

# TASK APPROACH IN ARTIFICIAL INTELLIGENCE: LEARNING THEORY AND KNOWLEDGE HIERARCHY.

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The report will present a new learning theory and knowledge hierarchy in AI. This theory is based on the concept of the task approach proposed by A.N.Kolmagorov in the 1930s [1], and then quite fully formalized by Y.L.Ershov and K.F.Samohvalov in the 2000s [2]. Further, Goncharov, Sviridenko and Vityaev developed this direction in their work [3]. Carl Hempel's work on the requirement of maximum specificity also played an important role in the development of learning theory. [4].

By probabilistic knowledge we mean the next triple:

$$(F(x, y), t(x), p)$$

where  $F(x, y)$  a task that has the following form:

$$F(x, y) : \forall x \exists y \Phi(x, y) \rightarrow \Psi(x, y)$$

$t(x)$  is a special  $L^*$ -program [5, 6, 7] which is solution to task  $F(x, y)$  with probability  $p$ .

On a set of probabilistic knowledge, one can define a partial order

$$(F_1(x, y), t_1(x), p_1) \leq_{\varphi} (F_2(x, y), t_2(x), p_2)$$

which generates a hierarchy of knowledge.

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