

# Dialogue Text Analysis: Topic Extraction and Dialogue Summary

## Background

With the development of speech and dialogue technology, a large amount of speech dialogue data is generated, and these data contain a lot of valuable information, such as the topics discussed by the dialogue participants and the summaries of the dialogues. By analyzing the dialogue text data, we can improve the service quality in sales scene, and evaluate consumers' purchase intentions and points of interest as well.

Therefore, we propose the dialogue text analysis task, which aims to explore the topics contained in dialogue text data and generate dialogue summaries. This evaluation will help researchers and developers pay more attention to topic extraction and summary generation, and provide an academic exchange platform for everyone, so as to further improve the research level of natural language processing and promote the application and development of related technologies.

## Task Setting

- Track1. Dialogue Topic Extraction: aims to extract topics from dialogue text automatically and explore the hidden structures of dialogue text through latent topics.

In the follow: the field "dialogues" is the input dialogue content, the type is list, and the list element is dictionary, where "text" is the dialogue content; "role\_type" is the dialogue role, "user" is the customer, and "service" is the customer service; "text\_id" " is the dialog id. The content of the "topics" field is the output of task 1, the type is list, and the list element is dictionary, where "start\_idx" is the starting index in the conversation, "end\_idx" is the end index. "topic\_role\_type" is the topic category, "topic\_level" " is the subject level.

```
{
  "dialogues": [
    {
      "text": "那个贷款",
      "role_type": "user",
      "text_id": 0
    },
    {
      "text": "你首付想大概想付多少? ",
      "role_type": "service",
      "text_id": 1
    },
  ]
}
```

```
    "text": "你家现在不首付五万吗? ",
    "role_type": "user",
    "text_id": 2
  },
  {
    "text": "首付咱家首付能给你做到百分之十",
    "role_type": "service",
    "text_id": 3
  },
  {
    "text": "完了什么剩下什么六万什么三三年",
    "role_type": "user",
    "text_id": 4
  },
  {
    "text": "一年免一年无息一年无息",
    "role_type": "service",
    "text_id": 5
  },
  {
    "text": "那你那广告白打了呀",
    "role_type": "user",
    "text_id": 6
  },
  {
    "text": "嗯咱家第一天是三十个第一天是三十个名额完事儿了",
    "role_type": "service",
    "text_id": 7
  }
],
"topics": [
  {
    "start_idx": 0,
    "end_idx": 0,
    "topic_role_type": "贷款",
    "topic_level": 2
  },
  {
    "start_idx": 1,
    "end_idx": 3,
    "topic_role_type": "首付",
    "topic_level": 2
  },
]
```

```

    {
      "start_idx": 0,
      "end_idx": 7,
      "topic_role_type": "洽谈商议",
      "topic_level": 1
    }
  ]
}

```

● Track2. Dialogue text summary: In the dialogue domain, summary is mainly used to refine the intentions and concerns of the interlocutor. Compared with traditional text summaries, dialogue text summaries have more diverse role information and complex contextual connections. This task aims to summarize the concerns of customers when purchasing real estate, so as to facilitate sales review and understand and grasp the core requirements of customers. The roles of this task are sales and customers, the input is in the form of multiple rounds of dialogue, and the output is a summary of the customer's concerns in this dialogue.

In the follow: the field "dialogues" is the input content, the type is list, and the list element is dictionary, where "text" is the content of the dialogue; "role\_type" is the dialogue role, "user" is the customer, "service" is the customer service; "text\_id" is the dialog id. The "summary" field is the output of task 2, and the type is string.

```

{
  "dialogues": [
    {
      "text": "那个贷款",
      "role_type": "user",
      "text_id": 0
    },
    {
      "text": "你首付想大概想付多少? ",
      "role_type": "service",
      "text_id": 1
    },
    {
      "text": "你家现在不首付五万吗? ",
      "role_type": "user",
      "text_id": 2
    },
    {
      "text": "首付咱家首付能给你做到百分之十",
      "role_type": "service",
      "text_id": 3
    },
    {
      "text": "完了什么剩下什么六万什么三三年",

```

```

        "role_type": "user",
        "text_id": 4
    },
    {
        "text": "一年免一年无息一年无息",
        "role_type": "service",
        "text_id": 5
    },
    {
        "text": "那你那广告白打了呀",
        "role_type": "user",
        "text_id": 6
    },
    {
        "text": "嗯咱家第一天是三十个第一天是三十个名额完事儿了",
        "role_type": "service",
        "text_id": 7
    }
],
"summary": "客户询问买房的贷款信息,因为利息问题不满"
}

```

## Register

- Visit <http://tcci.ccf.org.cn/conference/2022/cfpt.php> Task 6

## Submission and metrics

### Metrics

### Track1 Evaluation

Task1 uses strict Micro-F1 as the main evaluation index: the start and end subscripts of the predicted topic are required, and the exact matching of topic type and level is considered correct prediction.

