



AI-ASSISTED CHINESE LANGUAGE TEACHING SYSTEM IN DISTRIBUTED SENSOR NETWORKS

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Abstract. The Chinese learning system gained enormous importance to support the population of China with recent technologies. The AI and ML-assisted classes are useful for learners. However, it can cut down the employment of teachers. Various planning and act was passed to reform the Chinese education system with artificial intelligence and machine language. On the other hand, this education process is interesting, customized, and unsupervised based. It was observed that the human touch study process is more satisfying and clears doubts easily. The key object of data gathering sensor-based network is accumulating all the data from the nodes and sending those sensed data to the base station. These nodes are basically working while focusing on one thought: all the nodes present in the sensor-based system are well aware of all the other nodes currently working in the same network and transmitting data in the base station. Although AI comes with a few challenges like lack of resources, training, and various security issues, if these are overcome with proper strategies, AI can be the equipment to reign in the 21st century. Additionally, LLMs and NLP modeling are described in the results that helped to understand the use of different models. Moreover, the Benefits of LLMs and NLP for Chinese language training are discussed in the study.

Key words: AI, Machine learning, Chinese language, Learners, Impact, Distributed sensor, LLMs, NLP

1. Introduction. The educational systems are becoming more dependent on the automated learning process and it has changed the form of the Chinese learning process. The learners are becoming more dependent on the customized learning system, and it has a positive impact on the learning system [1]. It has been observed that the upcoming generations will be more dependent on the intelligent network teaching system model that is based on AI. Artificial intelligence is a process of perceiving, synthesizing, and inferring information that is demonstrated by non-human things. The uses of artificial intelligence and machine learning can decrease the process of traditional learning and will enable the smart learning process [5]. However, it has a side effect as it can reduce the human touch in the educational system, and many teachers can lose their jobs. Therefore, it can be said that behind every smart use, there is a side effect always available. In below are the well sides of artificial intelligence and machine learning assistance in Chinese learning, and they can create a positive impact on the student's mind.

The research is motivated by a complex interplay of factors such as technological advancement, educational reform, employment concerns, human-centric learning, and the potential benefits of AI and language technologies. By exploring these facets, the research seeks to provide insights into how technology can be harnessed to enhance education while addressing associated challenges. The Chinese language teaching with Intelligence creates wide interest among learners. The potential impact of this research is multifaceted. From an academic standpoint, the study can contribute to the existing body of knowledge by shedding light on the nuanced connections between urban green spaces and mental health outcomes. On a practical level, the findings could lead to evidence-based recommendations for designing and implementing green spaces that optimize mental health benefits. Such insights can foster healthier communities, reduce healthcare costs associated with mental health issues, and improve the overall quality of life for urban residents. Top of FormBottom of Form

2. Objectives.

1. To identify the importance of AI and machine language in the Chinese language learning process
2. To know more about the process of reform that makes by AI and ML in the computer-assisted instruction system in Chinese education
3. To analyze the impact of AI and machine language in the education system of Chinese learning

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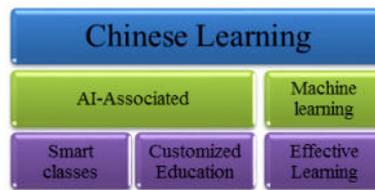


Fig. 2.1: AI and ML varieties in the learning system

Table 4.1: Uses of machine in education system

| Uses | Definition |
|-----------------------------------|---|
| Structured or unstructured | Machine learning can be either structured or unstructured way and that can be supervised by someone or not. |
| Robot navigation | There is someone needed who can use machine |
| Smart classes | While people are thinking of learning a new language, that must be interesting for them |

4. To investigate the use of distributed sensor networks to gather data about learners
5. To address the challenges that have been faced by Chinese language learners due to AI and Machine learning
6. To explore the methods that have been used by the learners using AI for the customized learning process

3. Methodology. The research process was done based on the secondary qualitative method and the information was collected about AI and ML. The whole research is related to machine learning and AI uses related to Chinese learning in distributed sensor networks [1]. Therefore, it is essential to gather information only related to the AI. Machine learning is a process that requires centralized sensors to handle instructional strategies. The data was collected with the help of Google Scholar, articles, blogs, and journals. In this way, it could find the information related to the topic, which was an appropriate data collection process for this study [2]. Without proper data collection, no research can have a successful outcome.

