Using Instant Messaging to Provide an Intelligent Learning Environment

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Outline

- Introduction
- Psychological Reasons
- System Architecture
  - RRMBot
  - ClassifyBot
  - AIMLBot
- User Case Scenario and Discussion
- Conclusion

Introduction

- Background
  - Instant Messaging
    - Enables learners and educators to interact in an online environment
    - Synchronous computer-mediated communication (CMC)
  - English as a Second Language (ESL)
- Purpose
  - TutorBot
    - Enhanced instant messaging-based Chatbot system
  - Provide students with on-line coaching in a total English learning environment by using AIML & Natural Language Processing technique.

TutorBot

Teacher cannot interact
with students anytime,
anywhere.

Teacher

Student A
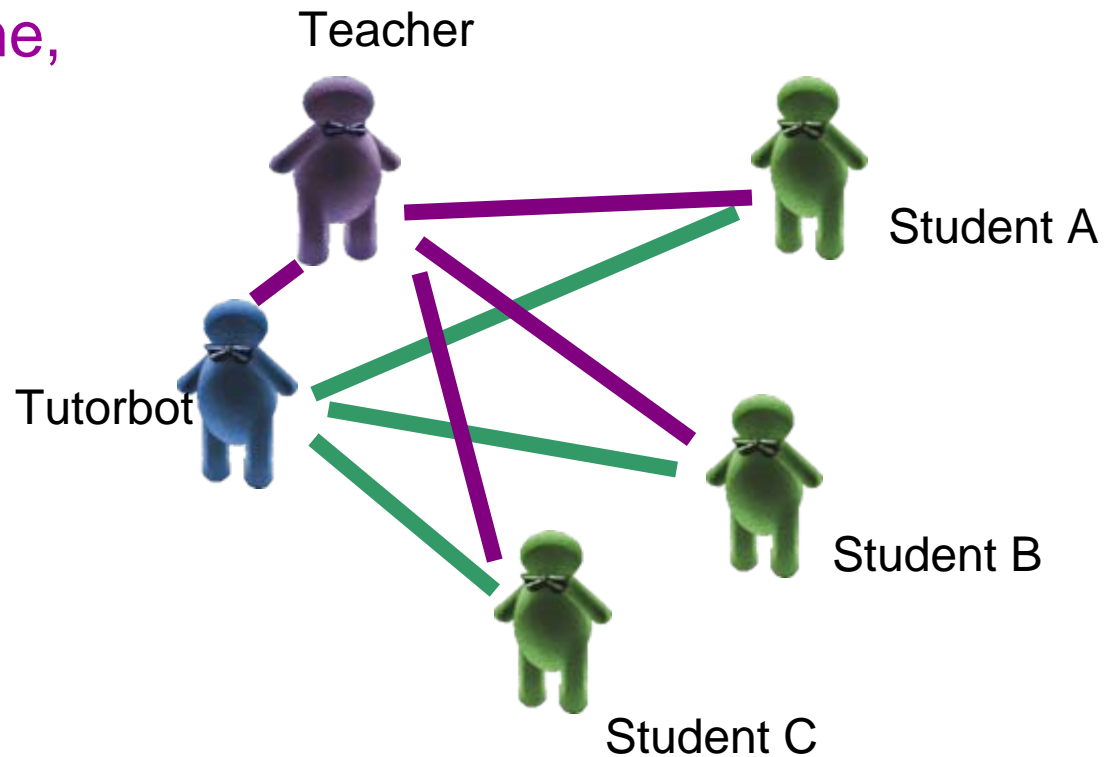
Tutorbot

Student B

Tutorbot like a
learning companion
of students

Student C

Fig. 1. TutorBot provides synchronous communication between teacher and students.

TutorBot

- Chatbot
  - A program that emulates human conversation and enables natural language conversations with computers.

