Universe Scientific Publishing

Quantitative Implementation of Artificial Intelligence Based on Task Completion Analysis

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Abstract: With the further development of the new generation of artificial intelligence science and technology, the new generation of artificial intelligence science and technology has been applied in many fields. AlphaGo program uses high technology of quantitative analysis to realize qualitative research and development of artificial intelligence, which has important reference significance for the research and development of a new generation of artificial intelligence in the future. From the perspective of task accessibility, this paper analyzes the defects of the disturbance, so as to achieve the quantitative implementation of the new generation of artificial intelligence task accessibility analysis method.

Keywords: Artificial Intelligence; AlphaGo; Quantitative Analysis; Task Completion

1. Introduction

In recent years, the research on artificial intelligence technology has become one of the hot research directions, and not long ago, the game of AlphaGo go against Li Shishi paid more attention to artificial intelligence technology. AlphaGo won the game with a record of 4:1. This victory not only reflects the strength of modern artificial intelligence technology, but also shows the necessity of quantitative analysis and qualitative behavior of artificial intelligence. Go has always been the most difficult performance in all chess games, and it is also the embodiment of human wisdom. Because go itself has a large chessboard, the number of solutions is very large, it is impossible to use the traditional way of traversing all solutions, and the chess game itself is very complex, so it is difficult to design an artificial intelligence algorithm with such a simple valuation function. The AlphaGo program also adds two calculations: deep learning and Monte Carlo tree. By comprehensively considering the drop probability, the winning rate in the current situation and the valuation function formed with the traditional fast walking strategy, it can be found from the chess results between the two, This method has successfully transformed the task of qualitative artificial intelligence technology into a quantitative solution process by computer [1].

In this paper, the concept of artificial intelligence expressed by AlphaGo algorithm is interpreted from the following perspectives: (1) from the perspective of task realizability, that is, feature completeness and representation space construction to evaluate the anti-interference ability of AlphaGo algorithm.

2. Task completion analysis based on representation space

For the implementation of artificial intelligence, when completing the task, it will be limited by internal and external conditions, which will affect the completion effect of the task. Therefore, in the process of task processing, artificial intelligence first considers the current system state and how to adapt to the needs of the task and complete the realization of the task. Only on the premise that the task can be carried out efficiently, can the task planning have its importance, otherwise it is just a waste of time. In addition, for tasks related to visual information, such as robot visual servo control system, how to better model the feature set in such tasks is also very important. This is because a complete feature set is the premise to realize the construction of representation space, which is also a necessary condition to demonstrate the completion of tasks, which also plays an important role in the planning and implementation of artificial intelligence tasks. However, the current

research on the construction of the above complete feature set is not deep enough, and we still need to strengthen the research in this aspect. As an important member of artificial intelligence, AlphaGo program reflects each other with the cognition of go image and decision-making process, and has great research value in vision and human-computer interaction. This chapter will analyze the mechanism and significance of AlphaGo algorithm from the perspective of human feature completeness and task realizability [2].

2.1 Feature completeness

The overall process of artificial intelligence technology in completing tasks is the process of the change of its information characteristics. The whole process and state of the task carried out by the whole artificial agent must be carried out and expressed through characteristics, that is, there must be an aggregate including at least one important information characteristic, and each stage and state of the task can be conceptually classified, which can form a complete feature set for a task. However, a single complete feature set is not unique, and its selection has many possibilities. Technically, it must also be combined with visual human-computer interaction process and optimization control algorithm. Then take the existing imperfect feature set as the starting point, combined with the surrounding qualified complete feature set, so as to determine how it can complement the surrounding existing feature set, so as to further improve the feature set. At the same time, it also provides specific task search strategies and evaluation methods, that is, it can judge what kind of complete feature set is needed through the state and manifestation of the task, and how to convert it into a complete feature set when the feature set is in an imperfect state.

In the field of visual servo control system, the tasks of robot visual servo system are classified from the perspective of feature completeness. The analysis shows that there is different completeness among the features in the images collected by various structures. These implementations require a special machine learning algorithm to establish a complete feature combination, so as to complete specific visual human-computer interaction tasks. The deep convolution neural network algorithm can complete the reverse transmission of error by using the characteristics of random gradient descent in training, so as to achieve the purpose of network layer education, such as the learning and construction of feature sets. The neural network algorithm also has the memory function of samples to a certain extent, and can be reflected in the network in the form of parameters. At the beginning, there needs to be an unsupervised deep learning process. Its purpose is to construct an original feature set. This feature set has no special requirements and may not be complete for the task to be completed. Then, after the establishment of the feature set, it is necessary to gradually add a supervised in-depth learning process to gradually convert the initial feature set to a more complete feature set required by the task. Therefore, the in-depth practice method and win-win result oriented practice strategy used in AlphaGo program, as a very effective characteristic learning means, deserve people's in-depth research and attention [3].

