

# **SMART WEB APPLICATION FOR INTERNATIONAL STUDENTS**

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## **ABSTRACT**

Chinese students have been flocking to international "One Belt and One Road" countries since China's "One Belt and One Road" initiative was announced, but there are few relevant studies. Analyze the cultural shock and acculturation that students in China experience on a daily basis. Language barriers are found to be a prominent problem. The experience of socializing varies from student to student. Language/communication/culture differences, academic learning differences, and learning differences in their home and new environments. As an international student from UKM, I also face the same problem and situation. Students at UKM can benefit from improved information services through these. Build static pages to gather information from Chinese students and improve NLP chatbots by collecting questions from questionnaires. Using natural language processing (NLP), the chatbot converts the user's text into structured data to select relevant answers, and like most applications, it is connected to a database. Knowledge bases or information databases are used to provide chatbots with the information they need to respond appropriately to users. The data store captures information about whether the chatbot can answer the user's questions. To find appropriate responses, NLP translates human language into patterns and texts that can be mapped in real time. As part of the project, international students can obtain some media information through the website, as well as send me questions through the questionnaire survey and receive relevant responses. To train NLP chatbots to interact with users, I organized the questions and expert answers in the database, integrated them, and packaged them together. By doing so, UKM's position in China will be strengthened and students' access to information will be greatly improved.

## **1 INTRODUCTION**

At the UKM campus, international students from China encounter various problems when applying for programs due to different education systems. There are two details in the transcript file that international students are required to submit. The first is: for Chinese students, transcripts require three years of high school grades. Meanwhile, in order to control the quality of students, UKM requires students to submit more than 80% of their total score. Second, the transcript needs to be notarized in both Chinese and English at the National notary Office to obtain the validity of the transcript and translate the transcript into English. Students can take the first step and test themselves, and if they fail to meet the standards, they do not need to consider applying for UKM. Therefore, a medium (such as Mobile Application) can be used to point out these problems to students who need to apply to save their effort, provide the best intermediary service, or show them how to contact the school directly for the latest news. Meanwhile, due to the restrictions of China's network firewall, Chinese students cannot use Google, FaceBook and other media to obtain UKM information in China. VPN play a key role but spreading and setting up VPN in China is illegal under Chinese law, making it difficult for students to find a suitable ONE. However, according to

my study experience in UKM, I have learned how to set up and use VPN technology, and I can teach this technology to Chinese students who need to use VPN to understand UKM.

According to the problems described the lack of timely access to UKM's application conditions and official information is one of the bottlenecks for UKM to recruit international students in China. Espeed Web, UKM's application system for international students, also provides guidelines for submitting materials, but no details. Under the current epidemic situation, Chinese students cannot use Websites such as Google to obtain information, and it is a consensus that they need to use VPN. Therefore, international students who do not apply for UKM fail to apply for UKM due to insufficient materials, wasting their experience. International students who have applied to The UKM program may be affected by network Settings during registration. For example, new international students need to register siswa email from UKM, but siswa is based on Google Mail. Therefore, the student cannot successfully register siswa Mail and needs the help of VPN.

This project aims to develop an information web page with the purpose of "student-oriented, answering questions and solving doubts", and build a chat robot to automatically reply to the questions that students need to solve. To serve students and promote the future development of UKM.

## **2 PROBLEM STATEMENT**

UKM campus information acquisition before application (1. Picture media, 2. Video media, 3. Word media); Application conditions; Tuition list and other issues.

Describes the ESPEED Web system and precautions during application

Detailed explanation of registration process and problems

Before applying, international students need to know whether UKM is suitable for them, from necessities of life to future after graduation. Present valuable information to international students who are interested in applying for UKM through objective media information, and introduce the status of UKM in Malaysia, as well as the requirements for international students, and other issues. Espeed Web is the application channel specially set up by UKM for international students. UKM PKP has provided the registration process and guidance, but due to different national conditions, it is not clear enough for many international students who apply. Visa is the most important item, which is verified and issued by EMGS. International students may have problems if they do not have a clear

process introduction. Finally, online registration, which may change to campus later; Among them, the network problems of international students have been registered and there are matters needing attention in course selection.

### **3 OBJECTIVES**

To Analyze the students' questions and establish the relationship between each question. Students need to be instructed briefly.

To Design the software user interface, style, type, and associated database and server Settings.

To AI human natural language building and embedded software.

### **4 METHODOLOGY**

Build and repair models In fact, many products are actually developed on an as-you-go basis, especially for small companies with too short a product cycle compression. In this model, there is neither specification nor design, and the software is constantly modified to meet the customer's needs, over and over again. In this mode, developers write programs based on requirements as soon as they receive a project and produce the first version of the software after debugging. After it is provided to the user, if the program goes wrong or the user asks for something new, the developer will change the code until the user, test, and so on are satisfied. This is similar to the development model of the workshop, while doing while changing advantages is undoubtedly the initial results. This works well for small programs that don't require much logic, but this approach is unsatisfactory for development of any size. The main issues are: 1) Lack of planning and design, the software structure becomes worse and worse with continuous modification, resulting in the inability to continue modification. 2) Ignoring requirements brings great risks to software development. However, for my software, the main issue it covers is what students learn. It's a small project, so this works best; Ideas or resources can be added as they arise, gradually improving the quality of software content.