- TurtorBot
  - Ready reference material
    - Dictionaries
    - Authorized conversation material with speaking
    - Question Answering function
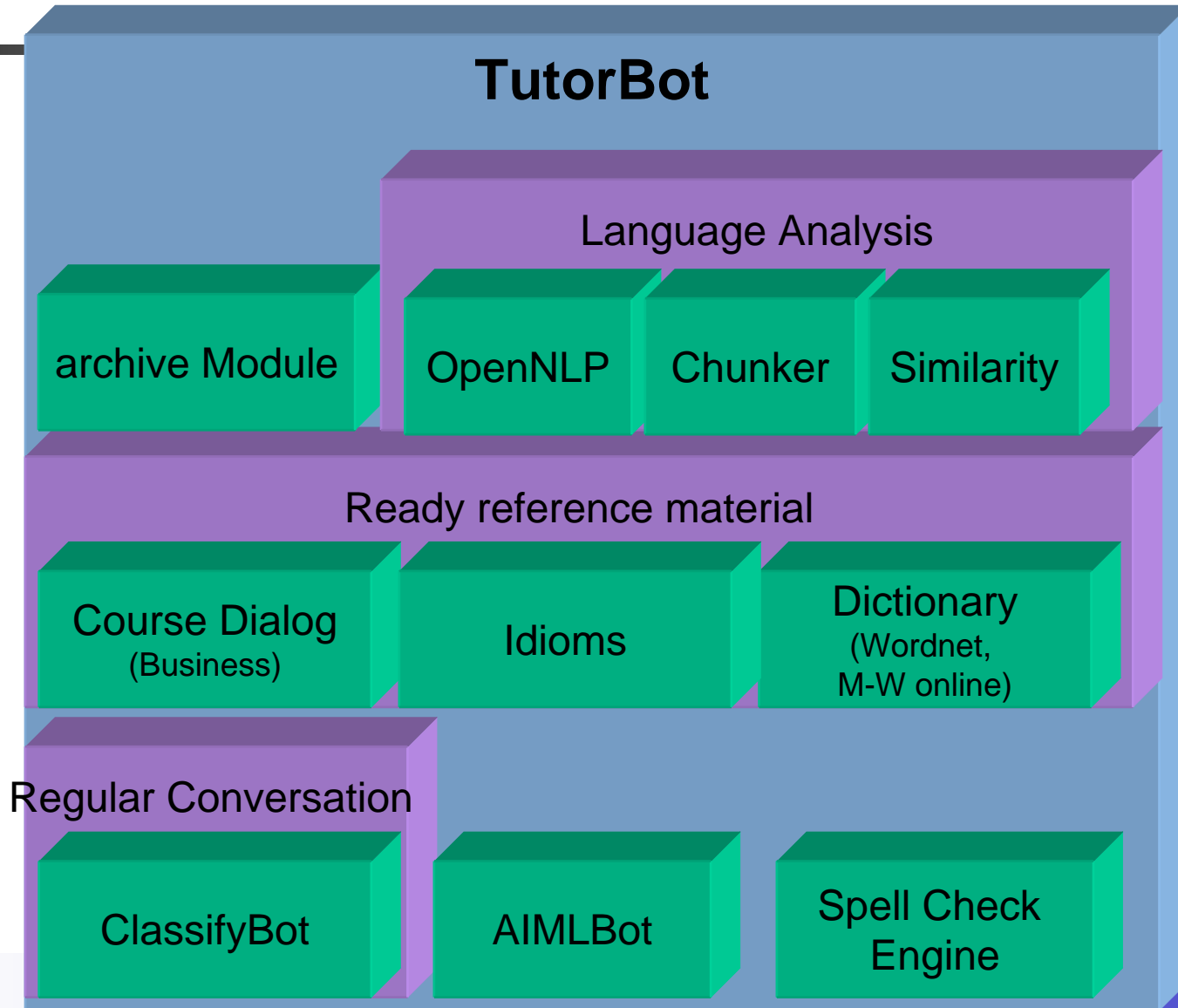 - Record conversation for analysis
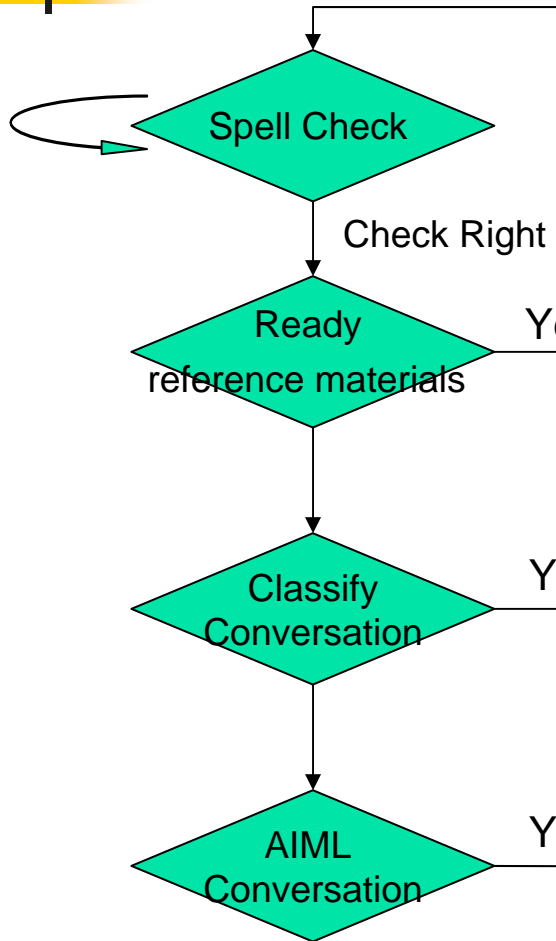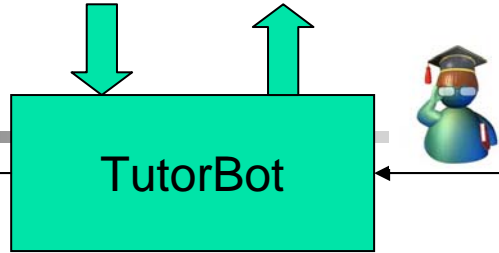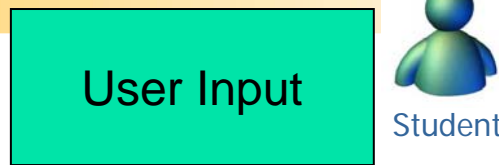
Psychological Reasons

- People work harder to understand material when they feel they are in a conversation with a partner, rather than simply receiving information.

  - An agent with learning capacity can grow with the student.

- Pedagogical agents are onscreen characters that help guide the learning process during an e-learning episode.

Psychological Reasons (cont.)

- Skill development and expertise are strongly related to the time and efficiency of deliberate practice.

  - An "Instant Messaging" based agent can provide practice anytime, anywhere.

- On-line learning is a collaborative endeavor in which participants learn by collaboration.

System Architecture

TutorBot

Language Analysis

archive Module | OpenNLP | Chunker | Similarity

Ready reference material

Course Dialog
(Business) | Idioms | Dictionary
(Wordnet,
M-W online)

Regular Conversation

ClassifyBot | AIMLBot | Spell Check
Engine

User Input

Student

TutorBot

Spell Check

Check Right

Ready
reference materials

Yes

AIML
Conversation

Classify
Conversation

Yes

Yes

English Environment

RRMBot

Ed and Amy are
planning a trip to
America

ClassifyBot

AIMLBot

Conversation
UI

Ready Reference Materials

Thanks to Overseas Radio & Television Inc.
(http://www.ortv.com.tw/)
who provides us magazines
"Let's Talk in English", "Studio Classroom", and "Advanced"

RRMBot

User Login

Searching exist profile

Loading section content

Ready reference materials Repository

Send text & link (voice) to user

Tutorbot's response

WebForm3 - Microsoft Internet Explorer

檔案(F)　編輯(E)　檢視(V)　我的最愛(A)　工具(T)　說明(H)

上一頁　・　　・　　　　搜尋　　我的最愛　　　　　　　　・

網址(D)　http://140.109.19.240/CourseShow/WebForm3.aspx?In=Ed %20and %20Amy%20are%20pla

Ed and Amy are planning a trip to America

ClassifyBot

User Key-in sentence

NP Chunker/ OpenNLP

Computed RRM Similarity by using Wordnet

Get Top 5 candidates

Computed similarity of context

Conversation achieve repository

Tutorbot's response

ClassifyBot

**Backend which provides corpus-based
concordance analysis and grammar analysis.**

A ClassifyBot that incorporates POS tagger and OpenNLP parser
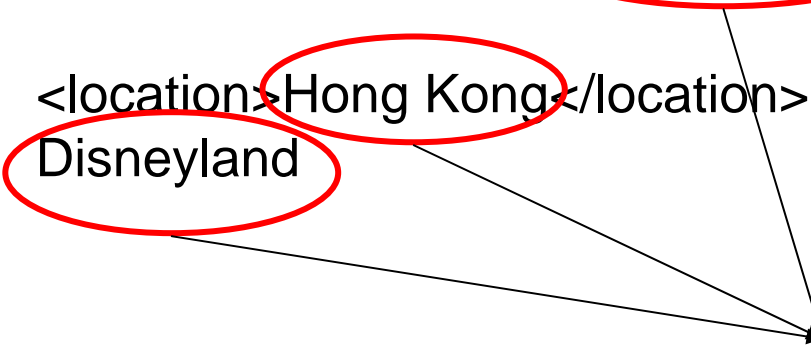
ClassifyBot

User Input

Oh, yes!
Hong Kong Disneyland was very crowded.

OpenNLP

chunk result: "[NP Hong/NNP Kong/NNP Disneyland/NNP]
[VP was/VBD very/RB crowded/VBN] ./."

NER

<location>Hong Kong</location>
Disneyland

Using these information to find related topic

AIMLBot

- AIML
  - Artificial Intelligence Markup Language
- Why AIML?
  - Derivative of XML.
  - Adopted by the AI Foundation.
  - Does not incorporate dependencies upon any other language.
  - Small learning curve.
  - Simple yet extremely powerful for describing natural language conversation.