2.2 Representation space construction

2.2.1 Representation space model

Representation space is a space composed of variables that can represent the current robot system and a given task. For the same robot system and task, the variables for constructing the representation space can also be different from different angles. It is necessary to comprehensively consider the characteristics of the robot system and task. Before executing a task, an artificial agent must first consider whether the current state of the system itself meets the conditions for completing the task. Only on the premise of completing the task first, and then planning the task, can it have its practical significance. At present, through the task planning for the main motion fields of robots and the cooperative working mode of multi robot systems, the task realizable characteristics and performance of robot systems have been preliminarily studied, as shown in equation (1):

$$\begin{cases} (\xi^0 \in A) \cap (\xi^g \in A), \\ \exists P \subset A,\ \mathrm{P} = \{\xi^0,\ \cdots,\ \xi^g\}, \end{cases} \tag{1}$$

According to the realization characteristics of the task, the robot control system design and task constraints are adjusted to make the task realizable, but there is no unified theory. The two-dimensional representation space is shown in Figure 1 below.

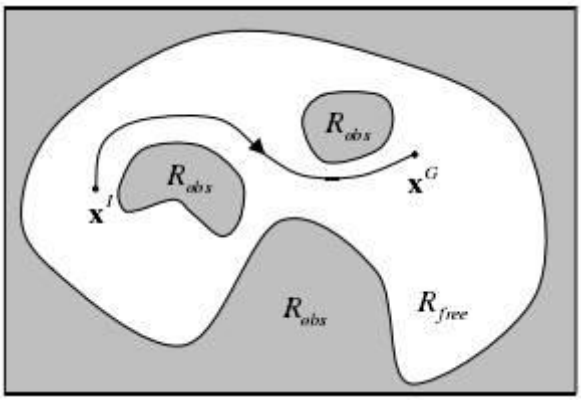

Fig. 1 Schematic diagram of two-dimensional representation space

2.2.2 Task completion conditions

The above task planning problem is transformed into the path problem of initial state coordinates and target location in two-dimensional representation space. Therefore, the task can be completed if the robot system meets the following three conditions:

(1) The initial state is reachable;

(2) The target state is reachable;

(3) There are connected paths of initial state and target state in the reachable region.

Conditions (1) and (2) can be judged by judging whether the initial state and target state are located in the reachable region of the representation space. In order to judge whether condition (3) is satisfied, it is necessary to introduce a deep learning algorithm.

3. Artificial intelligence analysis under anti-interference

In the process of completing the task, artificial agent will be inevitably affected by the internal and external environment, such as unknown model dynamics, model uncertainty and unknown disturbance. This disturbance will further deteriorate the characteristics of the system or the imbalance of the system itself, so that the final task cannot find the correct way from the representation space to achieve the goal. Therefore, in the process of introducing AlphaGo & apos; s deep learning network for modeling, it is difficult to avoid errors. Adding Monte Carlo search algorithm can indeed shorten the search breadth and duration to a certain extent, but it will inevitably lead to huge unknown disturbances in the system, and AlphaGo itself cannot form a more efficient mechanism to solve the interference, Finally, system instability occurs. Therefore, if we can borrow some ideas of anti-interference and control theory, realize the online prediction of system modeling error and unknown disturbance by establishing strategies such as interference observer, and take the prediction results as an important consideration for the next game decision, we may fundamentally improve the work efficiency and execution results of AlphaGo [4].

Conclusion

In this paper, the main research results on artificial intelligence technology are to explore the quantitative realization of artificial intelligence based on the realizability of tasks. Through the research on the representation space and anti-interference of artificial intelligence, it is analyzed that although the current artificial intelligence can solve certain quantitative problems, it is also subject to many constraints. It is also necessary to further find the internal relationship between qualitative description method and quantitative analysis, and then improve the level of artificial intelligence

algorithm to beta go or even higher.

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