4. Importance of Machine Learning and AI-assisted Classe in Chinese Learning. Figure 4.1 indicates that there are different types of importance available for machine learning and AI-assisted classes in Chinese learning. The students can learn about this language by staying at any place in the world, and digital medium is only the way to learn things [3, 6]. Students can easily enjoy these smart classes as there are different types of videos and gaming systems available in between the learning, and they can customize their learning hours. Artificial intelligence offers an effective education through online and automated instructors' routine tasks are available there. In this learning process, the reforming section might be available, and real-time decision-making processes, AI assistance, and robot navigation all are available [16, 7]. The supervised learning processes can easily give proper classification or clarification related to the topic. Having knowledge of machine learning can make a person successful in their career. This AI and machine learning education is effective for those students who are studying online and have enough knowledge about machines [5]. The uses of machine learning and AI can enable one to make a successful career as the uses of technology are increasing and uses almost in every organization.

5. Impact of AI and Machine Learning Language in the Education System of Chinese Learning. There is always an impact available behind every successful work and that has to be faced by everyone. On the other hand, there are many teachers available who are connected with this field and their only earning source is this. The increasing number of uses of AI and ML can easily cut down the teachers and human touch from the education sectors. In the future, students will only get an education from machines, and many people



Fig. 4.1: AI and machine learning uses in the education field

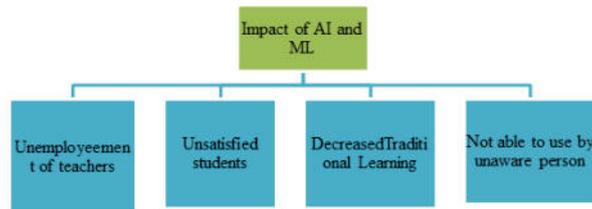


Fig. 5.1: Side effects of digital learning

will be facing unemployment.

Figure 5.1 says that online systems are mainly unsupervised learning and it was found that [9]. AI and machine learning a robotic systems that cannot able to work individually without anyone's help. Learners' and educators' connection matter a lot and the way it is possible online, is not possible in the online education system much as unemployment will happen due to machine use, people will be depressed more, and uncertain circumstances can happen at that time [10]. Therefore, it can be suggested that online education with the help of AI and ML can be also done based on supervised learning. Machine uses can be harmful to life also and as this can only be run by humans, therefore, having basic knowledge about it is necessary.

6. The Process of Reforming the Computer-assisted Chinese Education by AI and ML. With the help of artificial intelligence and machine learning, the education system can create a positive impact on the student's life. The Chinese education system is one of the fields that can create a positive influence on the student's life and they can increase the use the online education [10]. In the year 2019, the Chinese State Council developed two important plans to drive continued reform in and advancement of China's education sector. They have been trying to reform the learning system since China's opening up in 1978.

Figure 6.1 indicates two major plans of the education system in China. These plans are the "China's Education Modernisation 2035" Plan and the "Implementation Plan for Accelerating Education Modernisation (2018-2022)". The main ambition to reform the education system is to create sustainability in Chinese learning till 2035. By developing artificial intelligence, the education system can easily identify talented people among them. It has been observed that the main impact of machine learning and artificial intelligence was developed by mainland China [8]. AI and ML can able to replace human interaction in the learning field and that can give the students enough interesting work. Based on these education processes and reforming systems, AI and

