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# HUMAN COLLABORATION IN SELF -LEARNİNG SYSTEMS

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**ABSTRACT:** Human-machine collaboration in self-learning refers to having humans and automated technology work alongside each other to achieve a shared goal. [1] Having entered a new era for years, where experiencing a steady and strong improvement in computational power, storage, and availability of big data. Although artificial intelligence has become a pervasive organizational phenomenon, it is still unclear if and when people will be willing to cooperate with machines. [2] Human-machine collaboration in self-learning seeks to address limitations by combining the qualities of both humans and machines. Humans and machines are dependent on each other. While machines can analyze and stock extensive data rapidly, they still lack the same creativity and understanding as humans. On the other hand, humans have these qualities, but they cannot process the vast amount of data as quickly or accurately as machines. [3]

## 1. INTRODUCTION

"This is not a race against the machines. This is a race with the machines," said many, even Kelly. [4] The idea behind human-machine collaboration in self-learning is to combine the. Once the machine has been trained, you may realize that the way they use your product is very different from the assumptions you made when training the model, so you start providing strengths of humans and machines to create more intelligent and effective systems that can improve performance. The human-machine relationship was dictated by human needs and what the market dictated at the time. The collaboration between humans and machines in self-learning has several stages. First, humans initiate the data and knowledge for the machine. [5] This process can involve designing and creating training datasets or determining relevant features. feedback to adjust the learning and performance of the machine. [6] There are several uses for human-machine collaboration in self-learning, diagnosing disease, translating languages, and providing customer service. Another example is the use of human-in-the-loop (HITL) machine learning, where humans and machines work together to solve complex problems. [7] These are just a few of the many examples.

## 2. LECTURE REVIEW

Collaboration between humans and machines enables the delivery of more insightful data than each could independently. [8] The potential of AI and machine learning to glean insights from enormous data sets is unrivaled. But most of the time, people are still much better at comprehending the context of those discoveries and the finer points of their significance [9]. The human-machine collaboration combines the two to combine deep human

experience with the breadth and depth of analysis provided by AI. As seen in Figure 1, the human-machine cooperation system comprises the human, the machine, and the setting in which they interact. To accomplish particular goals, humans and machines work together in the environment. They interact, control one another, and communicate with one another. The key challenge here is to enhance the effectiveness of collaboration systems while simultaneously fostering a fulfilling human experience.

## 3. METHODOLGY

Self-learning systems, also known as machine learning systems, have become increasingly popular in various industries due to their ability to improve over time through exposure to new data [10]. Self-learning systems can be used for various purposes, including natural language processing, computer vision, and decision- making. [11] Machine learning is divided into five branches: self-supervised learning, unsupervised learning, active learning, reinforcement learning, transfer learning, and self-supervised learning.

Self-supervised learning is a machine learningtechnique in which a model is self-trained using automatically generated labels from input data. The system is fed up with examples; a well- known example of supervised learning is spam filters. Unsupervised learning identifies patterns and relationships in data without the need for explicit labeling or guidance from a human operator. [12] Applications of unsupervised learning, such as clustering, anomaly detection, and dimensionality reduction Active learning is a machine learning technique that involves selecting the most informative data points for a model to learn from. In the context of human-machine collaboration, active learning can be used to identify the most important data points for humans to label, thus reducing the overall labeling effort. [13] This can be particularly useful in situations where labeled data is time-consuming or expensive. Reinforcement learning is a machine learning technique where the machine learns to make decisions based on feedback from its environment. [14] In human-machine collaboration, reinforcement learning can be used to train machines to learn from human feedback. For example, a robot in a manufacturing setting could be trained to learn from human feedback on how to manipulate objects more effectively. 5- Transfer learning is a machine learning technique that involves using knowledge learned from one task to improve performance on another related task.

In human-machine collaboration, transfer learning can be used to improve the performance of machine learning models by transferring knowledge learned from human experts. [15] For example, a machine learning model trained on data labeled by human experts in one domain can systems. Leveraging the expertise and knowledge be used to improve performance in a related domain.

## 4. RESULTS

The concept of machine learning came into the picture in 1950 when Alan Turing published an article answering the question "Can machines think?". [16] He proposed a hypothesis stating that machines that succeeded in convincing humans that they were indeed machines would achieve artificial intelligence. [17] This was called the Turing test. In 1957, Frank Rosenblatt designed the first neural network for computers, now generally called the Perceptron Model, that is capable of supervised learning and binary classification tasks and is based on the biological model of a single neuron in the human brain. In 1959, Bernard Widrow and Marcian Hoff created two neutral models called Adeline, which could detect binary patterns, and Madeline, which was capable of making phone lines sound clearer.[17] In 1957, the nearest neighbor algorithm was written, which later used customer segmentation algorithms, systems, and anomaly detection.

Gerald Dejong introduced 1981 the concept of explosion-based learning, which creates a general rule to discard unimportant data. In the 1990s, work on machine learning shifted to a more data- driven approach. In 2002, using a combination of machine learning, natural language processing, and information retrieval techniques, IBM's Watson beat two champions in a game of Jeopardy. In 2016, Google's Alphago program became the first computer to beat a professional human using a combination of machine learning and tree search techniques. [18]Since the start of the 21st century, many businesses have ventured intomachine learning projects such as Google Brain, AlexNet, DeepFace, OpenAI, Amazon, and Resnet. "If you take the deep learning from Facebook, Instagram, YouTube, etc., those companies crumble," LeCun says. "They are completely built around it."

