I. Introduction

- Goal: Design an intelligent and natural conversational article-based agents

- Approaches
  - Coarsely assume users have two dialog acts
  - Developing a modular chatbot consisting of Dialog-act classifier (DA), Question-answering (QA) and Chitchat (CC)

II. Dialog-act classifier

- QA/CC Classification using CNN [1]
  - Trained on SQuAD (QA) and OpenSubtitles (CC)
  - Achieving the accuracy of 98.7%

- Manually labeled ConvAI dataset
  - 8k utterances, resulting in 8.6% of QA and 91.4% of CC
  - Additional training and achieving 91% test accuracy on ConvAI dataset

III. Question-Answering

- Passage Retriever
  - Users often ask questions beyond the given passage
    - Find related supplementary passages from the collected Wikipedia database (top 10k articles by PageRank), using BM25F algorithm [2]
    - The found relevant passages are also fed into the PQMN

- Passage-Question Matching Network (PQMN)
  - Find an answer span in the given passages according to the question by matching (attention) passage and question
  - Trained on SQuAD datasets
  - PQMN architecture:

IV. Chitchat

- Ensemble of Template-based and Neural-based models
  - Generic answer generation problems of the NN-based model
    - Answer selection between template- and neural-based answers based on the template matching result
      - About 57.5% and 42.5% responses from template-based and NN-based model respectively

- Template-based response model
  - Retrieve a response via template matching
  - Template sources: from ALICE [4] + manually designed 161 rules
  - Employing memories for predefined categories (name, job, etc.)
  - Example:
    - (Input): I am a policeman.
    - (Pattern): I AM A *
    - (Template): I have a lot of respect for those who wear a badge.
    - (set name="job">POLICEMAN</set>)

- Neural-based response generation
  - Generate a natural language response given the message.
  - RNN Encoder-Decoder [5]
    - LSTM 2 layers with 2048 hidden units
    - Trained on Dailydialog datasets
    - 9.8k vocabularies
    - PPL of the validation set: 36.99

References


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