Intelligent (Task-Oriented) Conversation Assistant for Course Selection

Progress Report



Information Technology Capstone Project

COMP5703

Group Members

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# Progress Status

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| **Project Name** | CS17 Intelligence(Task-Oriented) Conversation assistant for course selection |
| **Project Start Date** | 6/ 3/ 2019 |
| **Project Manager** | Biying Wang |

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| Project Description | The project focuses on using NLP and other technologies to build a dialog system to analyse and answer the questions that students ask in terms of course units on University of Sydney education system |  |

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| Project Status Report | # | Date:29/ 3/ 2019 |

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| **Status Item** | **Status up to last week** | **Planned for this week** |
| **Major deliverables** | Detailed project architecture  Added word emebedding into the intent classification mode | Analysis the realated dataset, finding the solution of design the intent and slot.  Finding the question template we can used in our project |
| **Planned delivery date** | 21/ 3/ 2019 | 28/ 3/ 2019 |
| **Major issues** | Design a plan for whole part of work  Understand the input requerment and out requirement of intentclassficication | The question template which we used should related to our project, And before we design the question template we need ensure the intent and slot had well design |
| **Major risks** | The accuracy and precision of the network mode.  Some part of the project should depend on the other part of work, the consisant should well defined. | The risk of this week is first we may can no find the suitable question template, and the intent and slot have not well designed |
| **External dependencies** | Slack Github Zoom | Slack Github Zoom |
| **Estimated effort (hr)** | 20hr | 20hr |
| **Recorded effort (hr)** | 20hr | 20hr |
| **Status (R, Y, G)** | red | red |

# Roles & Responsibilities

Shengyuan Sun

Role: developer

Responsibility:

* analysis the ATIS dataset and create a summary
* select the suitable question template
* design the intent and slot

Rui Chen

Roles: Analyser and Developer

Responsibility:

Biying Wang

Role: Project manager; Data collector

Responsibility:

Quan Chen

Role: Developer

Responsibility:

# Individual Achievements

In this week, my job is to analysis the analysis data set the finding of ATIS is there are 21 intents and at least 30 slot in each intent.

Since last week, we had more detailed discussions of the project. Ray and I shifted our work direction to collecting question sets. The available method is to find some available question templates and then add the relevant data from our database to the template to generate the question set. But there are some problems.

One of the characteristics of the training dataset used is that it can't be too obvious or too scattered. Using templates may result in a similar dataset structure, the problem is we have difficulty determining the corresponding data structure and dependencies before we have a clear understanding of the CUSP information structure and the diversity of template and slot. To respond to the above problem, I reviewed the ATIS dataset, first screening out the intents in training sets, and filtering out the slots that appeared in each intent and all the question keywords that appeared in each intent. It is no surprise that there are only 557 different combinations of keyword(slot) conditions in the intent of ATIS\_flight.

It is possible to imagine 557 different question keyword combinations as the rules, and its structure can also be constructed into a separate tree structure. Even if we remove the intermediate repeat and the slot combination with the inclusion relationship, we still need a lot of question template.

In order to ensure the diversity of these slot combinations, we should wait for the modeling of the cusp database to complete.

From this data set, we can get some suggestion. In the design of the slot and the design of the intent, we can see that each data set also has a large number of same slots, in which multiple keywords appear under different intents. There are also slots that help with data queries such as "B-or".

However, at present, I think that in addition to collecting some of the available question templates, we can also use the ATIS dataset for a simple attempt of dialog management. The specific question set can be done after the database is designed.

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# Group Collaboration

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# Summary

week 3

In our project, the NLU is the first issue, so the popular methods for NLU are

* Attention-based recurrent neural network models
* Capsule Neural Networks
* Slot-Gated (Intent Atten.)

In initial version production, there no need dialogue state tracking and policy learning , then our team design a rule-based syetem and dialogue recoding system.

1. the idea of the rule based system: design all rules for the question
2. design SQL for searching the database
3. design all responses type

combine with the database ,the system can direct find infroamation.

