Machine Understanding - a new area of research aimed at building thinking/understanding machines

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Abstract

In this paper machine understanding, which is referring to a new area of research the aim of which is to investigate the possibility of building a machine with the ability to think and understand, is presented. Machine Understanding, the term introduced by the authors to denote understanding by a machine, is the first attempt to establish the scientific method to investigate the complexity of understanding problem, and is based on the results of philosophical investigations and assumptions of the logical positivists. Machine Understanding, defined in the context of both human understanding and existing systems that can be regarded as the simplest understanding systems, is based on the development of the shape understanding system (SUS) and on the assumption that the results of understanding by the machine (SUS) can be evaluated according to the rules applied for evaluation of human understanding. Machine understanding refers to the categorical structure of learned knowledge and one of the most complex problems that is solved within this framework is understanding of visual objects (visual understanding). In this paper only some aspects of visual understanding, as examples of understanding process, are presented. The first stage of visual understanding involves perceptual reasoning that consists of the perceptual categorical reasoning and visual reasoning. The visual reasoning consists of assigned reasoning that assigns the perceived object to one of the shape categories. The assigned reasoning consists of the consecutive stages of reasoning where at each stage of reasoning the specific data are acquired based on the results of the reasoning at previous stages.

KEYWORDS: machine understanding; visual understanding; visual thinking; perceptual reasoning; assigned reasoning; image understanding concept