



Internet AI Technology and Its Impact on China's High Education

Chao Liu¹(✉), Chao Zhao², and Wentao Wang³

¹ Baidu User Experience Department, Baidu, Beijing 100085, China
Liuchao05@baidu.com

² Industrial Design Department, Academy of Art and Design,
Tsinghua University, Haidian, Beijing, China
zhaochao@tsinghua.edu.cn

³ Baidu Education Department, Baidu, Beijing 100085, China
wangwentao@baidu.com

Abstract. This paper discussed the probable influence and changes of China's high education under the background of era of Internet artificial intelligence (AI). There are two trends of the future high education development influenced by the internet AI technology: firstly, the new internet based education products and services based on the AI technology will strongly affect the learning process and interaction between students and teachers. Secondly, AI technology will change the future talent cultivation methods and further replace some traditional job opportunities through creating the new working positions for the future graduates. The authors identified the opportunities and challenges faced by China's universities, and explored the new teaching methodologies within the context of AI era.

Keywords: Internet AI technology · High education · Chinese context
Baidu · Tsinghua University · Learning process

1 Introduction

The internet AI technology as specified in this paper is realizable on the basis of the verified internet product. All-purpose AI technology, such as, speech recognition, image recognition, natural semantic recognition, augmented reality, deep learning, education mapping knowledge domain (millions of education knowledge), education user portrait (learning interest and learning progress), education data intelligence (big data behavior analysis) (Fig. 1) will strongly impact on the future changes and development of China's education. The scope of this research mainly focus on the China's high education institutions, except for kindergarten, primary school, junior high school and senior high school education. This paper presented the pilot study for the design institutions which focus on cultivating the design graduates to meet the talents recruitment requirement of the new technological enterprises.

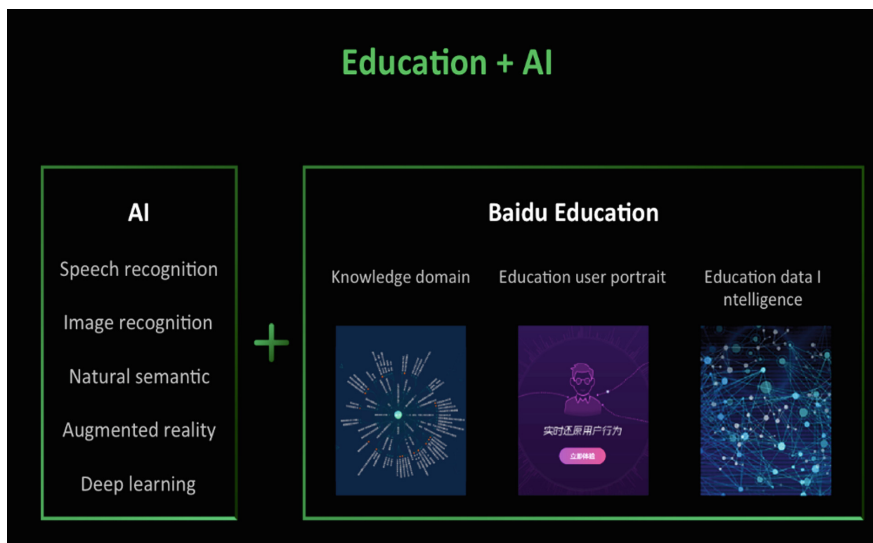


Fig. 1. All-purpose AI technology

2 Research Background and Problem

Based on the analyzing the big data released by 700 universities in China, the research team have identified 7 universities randomly to conduct survey (including 1 top university, 2 key universities, 2 regular high education universities and 2 higher vocational colleges). The survey shows that Chinese universities have invested more than USD 3 million in the teaching materials and hardware equipment. The investment amount of the key universities is over USD 10 million every year. However, the findings of survey indicate that the utilization rate of teaching materials and hardware equipment is not higher than the expectation. Moreover, it was difficult for the university students to find out the desirable materials from the huge number of teaching materials. This is because students don't know the teaching materials and hardware equipment purchased by universities, nor the correlation to their research topics. Therefore, the actual utilization rate of teaching resources is seriously affected and need to explore the solutions in this research.

