

Development and Application of Artificial Intelligence Multimedia Technology Based on Big Data

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Publication History

Manuscript Reference No: IJIRAE/RS/Vol.11/Issue12/DCAE10094

Research Article | Open Access | Double-Blind Peer-Reviewed | Article ID: IJIRAE/RS/Vol.11/Issue12/DCAE10094

Received: 10, November 2024, Revised: 21, November 2024, Accepted: 30, November 2024, Published Online: 15, December 2024. <https://www.ijirae.com/volumes/Vol11/iss-12/15.DCAE10094.pdf>

Article Citation: Harsha, Manvendra, Mohammad, Mukund, Geetanjali, Uma, Ishrat, Dr.Shivani (2024), Development and Application of Artificial Intelligence Multimedia Technology Based on Big Data. IJIRAE:: International Journal of Innovative Research in Advanced Engineering, Volume 11, Issue 11 of 2024 pages 980-986

Doi:> <https://doi.org/10.26562/ijirae.2024.v11i12.15>

BibTeX Key: Harsha@2024Development



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Abstract: Artificial intelligence is an innovative enterprise theme that combines computer science, physiology, science, and other disciplines, including expert programs, technical experiments, games, native language understanding, cognitive rehabilitation, robotics, engineering, recognition, and other fields. The breakthrough growth made the arrival of the era of big data have a fundamental impact on many traditional industries and has also promoted the transformation of teaching methods and methods in the field of education. In the traditional classroom, due to the limitations of teaching resources, teaching time, and location, students are basically passively accepted by the teacher, and the teaching form is single. This will improve in the age of big data with well-developed network message. Modern distance education uses advanced technology such as computer networks, multimedia, and artificial intelligence to build a virtual teaching environment based on the network. It breaks through the limitations of teachers, teaching materials, experimental equipment, and other resources that exist under the traditional teaching model. Using educational resources of the same scale can expand educational capabilities exponentially and at the same time overcomes the unified progress of traditional teaching methods, single teaching methods, and students' dissatisfaction. In this research we developed a system based on intelligent multimedia method and have the characteristics of security and stability and have done some help for network teaching of educational institutions.

Keywords: Ai, Big Data, Multi Media Application

I. INTRODUCTION

This model covers a wide range of multimedia, from simple emails and mailing lists to large and complex learning systems.

This mode is generally set up by an educational institution (such as a middle school, university, or research institution) to set up some problems suitable for specific students to solve and publish to students through intelligent multimedia and ask students to answer them. At the same time, a large number of problem-related information resources are provided for students to consult in the process of solving problems. With the rapid development of information technology in India, the importance of information has become increasingly prominent. As an important part of information technology, multimedia technology has been applied to classroom teaching, but this still cannot meet the modern personalized teaching needs, and online learning can make up for this shortcoming to some extent. In the process of education, we hope that students can conduct a variety of independent learning. For example, various types of teaching software on the Internet are important ways for students to learn independently. However, in the era of explosive growth of information data, it is extremely difficult to obtain the parts that are needed from the vast amount of data. In order to make the information of the Internet more extensive, shared, and targeted, intelligent multimedia technology based on big data should be added to it. This will not only provide strong technical support for teacher teaching and student studying but also give complete play to the rationality of learning resources as well. Therefore, the intelligent multimedia technology based on big data to construct a personalized multimedia online teaching system is in line with the latest requirements of the big data era and is of great significance. In modern distance education, not only can students ask questions to the best teachers, but also the system can automatically give answers to students' questions. In the automatic question feedback and answering system, a database system with an intelligent search engine is used. The representativeness and universality encountered by the students in the learning process, as well as the answers to the questions carefully selected by the teacher, are independently stored in the database in the form of data. When a student asks a question, the system starts an intelligent search engine to automatically find the most comprehensive answer in the database. This function of modern distance education saves the time of students and teachers and improves the utilization of learning resources [1].

