

# A Neural Network Approach to Context-Sensitive Generation of Conversational Responses

Zvengin  
zvengin@nii.ac.jp

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## 1 General Introduction

### 1.1 Problem

Previous conversation model seldom takes context information into consideration and even though some work does so, naive injection of context information will entail unmanageable growth of phrases table at the costs of increased sparsity and skew towards rarely-unseen context pairs. Therefore, author hopes to develop a context-sensitive conversation model.

### 1.2 Methods

The author adopts an end-to-end and completely data-driven approach to solving this problem. Based on recurrent language model(RLM), the author proposes three models to generate context-sensitive response. The core idea behind the three models is providing the RLM with initial hidden vector which is generated by encoding context information into fixed length vector. The difference among the three models lies in how to deal with context, user's utterance and systems's response.

## 2 Details

1.The first model just concatenates context, utterance and response into single sentence and uses this single sentence as input of RLM to train RLM by maximizing  $L(s)$  function.

2.The second model processes context, utterance and response in a different way. The author first concatenates context and utterance into single sentence and then a vector representation of this single sentence is generated by using bag-of-words. After that, a multilayer non-linear network is applied to vector representation of context and utterance in order to generating a more abstract vector representation, and then this abstract vector representation is used to initialize hidden vector of RLM and update hidden vector combined with hidden vector of previous time step and input vector.

3.The third model applies bag-of-words to context and utterance respectively. The author concatenates the vector representation of context and representation utterance to generate single vector. After that, similar to second's technique is applied to generating more abstract vector representation.