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Adv Robot Autom, 6:3 (Suppl)
DOI: 10.4172/2168-9695-C1-012

Cognitive robots powered by deep machine knowledge learning

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Cognitive robots (CRs) studies the e-brain of robotics that is capable of learning, perception and thinking based on the layered reference model of the brain (LRMB). One of the major challenges to CRs is cognitive knowledge learning (CKL) beyond classic learning categories of object identification, cluster classification, pattern recognition, functional regression and behavior generation (gaming). The philosophy and mechanisms of CKL are fundamentally different from those of human individual and redundant learning approaches. CKL reduces autonomous reasoning, problem solving and decision making to instances in the universe of discourse of machine knowledge. It enables CRs to share and transform knowledge among peers in order to exponentially grow their knowledge. A basic finding in AI reveals that the readiness of any new field is characterized by the maturity of its mathematical means because all theories are dependent on it. Towards advanced machine intelligence for CRs, potentially successful technologies are necessarily underpinned by denotational mathematics for AI. Without breakthroughs in basic theories and suitable mathematical means, the persistent challenges in AI would unlikely disappear by technical attacks knowing the problems had been out of the domain of real numbers and their manipulations revealed in the history of AI. A set of basic studies in this direction will be presented in the keynote lecture.

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