_A1_88_E7_B7_A8_E8_99_9F, _E6_95_B8_E5_80_BC, _E5_88_86_E5_AD_90, _E5_88_86_E6_AF_8D,
_E5_B7_B2_E5_AD_98_E6_AA_94_E6_AC_A1_E6_95_B8, _E9_81_8A_E6_88_B2_E7_8B_80_E6_85_8B, _E5_B9_80_E6_95_B8,
_E6_A8_A1_E5_9E_8B_E8_BC_B8_E5_85_A5, _E7_90_83_E7_9A_84x_E5_BA_A7_E6_A8_99,
_E6_AA_94_E6_A1_88_E8_B5_B7_E5_A7_8B_E7_B7_A8_E8_99_9F, _E9_81_8A_E6_88_B2_E6_AC_A1_E6_95_B8,
_E6_A8_A1_E5_9E_8B_E8_BC_B8_E5_87_BA, _E7_90_83_E7_9A_84y_E5_BA_A7_E6_A8_99,
_E8_B3_87_E6_96_99_E6_94_B6_E9_9B_86_E6_AC_A1_E6_95_B8, _E9_81_8E_E9_97_9C_E4_B8_8D_E5_AD_98_E6_AA_94_E6_AC_A1_E6_95_B8,
_E5_B9_B3_E5_8F_B0_E7_9A_84x_E5_BA_A7_E6_A8_99, _E5_B9_B3_E5_8F_B0_E8_A1_8C_E5_8B_95, _E9_81_8E_E9_97_9C_E6_AC_A1_E6_95_B8,
_E6_A8_A1_E5_9E_8B_E8_BC_B8_E5_87_BA_E7_A7_BB_E5_8B_95_E5_91_BD_E4_BB_A4_E4_BA_8C_E7_B6_AD, _E7_90_83_E8_90_BD_E9_BB_9E,
_E5_AD_98_E6_AA_94_E6_9C_80_E5_B0_8F_E5_B9_80_E6_95_B8, _E5_AD_98_E6_AA_94_E6_9C_80_E5_A4_A7_E5_B9_80_E6_95_B8,
_E5_B7_B2_E7_B6_93_E7_99_BC_E7_90_83
153     _E5_B9_80_E6_95_B8 = scene_info['frame']
154     _E9_81_8A_E6_88_B2_E7_8B_80_E6_85_8B = scene_info['status']
155     if _E9_81_8A_E6_88_B2_E7_8B_80_E6_85_8B == "GAME_ALIVE":
156         if _E5_B7_B2_E7_B6_93_E7_99_BC_E7_90_83:
157             _E7_90_83_E7_9A_84x_E5_BA_A7_E6_A8_99 = scene_info['ball'][0]
158             _E7_90_83_E7_9A_84y_E5_BA_A7_E6_A8_99 = scene_info['ball'][1]
159             _E5_B9_B3_E5_8F_B0_E7_9A_84x_E5_BA_A7_E6_A8_99 = scene_info['platform'][0]
160         if pygame.K_LEFT in keyboard:
161             _E5_B9_B3_E5_8F_B0_E8_A1_8C_E5_8B_95 = 1
```

平台的優點

- 1.完整的虛擬模擬環境、開發工具，可以學到多種裝置、感測器的控制原理。
- 2.虛擬環境方便移植與應用，減少實體器材損耗。
- 3.底層系統完整，應用範圍廣彈性高，除了可用於基礎機器人教育，亦可用於銜接未來產業。

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