AIMLBot

- Using AIMLbot from

  http://www.ntoll.org/projects/aiml/

- Adding 2 feature
  - Adding a spelling check engine
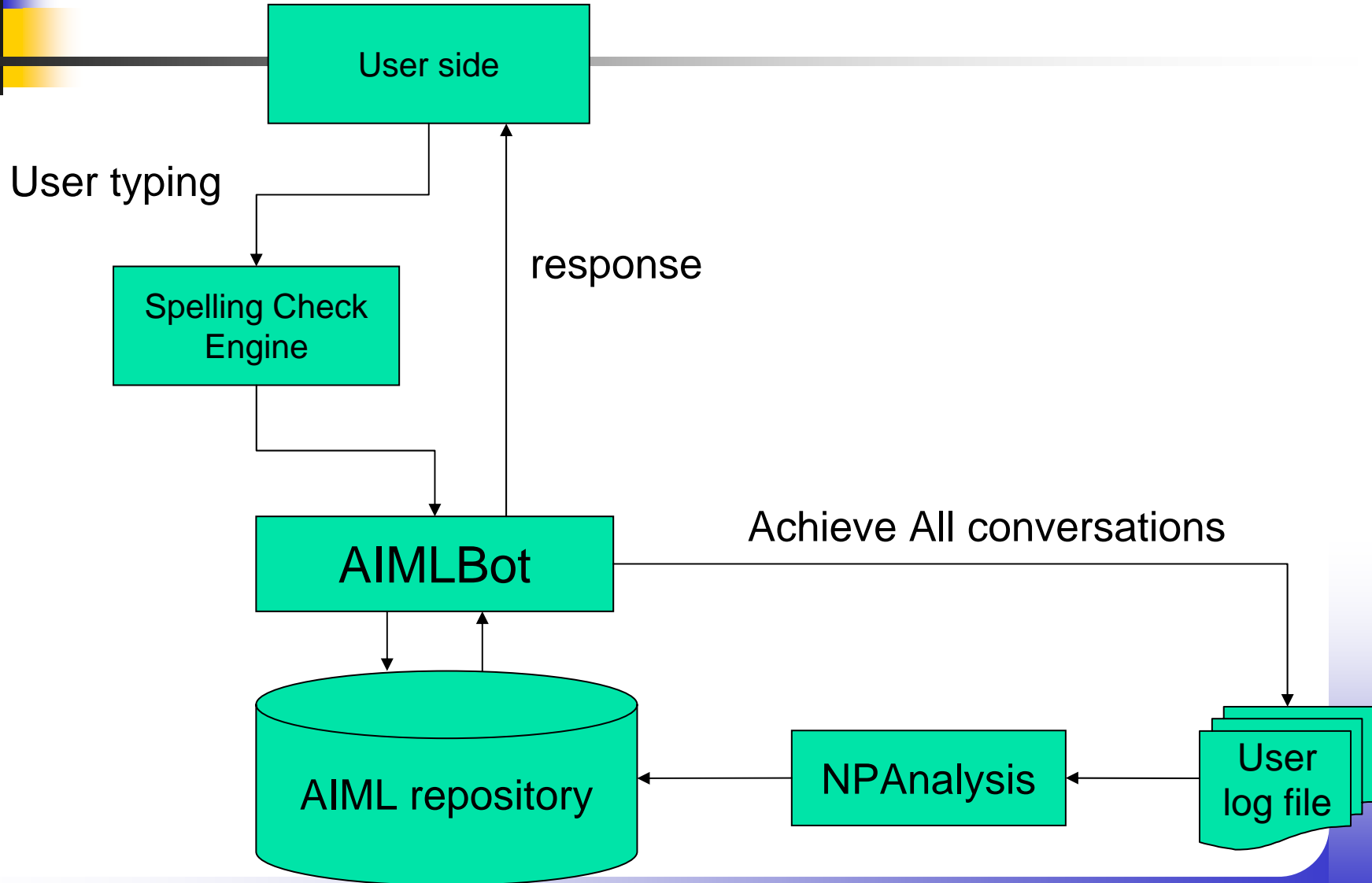 - Making AIMLBot can process <li> tag

ALICE System

- ALICE
  - The Artificial Linguistic Internet Computer Entity
  - A software robot that you can chat with using natural language.

- ALICE is composed of two parts:
  - Chatbot Engine
  - The language model

- ALICE language model is stored in AIML files.