Table 5.1: Impact and definition of machine uses increase

| Impact | Definition |
|---------------------------|---|
| Unemployment of teachers | Machine can replace the place of teachers |
| Unsatisfied students | students can only clear their doubts and be satisfied while there are teachers available |
| Traditional learning | The increasing uses of artificial intelligence and machine learning in the education system can be decreased the process of traditional learning [8]. |
| Unaware about machine use | It is not possible for one who has no idea about using systems. |

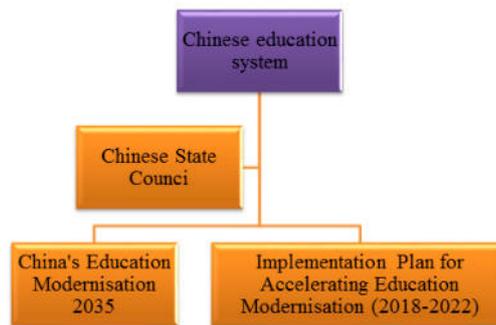


Fig. 6.1: Plan passed by Chinese state council

ML can be sustained many times. Reforming the education system with Artificial intelligence and machine are one type of significant as well as it can be harmful for human. It will reduce the work opportunities for many people and that can create huge unemployment [4].

7. Investigating the Utilization of the Networked with Distributed Sensor in Order to Gather Data about the Learners. The main focus of gathering the data in the network with distributed sensors is to transmit the data that is being sensed from each of the current nodes to another base station. Data gathering is basically a process of utilizing the nodes to their maximum capacity before they stop working or die, and the selected network becomes out of operation or inoperable at all [19]. A full complete round indicates that a specific base station is able to collect all the data that are being sent from the sensor nodes stationed outside. This is also used to reduce delay and minimize energy usage in the network that comes with the sensor [18]. There are different types of data gathering, as it is mentioned below:

Data Transmission: All the nodes with sensors transmit the called data directly to one place, the base station. However, there are some disadvantages of this whole process that cannot be ignored, such as:

1. It consumes a lot of energy and that makes it a lot more expensive than others do. The more energy it will consume, the more costly it will become.
2. The delay in the media is large also, as transmitting; the information that has been accumulated from the nodes to the base station that is located far away from the nodes would take a much longer time.
3. Whenever it is transmitting the data directly to the far-away base station, the performance becomes poorer.

PEGASIS: It stands for "Power-Efficient gathering For Sensor Information System", it is an enhancement for adapting in low energy in the hierarchy in clustering. It is founded on the belief that all the nodes that are connected in the network are aware of every other node that already exists in the network [18]. The main goal of PEGASIS is to decrease the distance of the noise transmission. Apart from that, it also manages to lower