Last part is how to generate the nature language for answer. Which we consider design a template answer table for the initial version of the project.

The link of the report : <https://drive.google.com/file/d/1OCqSokNG7o-Q-UGWZy32lelt-imOAJEZ/view?usp=sharing>

And I test the Attention-based recurrent neural network models with an other dataset which is MIT-Moive corpus my colab Link: <https://colab.research.google.com/drive/1gqZdEd_1a9FMOExkdUKG0jXfyNhw_YM1>

Wrote a descirbtion for high-level work-flow diagram

As we discuss the structure of the Top-level structure ,Rui Chen start to draw the workflow diagram and I wrote a describtion of the each stage and some details of the work-flow diagram. The link : <https://drive.google.com/open?id=1J_Esx7r-8frP24f38g8hPllHhZnhp_6ATY_Fxw9M-zg>

Week4

My job mainly force on the intent classification and word embedding, based on the last week work, we decide to use the Bi-Lstm and attention mode for natural language understanding, apart from the pre-processing part, we have test two dataset, ATIS dataset with result in 98% in test set, but when we use the model in another MIT-movie corpus dataset, the result only 85% after 50 episodes. The model has not the word embedding part, just give each word an index. Then I assume the word vector maybe can solve the problem.

I demo two word2vec method and one FastText method for word embedding all method provide by Gensim.

<https://colab.research.google.com/drive/1nbB9TPBEPgkF3p4EPGXc2USuRewbaKaF>

Week5

In this week, I job is to analysis the analysis data set the finding of ATIS

<https://drive.google.com/open?id=15XR0KjddXLxhA_CrBHa86FDrzYgcR5pd>

# Peer Review

**SID** \_4.\_6.\_0.\_2.\_5.\_7.\_8.\_2.\_0 Name \_\_\_\_\_Shengyuan Sun\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_

Student identification number First name (Preferred first name) Family name

**The submission of the deliverables up to this week required the application of the following three software development, project management and team work activities from each colleague in your team:**

* Contribution to the design and implementation of the current sprint user stories.
* Contribution to the full range of software development activities (including requirements capture, analysis and design, coding, testing and documentation).
* Contribution to group work and sharing of work.

Based on the overall combination of the contribution above, rate your teammates’ performance in the activities up to and including week 5.

**IMPORTANT: You *must* assess all your teammates. Use only whole numbers addressing the criteria below:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1**  **[0 – no contribution]** | **2** | **3** | **4** | **5** |
| Below satisfactory in 3 criteria ***or*** very poor in *any* activity | Satisfactory in 1 criteria ***and*** poor in 2 activities (none very poor) | Good in at least 2 criteria ***and*** activity in 1 | Excellent in at least 1 activity ***and*** good in 2 others | Excellent in all 3 activities |

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| **Student ID** | **Name** | **Rating 0 to 5 \*no fractions\*** | **Reason for rating** |
| 470067400 | Biying Wang | 5 | From the first week, Biying have taking the responsibility for meeting minutes and document management, she actively participates in online and offline discussions and actively participates in coordinating team members. At the same time, she is responsible for the work and participate in the interview and database design work. At the same time, she has a clear understanding of the next stage of the task, understand the other roles in the group and actively cooperate. |
| 470111585 | Rui Chen | 5 | Rui played an important role in the group and actively participated in the discussion during the weekly seminars. He often presented unique ideas, participated in a series of important tasks such as higher levels architecture design. He has a good sense of responsibility which is very concerned about the progress of the project. He is very hard to learn new knowledge. Be good at communicating with team members and coordinating relationships within the group. |
| 470199228 | Quan Chen | 5 | Quan has demonstrated good communication skills and programming skills since the team started. He is very active in the weekly discussions. He is very responsible for the task and can finish it faster. Participated in project architecture database design and machine learning, and is currently responsible for data work. He is always ready to discuss the progress of the project with other team members, while passing on the positive role and confidence in completing the project within the group. |
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**Comments**: