博士論文題目

Controllable neural conversation model considering conversation
structure and context
(会話構造と文脈を意識した制御可能なニューラル会話モデルに関する研究)

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(論文内容の要旨)

A neural conversation model is an end-to-end scheme that generates system responses from user utterances. It has potential to generate attractive responses, backed up by large amounts of training data and the powerful learning performance of deep neural networks. In this dissertation, three problems of current neural conversation models are examined.

In the first study, the problem of controllability in neural conversation models is examined. Neural conversation models rely on an end-to-end architecture. This complicates controlling the generation with human heuristics, knowledge bases, and dialogue models. A conditional neural conversation model is proposed that can control the model's response using semantic representations that are conscious of dialogue structure. Such semantic representations effectively enable dialogue systems to generate a consistent response toward dialogue goals. In this study, a conditional neural conversation model is proposed that is conditioned by semantic representations, especially on dialogue acts. The experimental results showed that the proposed model generated promising responses in terms of controllability and naturalness compared with those generated from strong conventional models.

In the second study, entrainment, which is an attractive human phenomenon,

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（論文審査結果の要旨）

A conversational dialogue system had a big advancement using end-to-end deep neural networks. The system generates attractive responses, backed up by large amounts of training data. In this dissertation, solutions to three problems of current neural conversation models are proposed and confirmend thir effectiveness through series of experiments.

1) Controllability in neural conversation models: The thesis proposes a conditional neural conversation model that can control the model's response using semantic representations that are conscious of dialogue structure. In this study, a conditional neural conversation response is generataed conditioned by semantic representations, especially on dialogue acts.

2) Entrainment: The entrainment, which is an attractive human phenomenon, is incorporated into neural conversation models. Entrainment is a well-known conversational phenomenon in which dialogue participants mutually synchronize with regard to various aspects, and entrainment is thought to be closely related to the quality of human-human dialogues. Thesis analyzed the entrainment phenomena and developed an automatic entrainment evaluation measure. Then, a conditional neural conversation model is proposed that can control generation using a given entrainment degree.

3) Dialogue floor structure:

The thesis expands the research scope to multi-floor dialogues. In this study, as a first step, the first baseline model is proposed that automatically identifies multi-floor dialogues in an object exploration task in a house.

The proposed three solutions provides a general framework and can be applied to the various application in conversational robots. The thesis research brought a very new dialog modeling and evidenced the novelty with various experiments. A series of his research resulted in two high-quality peer-reviewed journal papers, three peer-reviewed international conference papers. As a result, the thesis is sufficiently qualified as a Doctoral thesis of Engineering.