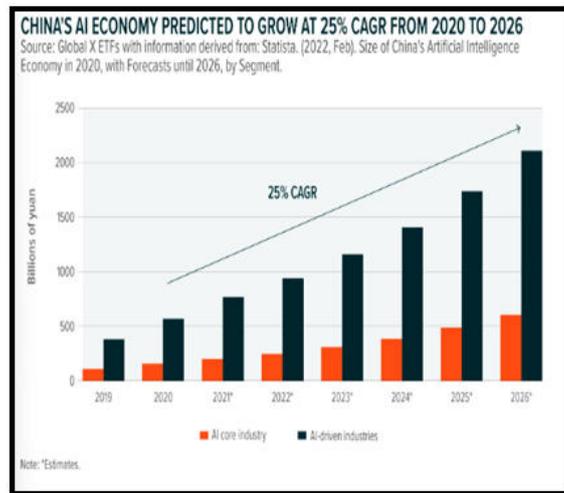


Fig. 7.1: Prediction of AI economy of China

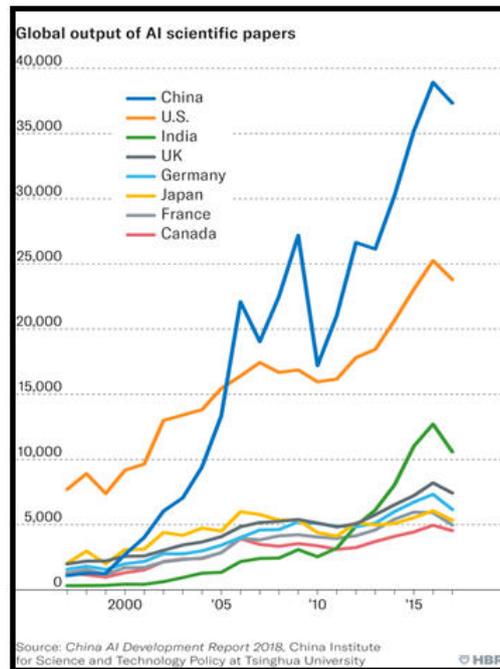


Fig. 7.2: AI development of China, 2018

the overhead of the overall broadcasting. It decreases the total number of sensed messages that are required to be sent to the base station [20]. It also makes sure that the energy is distributed equally throughout all the nodes that are connected in the network.

8. Evaluating the Key Issues Faced by Learners of the Chinese Language due to Machine Learning and AI. AI and machine learning are growing rapidly in China as the research on this topic is growing and ending up in real-life implications. The adoption of AI has spiked in the last few years in various

Table 7.1: Implication of data gathering sensor network

| | |
|---|--|
| <p>The implication of proper data gathering in the network with a sensor</p> | <p>Checking the current environment Mechanization of the industries Smart homes in the urban areas Checking on the health Reacting promptly to a disaster or crisis [22]</p> |
|---|--|

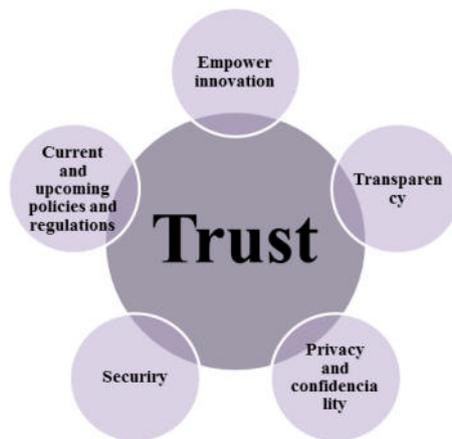


Fig. 8.1: Preserving privacy in the machine learning

industries, even beyond the tech industries [13]. These industries include retail, finance, telecommunication, and governance. The government in China has released a statement already that is very supportive in terms of the policies and guidelines for fostering more investments in the fields that are related to AI and machine learning.

As AI has some great sides that will help learners to learn new things quickly, there are some challenges too, that need to be agreed upon while incorporating AI in the classroom all over the world including China. The initial challenge that is faced in the case of using AI in the classroom is a technical expert is always needed in the room [11]. There are teachers who are not experts in these matters or are still not comfortable with using AI broadly and may face difficulties in applying this technology in their own practices of teaching. These teachers may need extra help, support, and training for them to adapt to the new technology [11]. Many universities and schools do not have the resources to buy these costlier machines and technologies and maintain them continuously. These institutes may need extra funding to incorporate them into their teaching practices in the classrooms [12]. Left apart from the concerns related to security, privacy, and the job demand market is also there. The challenges and limitations are discussed as follows,

1. The integration of technology could inadvertently widen the digital divide, as access to advanced technology might not be uniform across all regions and socioeconomic backgrounds. This could lead to unequal learning opportunities for different segments of the population.
2. While AI can enhance personalized learning, ensuring the accuracy and reliability of AI-driven content and assessments could be a challenge. AI systems might lack the nuanced understanding of human instructors, potentially impacting the quality of education.
3. Gathering and analyzing student data through sensor networks raises concerns about student privacy and data security. Safeguarding sensitive information and preventing unauthorized access become crucial considerations.
4. Integrating AI and technology into the education system requires substantial teacher training. Not all educators might be comfortable with or knowledgeable about these technologies, leading to potential

Table 9.1: Process of understanding, measuring, and mitigating the privacy breaching in machine leaning

| Understand | Measure | Mitigate |
|---|--|--|
| Conduct threat modeling and attack research Identify confidentiality properties and guarantees Understand regulatory requirements | Capture vulnerabilities quantitatively Develop and imply framework to monitor possible risks and mitigation success | Develop and imply techniques to decrease the risks of privacy Meet legal and compliance rules and regulations |

resistance or suboptimal utilization.

