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## 2.3. Task Environments

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## What is PEAS 什么是PEAS

- PEAS is a task environment specification, stands for:

PEAS是一种任务环境的规范，代表：

<b>P</b> erformance	■	性能
<b>E</b> nvironment	■	环境
<b>A</b> ctuators	■	动作器
<b>S</b> ensors	■	感受器

- In the simple vacuum-cleaner agent, we had to specify the performance measure, the environment, and the agent's actuators and sensors.

在真空吸尘器智能体这个例子中，我们曾经详述了性能指标、环境、智能体的动作器和感受器。

- For building rational agents, we must think about task environments, which are the “problems” to which agents are the “solutions”.

为了构建理性智能体，我们必须思考关于任务环境，这是“问题”，而智能体是“解决方式”。

Example: PEAS description PEAS描述

□ Agent Type: Taxi driver

智能体类型：的士司机

Performance	Environment	Actuators	Sensors
safe 安全 fast 快速 legal 守法 comfortable 舒适 profits 收益	roads 道路 traffic 交通 pedestrians 行人 customers 顾客	steering 方向盘 accelerator 油门 brake 刹车器 signal 信号 horn 喇叭 display 显示器	cameras 摄像头 sonar 声纳 speedometer 速度仪 GPS GPS odometer 里程表 accelerometer 加速度计 engine sensors 引擎传感器 keyboard 操作盘

## Example: PEAS description PEAS描述

### □ Agent Type: Satellite image analysis system

智能体类型：卫星图像分析系统

Performance	Environment	Actuators	Sensors
correct image categorization.  正确的图像归类	downlink from orbiting satellite.  轨道卫星的下行信道	display of scene categorization.  场景归类的显示	color pixel arrays.  颜色像素阵列

## Example: PEAS description PEAS描述

### □ Agent Type: Internet shopping

智能体类型：网上购物

Performance	Environment	Actuators	Sensors
price 价格 quality 质量 appropriateness 合理性 efficiency 效率	Websites 网站 vendors 厂商 shippers 货主	display to user 商品展示 follow URL 跟随URL fill in form 填单	Webpages 网页 (text, (文本、 image, 图像、 scripts) 脚本)



## 2.3. Task Environments

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- ☐ 2.3.2. Environment Types

## Different Environment Types 不同的环境类型

### □ Fully observable vs. partially observable 完全可观测与部分可观测

An agent's sensors give it access to the complete state of the environment at each point in time, then the task environment is fully observable.

一个智能体的传感器在每个时间点上可访问环境的完整状态，则该任务环境是完全可观测的。

### □ Single agent vs. multi-agent 单智能体与多智能体

An agent operating by itself in an environment, then it is fully single agent.

一个智能体在一个环境内自运行，则他就是一个单智能体。

### □ Deterministic vs. stochastic 确定性与随机性

The next state of the environment is completely determined by the current state and the action executed by the agent, then the environment is deterministic.

环境的下一个状态完全由当前的状态和由该智能体执行的动作所决定，则该环境是确定性的。



## Different Environment Types 不同的环境类型

### □ Episodic vs. sequential 阵发性与连续性

The agent's experience is divided into atomic episodes, and the choice of action in each episode depends only on the episode itself.

智能体的动作过程被分为原子的片段，并且每个片段的动作选择仅仅依赖于片段本身。

### □ Dynamic vs. static 动态与静态

If the environment can change while an agent is deliberating, then the environment is dynamic for that agent; otherwise it is static.

如果环境随智能体的行为而改变，则该智能体的环境是动态的；否则是静态的。

### ■ Semi-dynamic 半动态

If the environment itself does not change with the passage of time but the agent's performance score does.

如果环境本身不随时间的推移而改变，但该智能体的性能发生变化。

## Different Environment Types 不同的环境类型

### □ Discrete vs. continuous 离散与连续

- The discrete/continuous distinction applies to the state of the environment, to the way time is handled, and to the percepts and actions of the agent.

离散与连续的区别在于环境的状态、时间处理的方式、以及感知和智能体的动作。

### □ Known vs. unknown 已知与未知

- In a known environment, the outcomes for all actions are given.  
在一个已知的环境下，所有动作的结果是给定的。
- Obviously, if the environment is unknown, the agent will have to learn how it works in order to make good decisions.

显然，如果环境是未知的，则该智能体将需要学习如何动作，以便做出正确的决策。

## Example: Task environments and their characteristics 任务环境及其特性

Environment Types 环境类型	Example Agents 智能体举例		
	Taxi driving 的士司机	Image analysis 图像分析	Internet shopping 网上购物
Observable 可观测	Partially 部分	Fully 完全	Partially 部分
Agents 智能体	Multi 多个	Single 单个	Single 单个
Deterministic 确定性	Stochastic 随机	Deterministic 确定	Stochastic 随机
Episodic 阵发性	Sequential 顺序	Episodic 阵发	Sequential 顺序
Dynamic 动态	Dynamic 动态	Semi 半动态	Semi 半动态
Discrete 离散	Continuous 连续	Continuous 连续	Discrete 离散