Accuracy rate  $P = \text{number of topics correctly extracted} / \text{number of topics predicted}$

Recall  $R = \text{number of correctly drawn topics} / \text{number of true topics}$

Micro-F1  $= 2 * P * R / (P + R)$

Task 1-score = Micro-F1

## Track2 Evaluation

Task2 uses the ROUGE score, a general metric for automatic summarization which is the average of character-level ROUGE-1, ROUGE-2, and ROUGE-L.

$$\text{ROUGE-N} = \frac{\sum_{S \in \{\text{ReferenceSummaries}\}} \sum_{gram_n \in S} \text{Count}_{\text{match}}(gram_n)}{\sum_{S \in \{\text{ReferenceSummaries}\}} \sum_{gram_n \in S} \text{Count}(gram_n)}$$

The denominator is the total number of n-grams in the reference summary, and the numerator is the number of n-grams shared by the reference summary and the automatic summary. That is the recall rate. Correspondence Rouge-1: 1-gram, Rouge-2: 2-gram.

ROUGE-L uses the longest common subsequence, and m represents the length of the artificial standard abstract.

$$R_{lcs} = \frac{LCS(X, Y)}{m}$$

Task2-score = (ROUGE-1 + ROUGE-2 + ROUGE-L) / 3

Final-SCORE = Task1-score \* 0.5 + Task2-score \* 0.5

## Submission

### submission content

Task1: You need to fill up the "topics" field in the test file of topic.

```
{
  "dialogues": [
    {
      "text": "那个贷款",
      "role_type": "user",
      "text_id": 0
    },
    {
```

```

        "text": "你首付想大概想付多少? ",
        "role_type": "service",
        "text_id": 1
    },
    {
        "text": "你家现在不首付五万吗? ",
        "role_type": "user",
        "text_id": 2
    },
    {
        "text": "首付咱家首付能给你做到百分之十",
        "role_type": "service",
        "text_id": 3
    },
    {
        "text": "完了什么剩下什么六万什么三三年",
        "role_type": "user",
        "text_id": 4
    },
    {
        "text": "一年免一年无息一年无息",
        "role_type": "service",
        "text_id": 5
    },
    {
        "text": "那你那广告白打了呀",
        "role_type": "user",
        "text_id": 6
    },
    {
        "text": "嗯咱家第一天是三十个第一天是三十个名额完事儿了",
        "role_type": "service",
        "text_id": 7
    }
],
"topics": []
}

```

Task2: You need to fill up the "summary" field in the test file of summary .

```

{
    "dialogues": [
        {
            "text": "那个贷款",
            "role_type": "user",

```

```

        "text_id": 0
    },
    {
        "text": "你首付想大概想付多少? ",
        "role_type": "service",
        "text_id": 1
    },
    {
        "text": "你家现在不首付五万吗? ",
        "role_type": "user",
        "text_id": 2
    },
    {
        "text": "首付咱家首付能给你做到百分之十",
        "role_type": "service",
        "text_id": 3
    },
    {
        "text": "完了什么剩下什么六万什么三三年",
        "role_type": "user",
        "text_id": 4
    },
    {
        "text": "一年免一年无息一年无息",
        "role_type": "service",
        "text_id": 5
    },
    {
        "text": "那你那广告白打了呀",
        "role_type": "user",
        "text_id": 6
    },
    {
        "text": "嗯咱家第一天是三十个第一天是三十个名额完事儿了",
        "role_type": "service",
        "text_id": 7
    }
    ],
    "summary": ""
}

```

## submission format

The submission file is suffixed in jsonl format with “UTF8” encode.

## Timeline

Register: 3/15 - 5/5

Publish Training data: 4/6

Publish Testing data: 5/10

Results Submission deadline: 5/20

Publish Evaluation results and call for system reports: 5/30

Reports submissions deadline: 6/20

Result: The results will be published with other shared tasks in NLPCC.

## Reward

The top 1 participating team of each sub-task/track will be certificated by NLPCC and CCF-NLP.

## Reference

A Joint Model for Document Segmentation and Segment Labeling.In Proceedings of ACL 2020.

Topic-Aware Contrastive Learning for Abstractive Dialogue Summarization.In Proceedings of EMNLP 2021.