5. While technology can enhance learning efficiency, an overreliance on AI-assisted learning might lead to a reduction in direct human interactions between teachers and students. The social and emotional aspects of learning could be compromised.
6. Language models and NLP might struggle with capturing the intricacies of the Chinese language and its cultural context. Ensuring accurate language processing and cultural relevance in AI-driven content could be challenging.
7. The use of AI in education raises ethical questions, especially when it comes to data privacy, bias in algorithms, and potential manipulation of learning experiences. Ensuring ethical AI deployment is essential.
8. Integrating AI seamlessly into an existing educational framework is a complex task. Developing user-friendly interfaces and platforms that educators, students, and parents can navigate easily is a significant challenge.

9. Identifying the Strategies to Mitigate the Issues faced by Chinese Language Learners for the Tailor-made Learning Process. There are a few strategies that can be recommended to incorporate the AI system in the classroom of Chinese learners. The first thing is needs to be done here is to find a provider that is reliable and partner with them. Only then AI can be integrated into the classroom successfully [15]. This partner can be a company from a technological background, any NGO, or any local university. Rather than implying AI in the whole system or curriculum in the first go, it is suggested that the teachers start using it in smaller sections, and gradually expand it [14]. This will also allow the teachers to gain more experience on how to handle these technologies and build confidence in them. Eventually, it will end up building more confidence and refining the whole practice of teaching.

It is the responsibility of the teachers to encourage the students to think critically and make ethical decisions [17]. The students should follow the guidelines for implying AI ethically in their studies and in their real life while making critical thinking about it. They should also consider its usage in a broad spectrum and the possible consequences. This will also help the students to become more aware of the usage of the technologies and will be well-equipped digital citizens who can navigate through any challenges [17]. They will be enabled to grab the opportunities the digital era has to offer.

10. Pproblem Statement. This research addresses the issue that Chinese learners are facing due to the usage of AI and machine learning. This is an issue because AI and machine learning are growing at a light speed and putting their hand in every place possible. This is an issue in contemporary times because AI comes with a few default issues, such as privacy breaches, unethical usage, security and privacy, and so on. This research sheds light on the key issues that Chinese learners are facing due to the usage of AI in customized learning and how to mitigate those issues and use AI in the favor of the students.

11. Results. *Inclusion of LLMs model*

Large language models (LLM) are one of the most Implemented models for designing AI-based designs. Thus, Along with natural language processing (NLP) LLMs are best suited for AI-Assisted Chinese Language Teaching Systems. In addition, the inclusion of LLMs allows a wide range of themes. It was found that most of the linguistic-based AI interphones allied the data until 2021 [8]. For example, chat GPT-3, uses one of the AI-based models that handle data until 2021 [8]. However, with the expansion of different themes data range