The AIML Format

< aiml version="1.0" >

< topic name="the topic" >

<category>

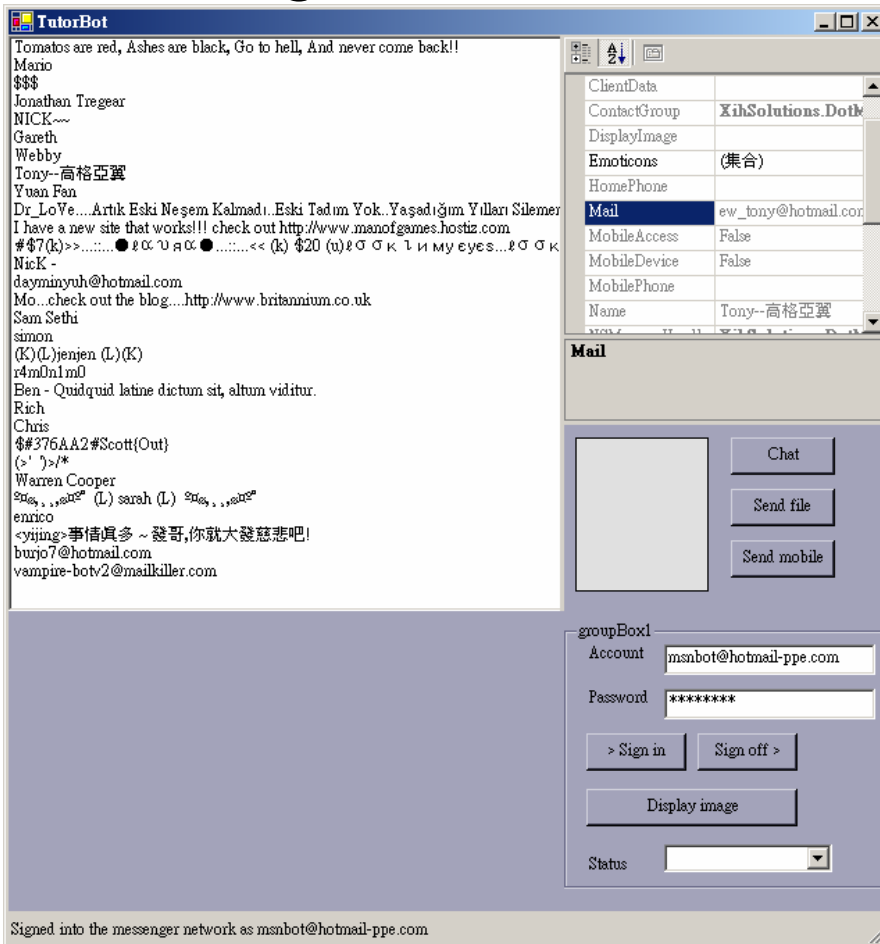   <pattern>Input</pattern>

   <template>Output</template>

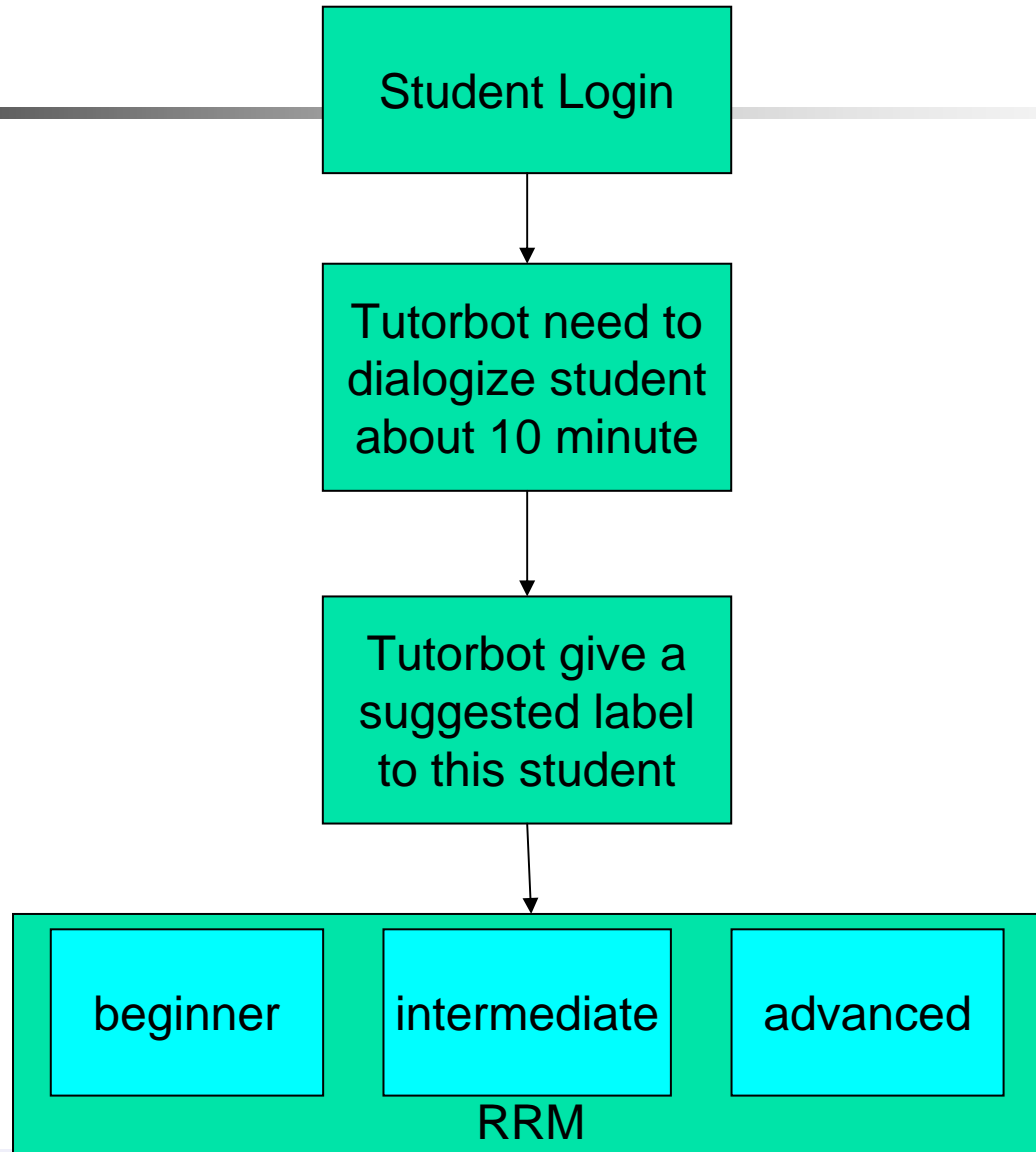</category>

   ..

</topic>

</aiml>

AIMLBot

User side

User typing

response

Spelling Check
Engine

AIMLBot

Achieve All conversations

AIML repository

NPAnalysis

User
log file

Backend of TutorBot

Login Screen

Backend Achieve System

User Case Scenario

```
┌─────────────────────┐
│    Student Login    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Tutorbot need to   │
│  dialogize student  │
│  about 10 minute    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Tutorbot give a    │
│  suggested label    │
│  to this student    │
└─────────────────────┘
          │
          ▼
┌───────────────────────────────────────────┐
│ ┌──────────┐ ┌──────────────┐ ┌──────────┐ │
│ │ beginner │ │ intermediate │ │ advanced │ │
│ └──────────┘ └──────────────┘ └──────────┘ │
│                    RRM                      │
└───────────────────────────────────────────┘
```
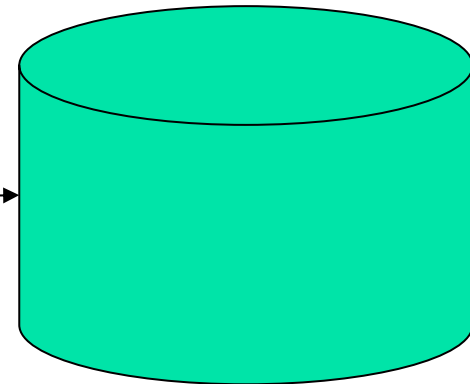
Conclusions

- TutorBot plays the role of "assistant instructor" to provide service anytime, anywhere.

- Contribution

  - We use NLP tool and AIML to integrate several language learning components (words, sentences, sounds, and meanings) in context with an instant messaging-based Chatbot for English as a Second Language programs.

Q & A

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