II. LITERATURE REVIEW

The use of computer Internet for distance education has now attracted the attention of many countries and people, and our country is stepping up its construction and implementation. Although multimedia technology has played a pivotal role in many fields, there are still many shortcomings. First of all, the traditional multimedia technology is limited to digital audio, Flash animation, etc. played by classroom projectors, and there is a problem of resource singularity. Secondly, information technology and the Internet are developing at a rapid pace, accompanied by massive data, and the selection of effective data has become a complex issue. Finally, the Internet has entered thousands of households. The traditional status of learning in the classroom alone cannot help students. A smarter multimedia platform is needed to help students learn independently. The advent of the information society and the popularity of the calculated industry, multimedia technology is increasingly used in all aspects of society. The science technology in school is conducive to visualizing unique content, strong static relationship, delivering colourful images, making interesting sounds, and increasing students' interest in educational activities [2].

The main feature of modern distance education methods is that teachers and students can interact in real time or no real time across spaces. This is the most significant difference between modern distance education and traditional education methods, and it is also its advantage. Modern distance education methods have the following advantages: teachers' lectures and students' learning can be carried out at different locations at the same time, and there can be sufficient communication between teachers and students; students can independently arrange learning time and location according to their own needs, freely choose learning content, arrange the study plan by oneself, ask the questions in study at any time, and get answers in time; modern distance education methods are conducive to individualized study. In today's era of big data, big data technology can help people get the information they need more easily from massive amounts of data. With the development of smart grids, the distribution system is generating more and more data. In response to this problem used big data technology to process and analyze power data, tap potential value, and improve power management. introduced big data technology into the logistics field, analyzed logistics information, and predicted market changes, thus helping the logistics industry to further expand smart marketing. It used the data mining and other techniques to construct a systematic framework of TCM physique big data in the field of TCM constitutional science and found the academic laws of TCM constitution used to guide clinical practice. It takes the vocational colleges as an example and introduces the technology into the construction of smart campuses to improve skills. He applied big data technology to radio and television monitoring, improved the intelligence of the satellite radio and television monitoring system, and greatly reduced the workload of manual operations. Ma and Dai helped the coal industry to develop steadily by building a coal big data platform and integrating skill. In summary, big data technology succeeds in various parts to help the industry develop healthily. Therefore, we can consider combining big data technology with multimedia teaching that improve the level of education in India.

Through the use of intelligent multimedia technology based on big data, the built system not only has the functions of basic user information management, video resource playback, uploading and downloading, online communication, online testing, etc. but also enables personalized learning resource recommendations based on the learning habit data that the user exhibits while using the system. The system integrates various effects required for production, process, and quality control by combining information technology, physical storage technology, graphical user interface, artificial intelligence technology, data synchronization architecture, and other related fields and delivers image information to customers, through the Internet or other notification methods, promptly and accurately mentions all kinds of users in the form of graphics and text and status, and notifies relevant users as soon as possible [3].

III. ROLE OF BIG DATA

The core strength of big data technology lies in capabilities. The processing modes of big data mainly include directly entire data collection, high efficiency, and main mining of new things, but no systematic method theory has been formed. Data mining is also called knowledge discovery in the database. It refers to the process of revealing hidden and previously unknown data from a large amount of data in the database and discovering valuable information.

The specific process is as follows:

- First of all, the data collection needs to be carried out. The objects to be studied need to be selected according to the plan, and the information to be collected is positive for the analysis work and may be data of different dimensions or data of different formats.
- Save the previously collected data in a unified manner; you can choose to use the database, and you can also use a text file.
- Among the collected data, there are often some columns of information that are meaningless to the mining process. One aspect is not related to the problem that needs to be solved. The other aspect is that when the variance of a column of numerical features is zero or very close to zero, this information is of no value. Then, when the data is removed, there is no impact on the results of data mining, and the amount of calculation is also reduced. This process is also a convention.
- According to the data, the data was not filled when it was saved, resulting in some data missing features, or adding some extraneous features when saving the data. These need to be "cleaned up" to ensure the consistency of the data format. Only in this way can the data be model in the later stages to ensure success.
- Modeling results have a great relationship with the selection of numerical dimensions. For example, in logistic regression, if the data dimension is large, it can directly affect the results of the model. Then, in order to solve this problem, it is necessary to transform the data into a suitable form, such as normalizing the data 0–1, letting the data be in the range of 0–1, and then analyzing the data.
- According to the nature of the task, choose the appropriate algorithm to analyze and model the problem. If it is a classification problem, use algorithms such as logistic regression or decision tree. In advanced cases, you can use random forest or promotion methods. If it is a clustering problem, you can try the K-means algorithm or the DBSCAN algorithm.
- The results of the modeling analysis are reapplied to practice, and it is judged whether the model results are realistic and have a positive effect. Otherwise, the problem needs to be reanalyzed and modeled again [4].

Big Data Analytics with AI Big data and AI complement each other. AI becomes better, the more data it is given. It's helping organizations understand their customers a lot better, even in ways that were impossible in the past. On the other hand, big data is simply useless without software to analyze it. Humans can't do it efficiently. AI uses Big Data as follows:

Detecting anomalies - AI can analyze artificial intelligence data to detect unusual occurrences in the data. For example, having a network of sensors that have a predefined appropriate range. Anything outside of that range is an anomaly.

Probability of future outcome - Using known condition that has a certain probability of influencing the future outcome, AI can determine the likelihood of that outcome.

AI can recognize patterns - AI can see patterns that humans don't.

Data Bars and Graphs - AI can look for patterns in bars and graphs that might stay undetected by human supervision.

1. AI is creating new methods for analyzing data Statistical models have merged with computer science and became big data and machine learning.
2. Data analytics AI and ML are tools that help a company analyze its data more quickly and efficiently than what could be done by employees," "One of the most profound ways ML is changing the world can be seen in the current trends in healthcare. AI is being used to give a diagnosis based on answers to repopulated questions that the patients fill out. Doctors don't have to examine every patient that comes through the door",
3. Analytics become more predictive and prescriptive In the past, when talking about any kind of data, we used to say: "Here's what happened." Nowadays, thanks to AI and ML, we can use data to say: "Here is what is going to happen." Even better, we can instruct machine learning algorithms to do specific actions based on the predictions they make [30]. B. AI methods and techniques Artificial Intelligence (AI) algorithms enhance the ability for big data analytics. We can select three different types of IoT (The Internet of Things) Data:
 1. Raw (untouched and unstructured) Data,
 2. Meta (data about data), and
 3. Transformed (valued-added data).

AI will be useful in support of managing each of these data types in terms of identifying, categorizing, and decision making. AI coupled with advanced big data analytics provides the ability to make raw data meaningful and useful as information for decision-making purposes. The use of AI for decision making in IoT and data analytics will be crucial for efficient and effective decision making, especially in the area of streaming data and real-time analytics associated with edge computing networks. Real-time data will be a key value proposition for all use cases, segments, and solutions. The ability to capture streaming data, determine valuable attributes, and make decisions in real-time will add an entirely new dimension to service logic. In many cases, the data itself, and actionable information will be the service [5].

IV. PROPOSED METHODS FOR IMPROVEMENT OF MULTI MEDIA

Cluster analysis is to group a series of unmarked data, and these data are all numerical, and according to the distance between the data, the near-distance data is divided into a group, so as to describe the data. The existing K-means clustering algorithm adopts a random selection method when selecting the cluster centre. This method will produce large errors for the clustering results and affect the correctness of the clustering results. Therefore, this topic improves the K-means algorithm to eliminate the impact of randomly selecting cluster centers.

When analyzing the user behaviour data, the index is basically consistent with the original K-means clustering algorithm. The difference is that the selection idea of the cluster center is different. The algorithmic process of the improved K-means clustering algorithm is as follows:

- a) Arbitrarily select a point in the data set as the first cluster center C_1 .
- b) Calculate the distance from the non cluster center point to each cluster center, and record the distance between the non clustered center and its nearest cluster center as $D(x)$.
- c) Calculate the probability $D(x)^2 / \sum_{i=1}^n D(x_i)^2$ that each non clustered center becomes the center of the next cluster, and select the next cluster center by the roulette method.
- d) Repeat steps (2) and (3) until K cluster centres are selected.
- e) Calculate the distance from each non clustered center to K cluster centers, and divide it into the cluster where the nearest cluster center is located.
- f) Recalculate the cluster center for the K clusters, i.e., the centred of the cluster.
- g) Repeat steps (5) and (6) when the number is enough, or the cluster center position change is less than the set threshold.

