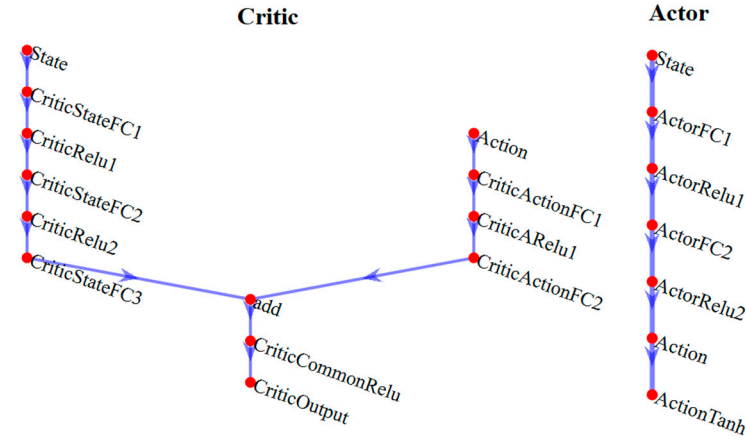# 1. More internal structural details of DDPG agents

Figure S1 shows the Critic and Actor neural network structures of the intelligent agent in the paper, and Table S1 corresponds to the parameters of each layer of the neural network.


Figure S1. Critic neural network structure and actor neural network structure of DDPG agents

Table S1. Parameters for neural network

Parameters	Value
CriticStateFC1	400
CriticStateFC2	400
CriticStateFC3	200
CriticActionFC1	200
CriticActionFC2	200
ActorFC1	400
ActorFC2	200

2. Principle of constructing monocular stereo vision system in physical platform

The basic principle of monocular stereo vision is to measure targets with known size or angle shapes on a moving platform within the camera coordinate system, and use these targets to calculate the coordinates of objects within the camera coordinate system. Commonly used targets include points, straight lines, quadratic curves, etc. Here are some examples to briefly explain it.
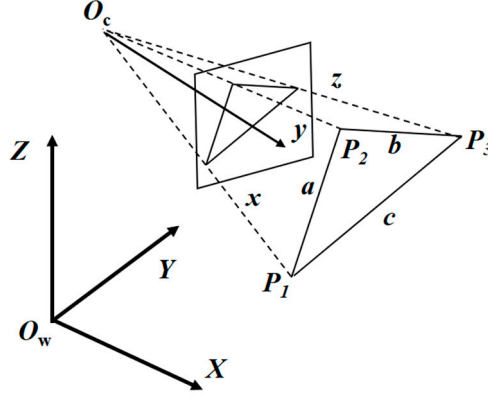
Figure S2. Schematic diagram of Monocular Stereo Vision P3P problem

As shown in Figure S2, this is a classic PNP problem, which involves finding the distance between N points with known relative distances and the angle between the points and the optical center. At least three such points are required, which is called the P3P problem. Let P_1, P_2, and P_3 be the three points on the target, and a, b, and c be the distances between the points. Let the distance between the camera origin and the three feature points be x, y, and z. There exists the following geometric relationship:

$$\begin{cases} x^2 + y^2 - 2xy\cos(\alpha) = a^2 \\ x^2 + z^2 - 2xz\cos(\beta) = b^2 \\ z^2 + y^2 - 2zy\cos(\gamma) = c^2 \end{cases} \tag{S1}$$

The distance from the feature point to the camera origin can be obtained by solving the above equation system. Although there are multiple solutions, the correct solution can be selected by checking the position of the camera origin projected on the feature point plane. In addition, to reduce errors, calibration disks are generally used as targets to obtain more accurate positions of feature points.
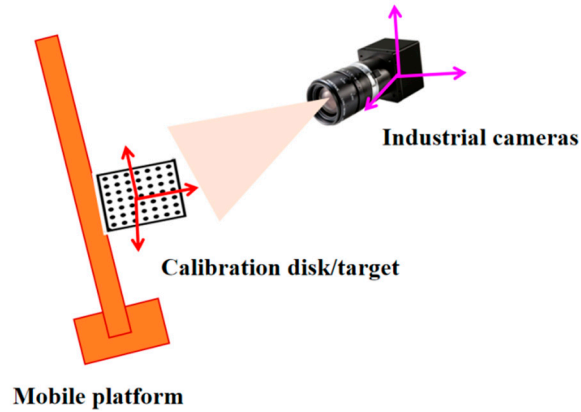
Figure S3. A monocular stereo vision system constructed using an industrial camera and a target

As shown in Figure S3, the relative relationship between the target coordinate system and the camera coordinate system is measured using monocular stereo vision. The target is fixed on the end platform, that is, the relative position between the target coordinate system and the end platform coordinate system is fixed. The next step is to associate the camera coordinate system with the gantry coordinate system. After the frame coordinate system is determined, the parameter coordinates of the mechanism are also determined. The coordinates of the mechanism parameters before identification are unknown, and the magnitude of the identification result depends on the way the origin and coordinate axis of the frame coordinate system are established at this time. In the article, the target is placed at the center of the bottom of the mechanism, and the target coordinate system is the specified rack coordinate system. The camera measures the pose of the target relative to the camera at this time, thereby establishing the relationship between the two. Thus obtaining the pose of the end platform coordinate system in the rack coordinate system. It can be seen that the coordinates of the mechanism parameters identified based on the end platform pose are naturally relative to the specified frame coordinate system at this time.