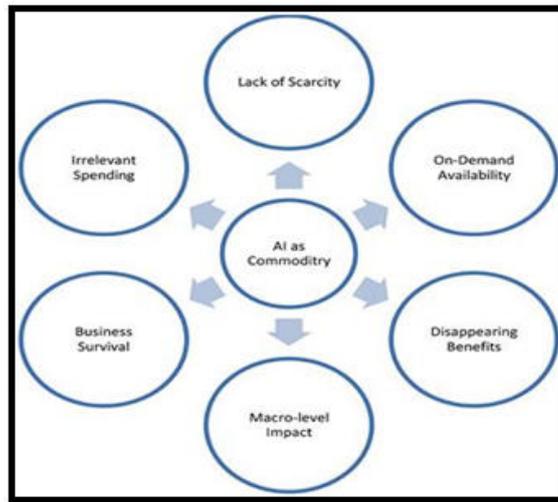


Fig. 9.1: AI as commodity

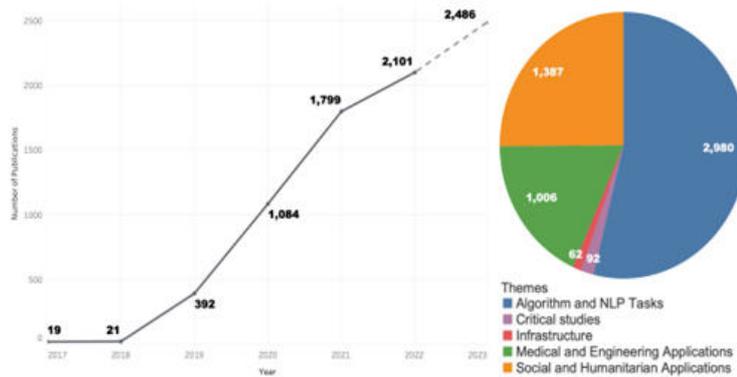


Fig. 11.1: Research themes and trends for LLMs

is increasing for such models.

Figure 11.1 is related to different themes and trends of LLMs, additionally, the data is presented in correlation with NLP tasks. Moreover, the above graph indicates that the LLMs field can be distinguished in several different themes that are related to other subfields. Therefore, a large field of data, algorithms, and mass can be included in the natural Chinese language processing system. Furthermore, with the help of such models, a wide range of information is fed into the AI modeling. From the above graph, it can be seen chances of inclusion of algorithms in the NLP task and in the field of LLM is 54%. In addition, humanitarian applications and social application topics have a 25% representation [8].

Such studies indicate a wide range of applications for LLMs, for instance, Identifying controversial speeches and humanitarian research is one of the major themes. In addition, identifying controversial speeches and identifying translated language and sentimental analysis are some of the primary features [15]. In addition, an LLM pre-training and fine-tuning of an AI-based linguistic model helps to identify different tasks and provide responses accordingly [8]. In order to such advanced models and differentiate linguistics for natural language processing, LLMs are one of the most effective models. Moreover, moreover, with such a design of the natural language proposing system a network of different linguistic abilities can be achieved. For instance, comparing a



Fig. 11.2: LLMs research and its popularity over different regions

theme based on different strata of data provides the most preferable responses for a language processing system. In addition, there are different factors that allow us to compare data by comparing all the possibilities factors. Therefore, with such abilities an improved system of language learning is achieved.

Figure 11.2 of the statistical analysis provides an overview of LLMs research and its popularity over different regions. Additionally, it highlights the networking between the different systems for the year 2022 [8]. Thus it can be seen that with a widespread network, improved databases can be achieved. Thus, designing the Chinese language and Implementing an LLM module is preferable. In addition, the main interaction of such a model will be related to the students. Thus, an appropriate distribution of the following model can be seen in the image above figure [8]. Figure 11.2 further shows a cluster of different nations, China and the USA being the leading nations for using LLMs and natural language processing for linguistics. Moreover, it was found that with the increment in the databases, a better training model can be formulated for the AI-based linguistic training system. Additionally, a wide distribution of data is required in order to provide different strata of information[8]. Hence, the Implementation of such a model in the ai-assisted Chinese language teaching system is important. Moreover, implementing LLMs along with NPL provides an improved data set to work with.

12. Conclusion. In conclusion, AI and machine learning in the classrooms of Chinese learners may offer an opportunity that is both unique and excellent for the students as well as the teachers. AI has the possibilities and potential to offer learners engaging and tailor-made learning experiences. This will also help them to develop skills that are necessary for the 21st century such as problem-solving and critical thinking. However, this also comes with a range of issues and if it can be overcome, this will be a revolutionary change.

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