It can be seen from the above algorithm process that the first four steps ensure that the distance between the selected K cluster centers is as far as possible, and the error caused by the K-means algorithm randomly selecting the cluster center is reduced. It is the step of the existing K-means algorithm. Finally, the algorithm is used to analyze the behaviour of student users. Virtual reality technology is a significant part in current science space. It is in office design and industry, education and training, military and outdoor services, telemedicine and surgery, sports and games, and space expenditures and has had a significant impact on the production and life of human society. This is a high-tech machine with strong growth and full of vitality. Multimedia network teaching is inseparable from the playback of audio and video. Most users nowadays generally use the method of transmitting while playing audio and video. Streaming media technology is actually playing video data in real time while downloading. By storing the multimedia files containing a large amount of information in the computer memory in advance, the client only needs to wait for a certain buffer time during playback, which not only saves the client's traffic but also saves the customer's viewing time.

In general, the development and application of a technology must be based on certain technical principles, and the principle of streaming media technology is the application of buffer technology. When the client transmits files, the network cannot synchronize the files due to the discontinuity of the data packets. Therefore, the video and audio file formats are generally compressed before being transmitted, and the data is divided into small data packets that can be transmitted. It must be noted here that, due to the dynamic nature of the network, it may cause confusion in the transmission of data packets, resulting in inconsistent time to-order of file arrivals, so it is necessary to use buffer technology to solve this problem. The buffer system not only regulates the transmission order of the data packets but also enables high-quality continuous decompression and output of the video and audio files compressed before transmission [6]. This method can reduce the playback delay without affecting playback. When the streaming media file is played, the space occupied is not large. The data stored in this buffer is generally discarded after being played, so as to free up buffer space for the content that has not been played. The implementation of streaming services consists of the following:

- The video player is used for format conversion of multimedia on the system side, so that the video information is displayed on the web page.
- The streaming media server is responsible for storing and transferring the media information that has been formatted.
- The protocol layer uses the multimedia transmission protocol commonly used in the network.
- The web-side multimedia player provides a variety of operations for providing users with corresponding multimedia files.

In the development process of this system, multimedia transmission uses streaming media transmission technology. One of the basic protocols of streaming media transmission technology is the IP protocol, which implements streaming by sending packets in packets. The transmission process is as follows: first, the multimedia file is compressed, and after the format is converted, it is converted according to the semantics of the IP protocol and then transmitted by grouping, packing, and protocol. After the encoding and decoding of the web page program, the video information's restored and displayed. This can guarantee the integrity of the data and the quality of the multimedia files to a certain extent [7].

V. SYSTEM DESIGN

Overall System Design, Multimedia is an important material foundation of the information society. Multimedia is ubiquitous. Human activities will depend on multimedia to a large extent. The education in the new century cannot be separated from the multimedia. The education model based on multimedia impacts the traditional education model and will become the mainstream education form in the new century.

In our traditional teaching process, the most classic teaching mode is based on the teacher, the teacher speaks on the podium, and the students listen in the seat. Another mode of traditional education is the distance education mode such as correspondence education and radio and television education. According to the various functional requirements of the personalized network teaching system, the system mainly includes four functions. And the system combines teacher information management, student information management, and course information management; the teaching resource management module mainly includes teaching video uploading, downloading, and data statistical analysis; the interaction module includes online communication, problem discussion, message recording, etc.; online test management includes test management, online test, test score query, and so on. The overall functional structure of the system is shown in

- Login Interface. All the latest information technology methods optimize the education and teaching process and have achieved remarkable results. The current new information technology revolution marked by multimedia and network has caused profound changes in the field of education and will make a major leap in the education system and teaching mode. At present, online teaching is mainly through online virtual classrooms, campus networks, and the Internet. Web-based multimedia CAI courseware is a combination of multimedia CAI courseware and Web technology, and it will become the main form of multimedia CAI courseware for network teaching.
- Video Upload Interface. Online teaching is a “digital learning environment” based on computer, multimedia, network, hypertext, and hypermedia technology. Online resources (teaching content) organize and manage information through the hypertext interconnected “chain” and “section”, which promotes the cognition of the meaning of the subject’s knowledge. Constructing a nonlinear, net-like, multilevel way of organizing and managing information in online hypertext is more in line with human thinking characteristics and reading habits. The basic structure of hypertext is composed of “Node” and “Link.”

