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論 文 題 目	Elucidation of physical similarity concepts by machine learning approach		
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論文の内容の要旨

Canonical similarity measurements in machine learning determine relationships among data objects over the description space to achieve efficient inferences. In contrast, in human recognition and materials science, the similarity between two objects depends on whether they follow a common mechanism/driven function. In this thesis, I illustrate the use of existing machine learning model as well as our developed methods to measure similarity–dissimilarity among data objects with respect to physical properties.

Keywords: machine learning, similarity measurement, material science, committee machine, theory of evidence

論文審査の結果の要旨

Canonical similarity measurements in machine learning determine relationships among data objects over the description space to achieve efficient inferences. In applying to measure similarity among physics objects, there are several limitations in reflecting the physical meaning of human to the relationships of these objects. In natural science or especially materials science, the similarity between two objects strongly depends on whether they have the same underlying mechanism. In this work, the candidate has investigated the use of existing machine learning model as well as developing methods to determine similarity and dissimilarity among data objects with respect to physical properties. The main contributions are described as follows:

- 1) Modeling of the similarity terminology used in convention human cognition, physics to machine learning algorithms.
- 2) Development of new voting machines for similarity or dissimilarity measurement.
- 3) Application of the Dempster-Shafer theory to model similarity.

4) Implementation and demonstration of similarity measures developed to extract valuable knowledge from materials science data.

This is an excellent dissertation with great novelty and is highly evaluated in this field. We approve awarding a doctoral degree to Mr. NGUYEN Duong Nguyen.