## 5. DISCUSION

Our study has demonstrated the significant potential of human collaboration in improving the accuracy and robustness of machine self-learning of human workers can improve the accuracy and efficiency of machine learning models, especially in situations where labeled data is scarce or difficult to obtain. [19]The results also highlight the importance of designing effective mechanisms forincorporating human feedback into machine learning algorithms. This is because different types of feedback can have different effects on model performance. There are lots of benefits to human-machine collaboration in self-learning systems, like better decision-

making. With increased accuracy and the power of humans and machines, the way of doing things developed and reached a higher level. [20]Also, self-learning systemsare accountable; they are more transparent and explainable. However, there still may be many challenges to overcome and fully leverage the benefits of human-machine collaboration in these systems. The first one is data limitation [21]. Manymachine learning algorithms require large amounts of data before producing convenient

results, so it is crucial to have high-quality data. The lack of good data may have created problems. The second one is ethics. Self-learning systems lack accountability. Last but not least is overfitting. [22]Overfitting may fail to fit additional data, which could cause alteration in the accuracy of predicting future observations.

To overcome the challenges of human-machine collaboration in self-learning systems, it is important to adopt a comprehensive and strategic approach. This involves not only designing effective mechanisms for incorporating human feedback into machine learning algorithms but also addressing issues related to data quality, ethics, and overfitting.[23] By doing so, can fully leverage the benefits of human-machine collaboration in self-learning systems while minimizing the associated challenges and risks. There are too many approaches to human- machine collaboration in self-learning systems, such as humans in the loop. Human in the loop means integrating human employees into machine learning so that they can continuously validate the model. In this approach, humans are responsible for providing feedback and adjusting the system in real-time. This approach ensures the self- learning system is accurate and reliable, as human feedback can quickly correct errors. However, this approach can be time-consuming and costly, as it requires human resources to be dedicated to the system's operation.

In conclusion, the potential of human-machine collaboration in self-learning systems is significant and promising. [24Using human feedbackand expertise, machine learning models can achieve greater accuracy and efficiency, leading to better decisions and more transparent and accountable systems. However, future research isneeded to explore the best ways to integrate human feedback into machine self- learning and identify the most effective mechanisms to facilitate human-machine collaboration. [25]This requires a multidisciplinary approach involving experts from different disciplines, such as computer science, psychology, and ethics. Only through such cooperation can the full potential ofhuman- machine collaboration in self-learning systems be exploited while minimizing the associated risks and challenges.

Figure 1: The conceptual image of a human-machine collaboration system

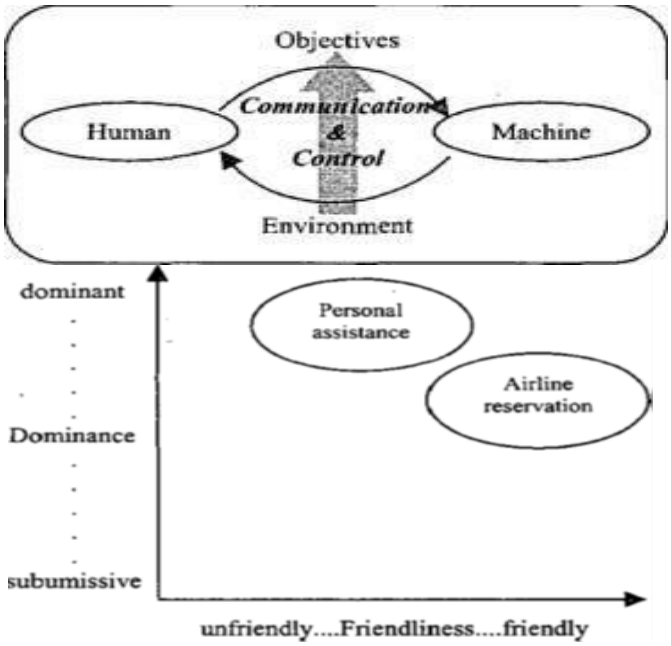


Figure 2. Personality space for specifying agents' personalities

## 6. CONCLUSION

Self-learning systems have become an integral part of various industries, such as healthcare, finance, and manufacturing, due to their ability toimprove over time through exposure to new data [26].While self-learning systems have many benefits, they also have limitations. For mentioning these limitations, various approaches to human-machine collaboration in self-learning systems have been developed, such as a human inthe loop, a human on the loop, and a human as a critic. [27Each approach has its benefits and drawbacks. As self-learning systems continue to evolve and become more sophisticated, the collaboration between humans and machines will become increasingly important. We started our research with a quote of Kevin Kelly (2016), who in his book, The Inevitable, noted that, “This is not a race against the machines … This is a race with the machines.”[28] The positive message conveyed by our results is that most managers are willing to accept a cooperative partnership with machines, as long as humans have the feeling that decisions.

Overall, human-machine collaboration in self- learning can lead to faster, more accurate, and more effective learning outcomes. [29]By combining the strengths of both humans and machines, we can improve the efficiency and effectiveness of self- learning systems.

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