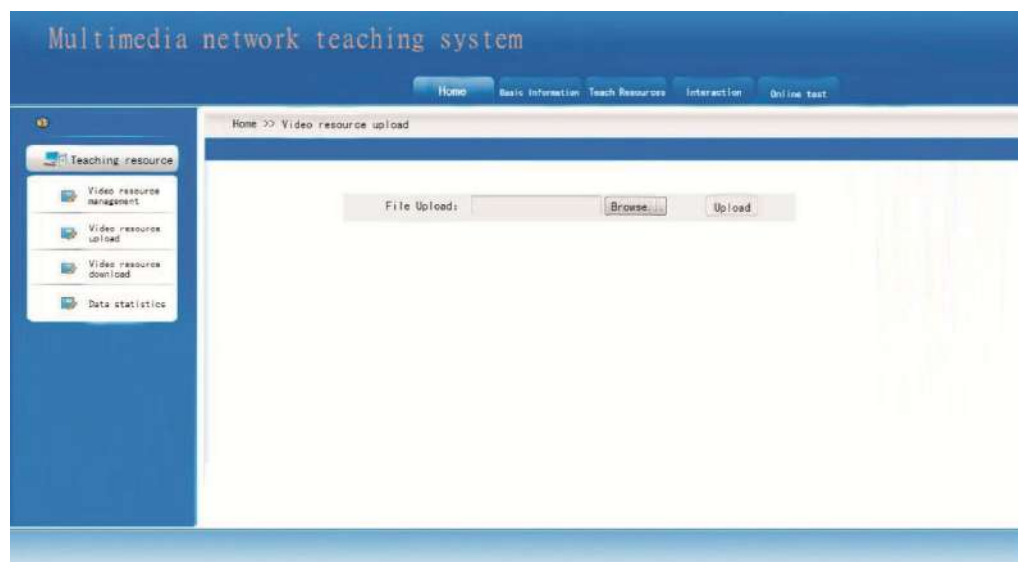


Fig.1: Video upload interface

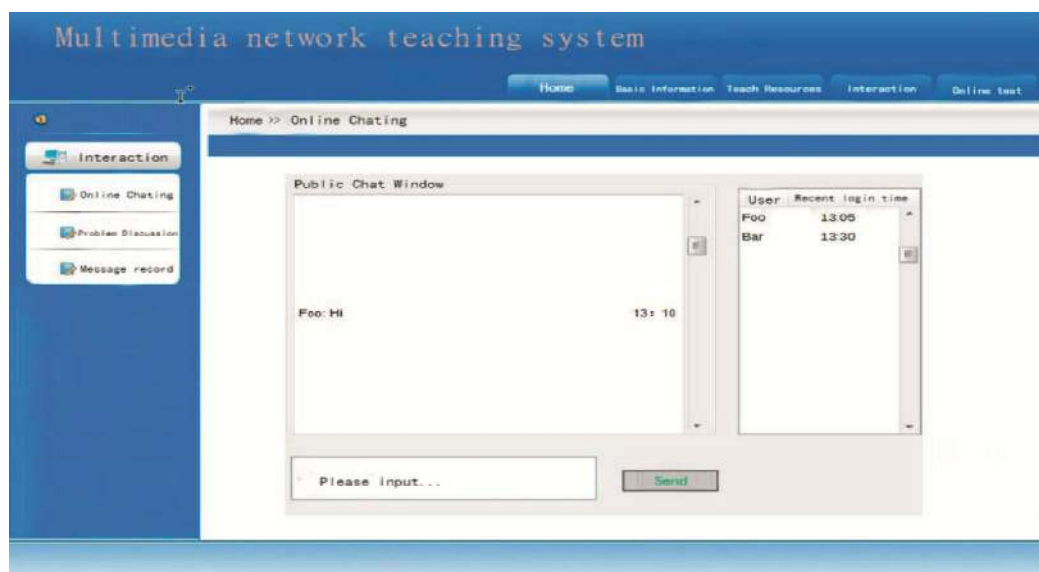


Fig.2: Online communication interface

- Online Communication Interface. The requirements for MDBMS can include several aspects: it should include the functions of the standard database management system that should be included in the conventional database, including persistence, concurrency, recovery, and ad hoc query; the modeling facilities involved in multimedia applications, that is, the data model requirements, are database object sharing and operation requirements. The big problems faced by such databases are data retrieval, security, and consistency issues.
- After logging in to the multimedia network teaching system, the user enters the system home page. Take online communication as an example, as shown in Figure 4. The user selects the online communication function and enters the online communication page, which has an information input box, an information display module, and an online person module.
- Because each student's online communication problems are different, through the preservation of message records, the data mining cluster analysis method is used to recommend personalized learning resources to students [8].