3 Research Methodology and Coding System

In order to solve the knowledge screening problem of different students in different learning phases, the research team composed by co-operation between Baidu Company and Tsinghua University conducted the qualitative and quantitative research about the high education administration and academic affairs in the different universities. This research matched the knowledge points with the curriculum of each university to form a personalized educational AI knowledge map based on the different students in different disciplines. Firstly, the research team developed knowledge system to link the related knowledge documents within the Baidu internet system to the different

disciplines. And then, this research build a coding system based on the analyzing amount of the reading and downloaded of knowledge data base. There are two categories in this coding system: document relevance, and document quality. Figure 2 shows the coding system to map the relationship among the different domain knowledge to build the body of knowledge for particular disciplinary. The Wisdom College PC System (Fig. 3) has been developed based on above understanding. It is worth noting that students retention rate of product utilization increased by 16% when AI mapping knowledge domain is launched on the line [1].

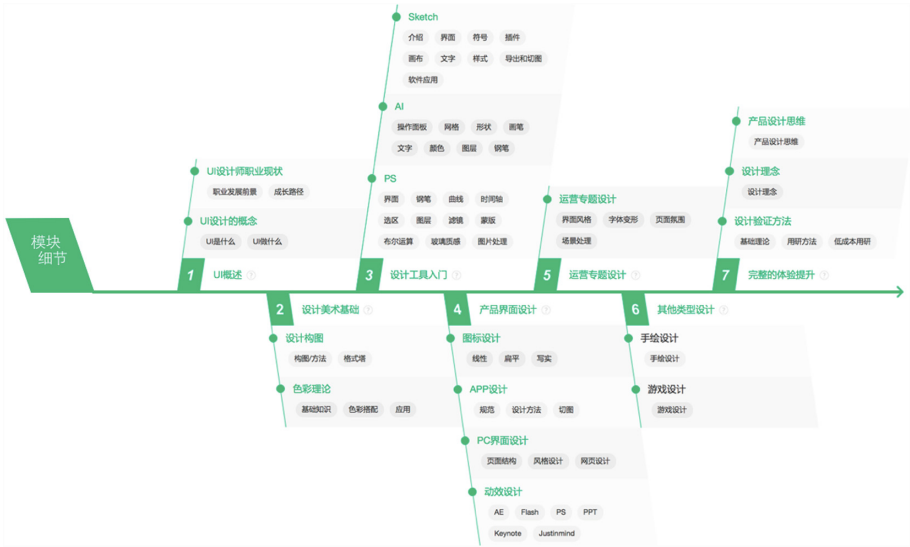


Fig. 2. Mapping of the domain knowledge

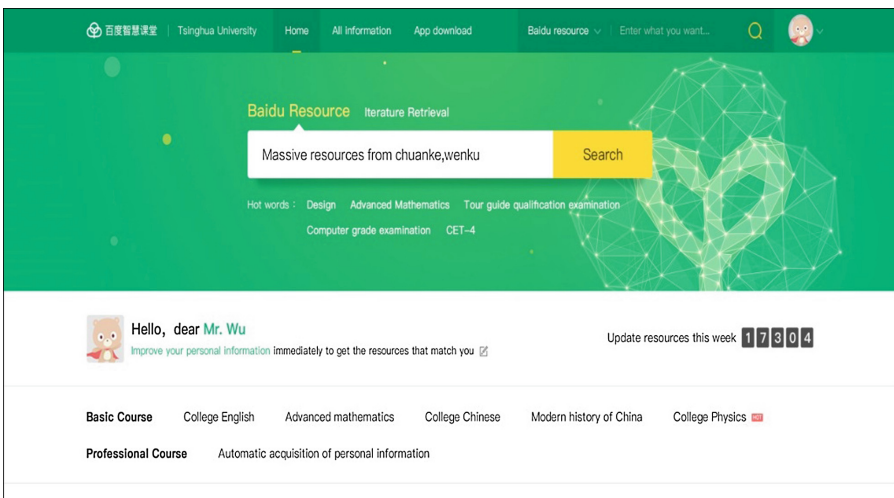


Fig. 3. Wisdom College PC System based on the AI mapping knowledge domain

4 AI Wisdom Class Schedule

AI mapping knowledge domain is established on the basis of the vast amount of knowledge documents' optimization of Baidu. However, this research found that the time sequence of knowledge points doesn't necessarily correspond with the learning time of students. So it is necessary to develop a product to increase the utilization frequency of knowledge document by students. The AI wisdom class schedule has been developed by this research through linking the AI mapping knowledge domain with the universities' curriculum. This product supports the teaching process with the multi-functions such as class time reminder, classroom location, campus map navigation, and the course tips (course complexity, roll call frequency, the course assignment and so on). Students can read their class schedule on the mobile phone at anytime and anywhere (Fig. 4).

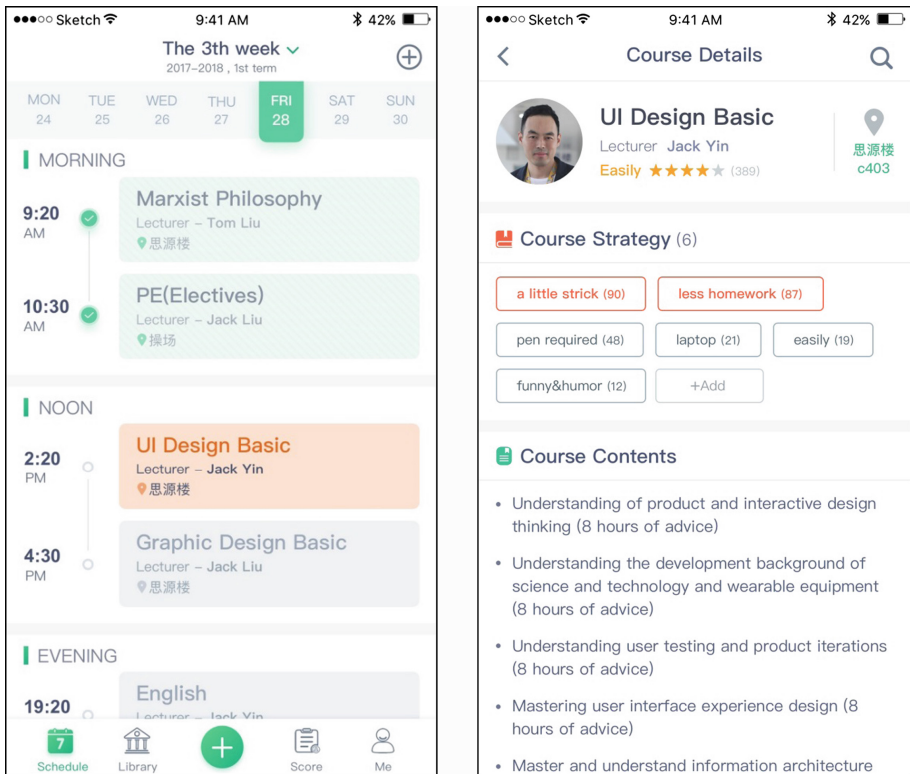


Fig. 4. AI wisdom class schedule

The value of the AI wisdom class schedule is not only enhancing the utilization frequency of students, but also provide new method of individual teaching knowledge data base. For example,

There are 15 million knowledge points and 0.2 billion knowledge documents in Baidu Baike linked with the universities' curriculum (Fig. 5).

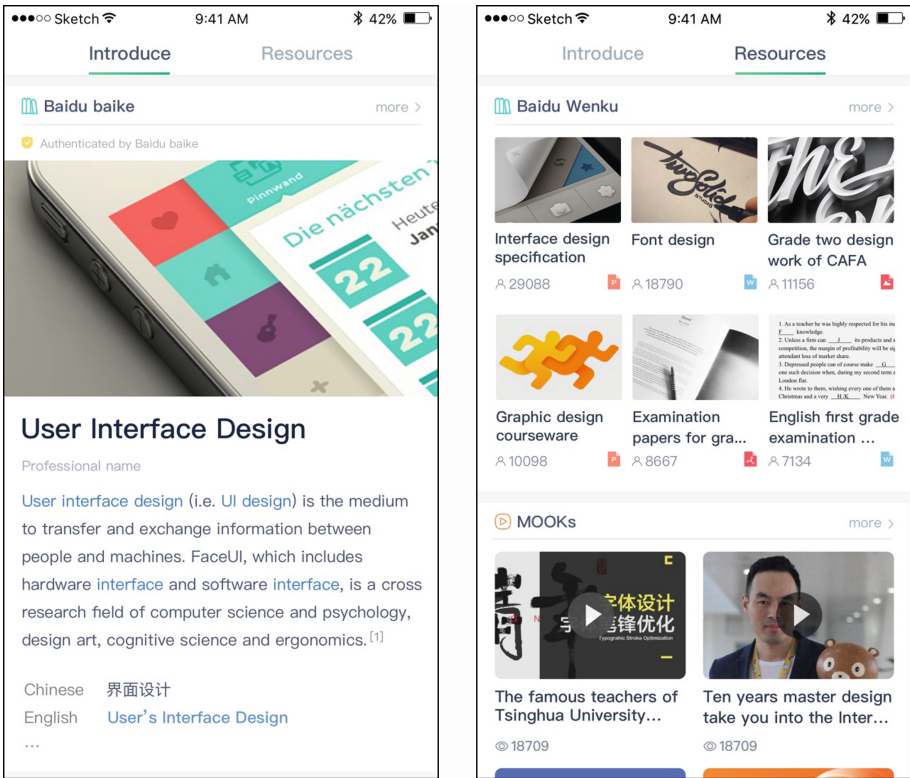


Fig. 5. Huge amount of knowledge points and documents linked with universities curriculum

When the class schedule is docked with knowledge point, research team find out that the class schedule utilization frequency of students is increased for 200% and the students raise more utilization demands. Based on the functions such as the examination prompt and score query, this research analyze the learning state of every student at present to help the students planning next-step learning path through AI technology. In such case, the individual learning plan of students will be matched to AI mapping knowledge domain again (Fig. 6).



Fig. 6. Individual learning plan of students

5 AI Image Recognition Technology's Application in the University Education

It is well known that the basic application of AI technology includes image and speech recognition. How to use these technologies in the university education? The research team has developed following products to explore the solutions to answer this question:

One solution developed by research team is data extraction based on face recognition and student attention. Every educator knows that not all students have the strong self-control ability and not every teacher can attract the students during class. The traditional method is roll call, however, this time-consuming work is likely to provoke opposition between students and teachers. It is important to note that AI technology can solve this problem easily. AI face recognition technology can recognize the faces of all students within the short time and line out the possibly absent students under the supporting of camera installed in the university classroom. The professor can carry out roll call for small group of students who are suspected to be absent screened by AI technology (Fig. 7).

