

On Using Humanoid Robot Imagination to Perform the Shortened Token Test

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Mental models allow us to imagine how something may be, only by its description. This video presents a use-case demonstration of a high-dimensional geometrical system for acquiring mental models for robots, called Robot Imagination System (RIS). RIS generates models of objects based on their descriptive words, even prior to their perception. This is achieved by using an inference algorithm that computes the fusion of features corresponding to descriptive words, allowing to imagine an object whose description has never been presented before. As shown in the video, there is a previous training process where visual data is combined with semantic information. Each keyword creates an n-dimensional instance of the object in the feature space. Feature inference is treated as the intersection of hyperplanes generated from the keywords in the feature space. These hyperplanes extend the meaning of keywords. With a previous basic algorithm, we explored the basis for robotic imagination through mental models. Now, the extended algorithm allows context detection by introducing a previous clustering step combined with cluster bigram co-occurrences, and an analysis of keyword point cloud principal components. In the video, a experiment is performed using the Shortened Token Test.

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