VI. RESULTS AND DISCUSSION

In the information age of the Internet, our educational training goal is to cultivate knowledge-based talents who are creative, good at innovation, and daring to innovate. Cultivating students' innovative ability has become the development trend of today's world. As a teacher, you must not only impart limited knowledge to students but, more importantly, teach students how to learn, so that they have the ability to acquire knowledge, analyze knowledge, apply knowledge, and innovate knowledge, which also meets the requirements of quality education. The playing interface of the animation design students use in the system to watch related teaching videos is shown in Figure 5. Users can drag the progress bar to select the clips they want to watch. At the same time, you can download the video from the website to the local device while playing the video [9].

Online education will trigger the "fission" of the three cornerstones of reading, writing, and calculation in the traditional education model. The linear reading method will be replaced by the nonlinear hypertext reading method, and in the form of information, it will be expressed in various media such as text, sound, graphics, and animation; writing will mainly use computers such as keyboard, mouse, and scanning to complete; in terms of computing ability training, more attention will be paid to cultivating students' ability to use computers to solve computing problems, thereby improving the efficiency of problem solving; information technology, information processing, etc. need to be added to the teaching content [10].

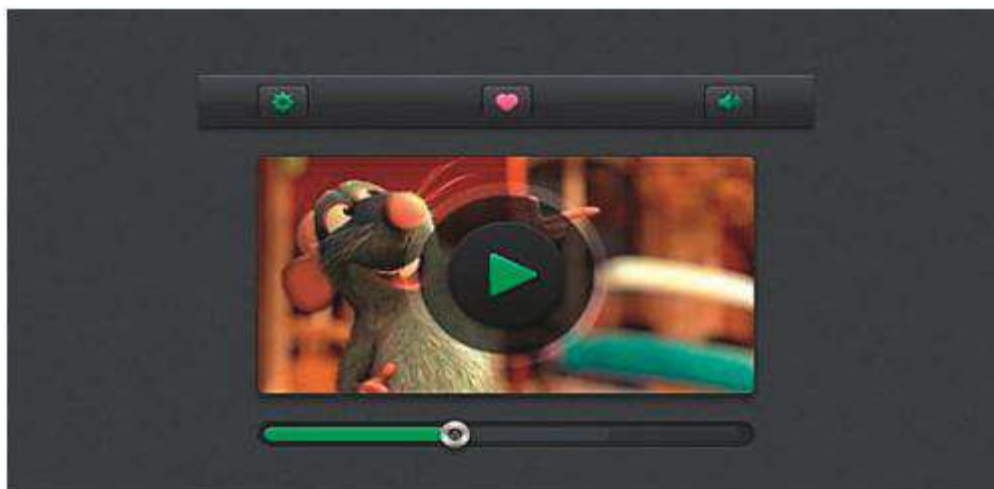


Fig.3: Video playback.

Due to the use of multiple technologies for verification, the current work of artificial intelligence is reasonable and accurate. Semiotics proposes physical labels and expert programs, which makes the subject of artificial intelligence change from motion to technology for the first time. In use, the video is played smoothly and there is no jamming. The streaming media file transfer process is to first play the data from the server link, then obtain the relevant play parameters through the web downloading the video is because of streaming technology. Streaming media playback methods mainly include unicast and broadcast. Later, due to the shortcomings of the two, multicast was generated [11].

VII. CONCLUSION

AI will be in high demand for the foreseeable future. Data and AI are merging into a synergistic relationship, where AI is useless without data and data is insurmountable without AI. "Making connections between these data sets enables a holistic view of a complex problem, from which new AI-driven insights can be identified." AI is becoming a cyclical, ongoing process with Big Data, AI and Big Data are now permanently connected. Their combined usage will expand significantly over the years. This megatrend is driven by the strong value proposition of the AI analytics applied to Big Data and the rapid expansion of the IoT, increasing the amount of Big Data. AI and Big Data are being used increasingly by companies of modest size. They access the IT hardware resources available from data centres. Then, they apply the AI tools available as cloud services to the Big Data that they collect.

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