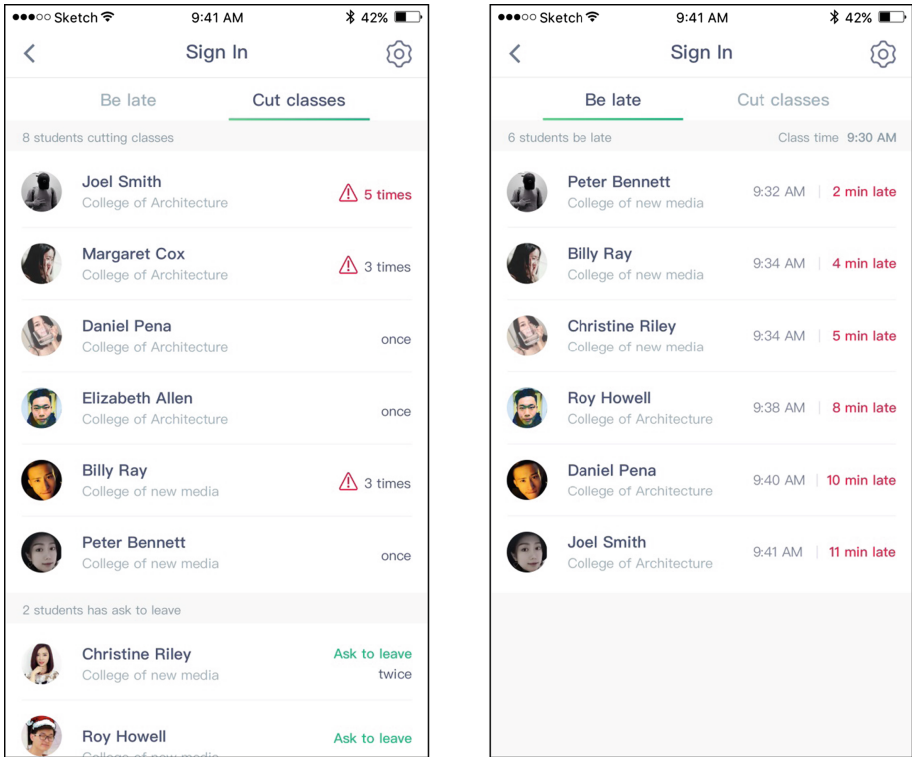


Fig. 7. Data extraction based on face recognition and student attention

Besides the reason of self-control ability of students, the quality of curriculum might be another factor to cause the students absenteeism. Therefore, AI face recognition technology might monitor the excitement and attention of each student in the class to evaluate the teaching quality. If most students are absent-minded and sleeping in the class, it means that the course has quality problem. Therefore, this system developed multiple dimensions to assess the curriculum quality.

Another solution is the AI based image recognition to support the copyright protection during the teaching process. Sometimes, it is difficult for professors to solve the copyright issue in the class. However, the AI image recognition technology might utilize the big data to protect copyright during the teaching process. With the image rechecking function, the product developed by this research can scan and check the students' homework, and then calculate the percentage of copying. In case of original homework, the professor can recommend the students to apply to the National Patent Office for design patent (Fig. 8).

AI speech and image recognition technology's application is valuable in the massive online teaching process. Now days, although the universities pay more attention to record the video courses to develop the massive online course, not all teachers have the capability to record the online course and edit the video. therefore,

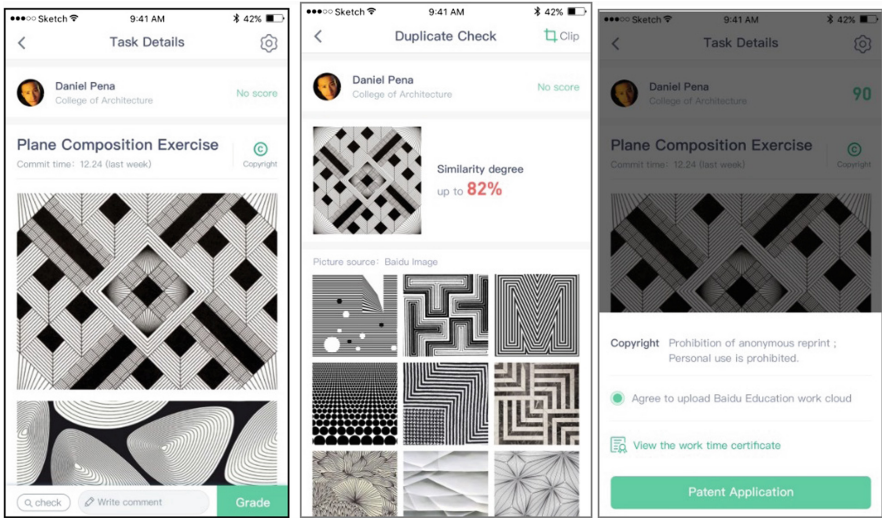


Fig. 8. AI based image recognition to support the copyright protection

many universities have employed the third-party companies to support professors recording the video course. Considering that most online courses might last for dozens of hours, the reviewing and editing process will cost a lot of money. The AI based speech and image recognition can help the judges and college leaders to check the problems of video, such as, whether there is long-playing empty image, and whether the course contents correspond with the online catalog.

6 Cloud-Based Education Data

The artificial intelligence is based on the huge amount of big data to provide service for the users' demands. As an important education resource, students' work and assignment are always ignored and wasted in the traditional offline teaching process. However, as the learning records of individuals, these data are very valuable to support every student learning process and provide learning demonstration for the future students. For this purpose, the research team have developed Baidu Homework Cloud Platform, zp.baidu.com (Fig. 9), within one year [2]. The university students can upload their daily homework and assignment to Baidu Homework Cloud Platform which is able to save homework for students forever. Meanwhile, the homework can be seen and praised by other students. To recruit talents from universities, many companies are willing to provide scholarship based on this homework cloud platform. If students do their homework well, they will win the scholarship and internship opportunity sponsored by the industries. Based to the analysis of huge amount data of homework, AI technology can link the students' homework to Baidu wisdom class schedule, which might help the next students who take the course with the reference materials.

