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Change in knowledge representation in the digital economy

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Аннотация:

The emergence of machine learning inevitably entails the emergence of machine knowledge. Furthermore, the rate at which the latter arises in certain cases is considerably higher than what people are accustomed to. There are both similarities and differences between human and machine knowledge, which requires an update of the concept of knowledge. The similarity that is particularly relevant for the epoch of digital economy is the decision-making process, which inevitably accompanies knowledge. In all cyclic models describing knowledge production, beginning with the Shewhart-Deming cycle (PDCA), the decision making is presented, in one way or another. At the same time, knowledge management has yet to duly adapt promising neuroscience developments that offer higher accuracy in formalization of processes that determine a human-made decision. In a digital economy, we can observe growing demands on the speed and complexity of the decisions made, as well as substantial increase of the share of decisions made by robots (autonomous algorithms). For example, in large retail networks, a human no longer interferes with the pricing decisions for the goods sold. It is currently unknown which parts of the knowledge acquired by machines are unavailable to a human. A disruption in knowledge exchange between humans and machines can be unnoticeable and would not necessarily cause a loss of knowledge at an organizational level. However, safety control in this case is to provide a guarantee against errors for new machine-made decisions. In knowledge exchange between humans, new additional feedback factors arise that reduce the risk of erroneous decisions. But similar mechanisms are not currently provided for machines. Building upon existing approaches to knowledge exchange - stock and flow approaches, - it is proposed to adopt, for knowledge management purposes, a multi-Agent approach made known, inter alia, through works of M. Wooldridge. One premise for an application of a multi-Agent approach is the definition of knowledge as a network (usually, neural) created to represent the reality and interact with it. Because networks should merge for a more accurate representation of the reality, the carriers of such networks -Agents - create an interaction environment. Application of a multi-Agent approach assumes establishment of rules at several levels. Basic level -An "attestation" of an agent for operations in the environment and a resolution of disputes. Level of statuses requires an agent to be in one of the conditional states for knowledge exchange. Also, the rules can define resource limits for exchange and create stimuluses for agents to perform. Finally, indicators and a monitoring system will allow to timely identify problem areas of exchange where resolution is required.

Ключевые слова:

Knowledge sharing, Machine knowledge, Machine learning, Multi-Agent approach, Neural network