# 2. Project background

Artificial intelligence (AI) is always a hotspot problem in the computer science since the terminology has been put forward in 1956 Dartmouth conference. Artificial intelligence is a technical science to research and develop theory, method, technique, and application system used to simulate, expand human intelligence. Artificial intelligence simulates the information process of human consciousness and human thinking. Artificial intelligence is not the human intelligence but it could be thinking like a human being or even surpass human’s intelligence. Main research fields are artificial-intelligence robot, speech recognition, national language process, expert system, and image recognition.

Image recognition is the important branch of the AI. Image recognition is based on the major characteristic of the image. Every image has its characteristic. For example, capital letter A has a sharp and letter p has a circle. Human’s eye always focus on the major characteristic of the image in the process of image recognition. Thus, it is important to get rid of redundancy information and focus on the key features. Computers could recognize the image by compare the key features with the database, that is, pattern match. However, not every image has their pattern in the database. Gestalt psychologist propose prototype matching model to deal this problem. Prototype matching model focus on the similarity. The method abstract the similarity from the image. The similarity is called prototype which is used to recognize the image. Prototype matching model clarify how human analyse and process the similarity. Obviously, this model is better than pattern matching. However, this model is difficult to employ in computer programs. In modern industry, programs find useful information through image grey-scale difference.

According to our group idea, our application will have three parts. In the first part, application need to recognize the character of the image the user provided by itself. And the application should have the ability to complete the image. For example, if user draw a dragon horn and a dragon wings. Application should draw a dragon based on user’s painting. It is worth mentioning that application should learn from user’s painting style in order to make sure that the picture will be completed in the matching style. The second part is colour the whole picture. This process should base on the deep learning. The last part is modify the painting into different style like photorealism, conceptual art, impressionism and so on.