7 AI Technology's Influence on the Talent Cultivation Approach

As a service provider, AI technology will be widely used in various field within the next twenty years. The job opportunity competition is inevitable between human and AI service. This research explored the new approach and methodology for the future talent cultivation in AI era. It is important to note that some existing services will be replaced by AI technology because these services just provide simple and similar solutions for the public service with expensive cost. For example, web banner designers usually repeated similar job such as input text, Align text, Adjust Font, Adust text size, select color, and insert pictures for the different projects. These works are repeated constantly and might be completed by template. As the largest E-commerce platform of China, Alibaba company employed AI technology to develop a banner design program, Luban, to do the E-commerce advertisement web design job automatically [3] in 2016. Since then, the banner design costs are reduced to 1/10 of labor cost. This trend will challenge some job positions like graphic designers in the e-commerce industries (Fig. 11).

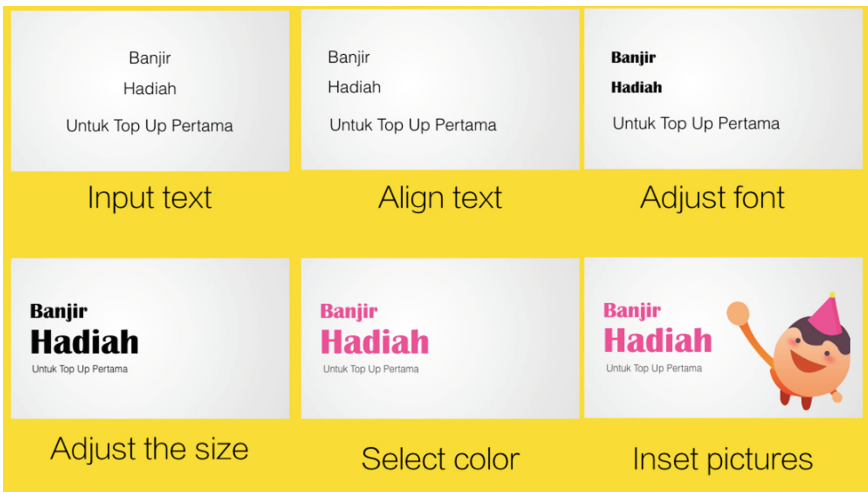


Fig. 11. AI based banner design program, Luban.

To face the challenge of AI technology in the high education areas, it is necessary to analyze the working mode of AI technology. It is a kind of in-depth learning process based on the big data, and it can master the certain rules and provide the specific solution automatically. There are three key points emerged during the AI working mode: 1. Vast amount of repeated big data. 2. Single field and domain. 3. Relatively high-quality solution based on the big data solution. On the basis of the above three points, this research suggests three principles for the talent cultivation within the high education context:

1. To do the innovative work rather than making the repeated work. For example, people should pay more attention to learn how to create the new coffee flavor rather than to learn how to keep the flavor consistency of Caffe Latte, because human being is not as good as machine for repeated work.
2. To create new areas based on the multidisciplinary collaboration. For example, there is a strong risk of English teaching replacement (based on the teaching materials) by AI; however, it is difficult for AI to replace the students who have linked the two disciplines, rugby and English, as rugby English. The reason is that the big data are absent in the trans-boundary field and AI is unable to find out the rules in small data.
3. Do the best product/service design innovation, instead of the common simple service. AI technology is able to provide the service with high cost performance, and human being cannot compete with AI technology to finish the simple task with the cost performance.

In conclusion, there are two trends of the future high education development influenced by the internet AI technology: firstly, the new internet based education products and services based on the AI technology will strongly affect the learning process and interaction between students and teachers. Secondly, AI technology will change the future talent cultivation methods and further replace some traditional job opportunities through creating the new working positions for the future graduates. The future high education should develop new curriculum based on the AI technology to cultivate the future talents with the high-quality innovation capability.

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