#### **4.1 Planning Phase**

Before starting the project, I collected over 30 user messages using Google form, which included questions from Chinese international students who had graduated, were currently enrolled, and were not yet enrolled in school. These questions were divided into a few

different fields for the web page information display, and the remaining questions were used by users to collect data to build a chatbot

#### **4.2 Analysis Phase**

Because there are two systems that need to be developed at the same time, the data is first divided into two parts. The first part is the mainstream information, I use UI to beautify the web page so that I can do the will to attract users to click and add static page information afterwards; the second part is to classify some specific problems, and this information is manually added to the database of the chatbot for building the model.

#### **4.3 Implementation Phase**

During the implementation of the project, I collected many media materials and official documents for the static pages, and I put the content directly into the web pages; in order to be able to better talk to international students Messgae Board was added later as a project to collect more student messages directly, and to increase the database through messages, so as to better build the media static pages and chatbot model.

#### **4.5 Testing Phase**

The web page test mainly with the help of BrowserStack platform to test the web page, including functional test, usability test, UI (user interface) test, compatibility (configuration) test, performance test and mobile friendly test. It also includes whether the ARTIFICIAL intelligence robot NLP dialogue system works properly.

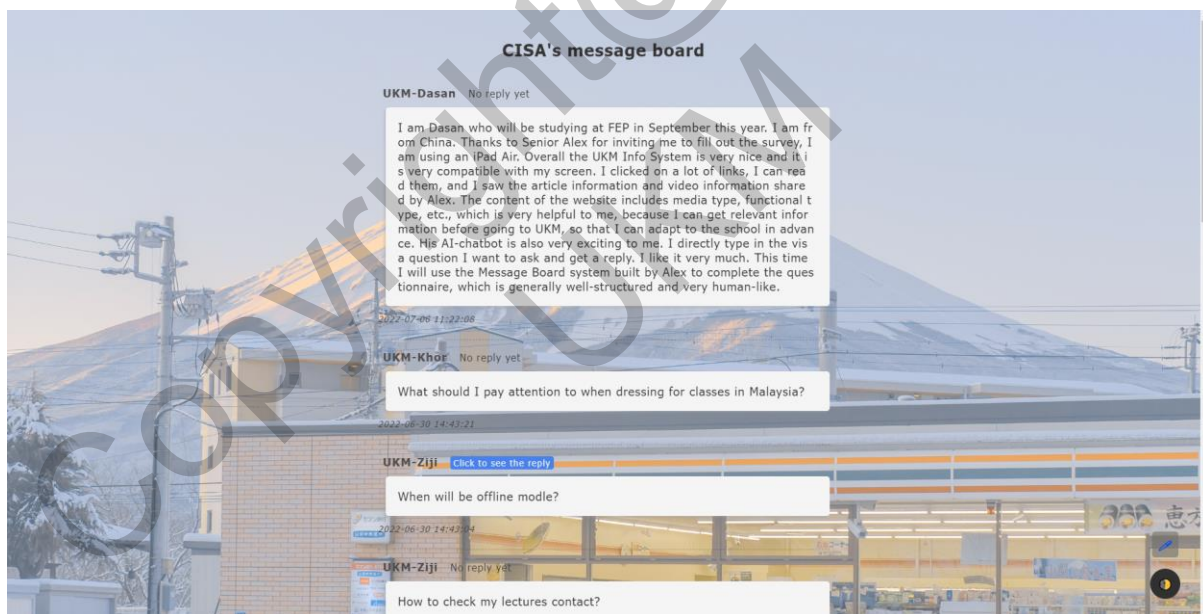
## **5 RESULTS**

The whole project aims to introduce the preparation, process and results of web development; it is a long process from problem gathering to software development. After the initial understanding of the requirements, use Excel or Word to list the big functional modules of the system to be developed and which small functional modules are available for each big functional module. For interfaces with special requirements, you can define a small number of interfaces in this step. Identify the interfaces and functional requirements and outline the system design for each interface or functional iteration. The project will address problems that students have encountered and may encounter, and identify relevant potential software development markets while helping students. Identifying and solving problems from the students' perspective, effectively bringing information value to students through software development projects, and driving UKM to attract international students in the Chinese market. web UI, database and algorithm design are key issues in this update. The renewed focus on Web functionality and UI design has led to a clearer goal for my future. The project

implemented the function of collecting user questions. For Chatbot, the current database is separate from the NLP model and cannot be trained in real time. That is, Chatbot can only collect data intermittently and then package the data. Once the data is received, it can be trained locally and then uploaded to the cloud.



Figure 1 Main Project interface



id	int(11)	Primary key for every users enter to this web system
name	varchar(64)	Names of different style in system
date	datetime(0)	Date of user asking question time
content	varchar(1024)	Record for every manager answers the question
ip-address	varchar(40)	Record for every user ip-address
user-agent	varchar(512)	Record for every user detail about their busily information
reply	varchar(1024)	Show the reply of the users

Table 1 Data Dictionary

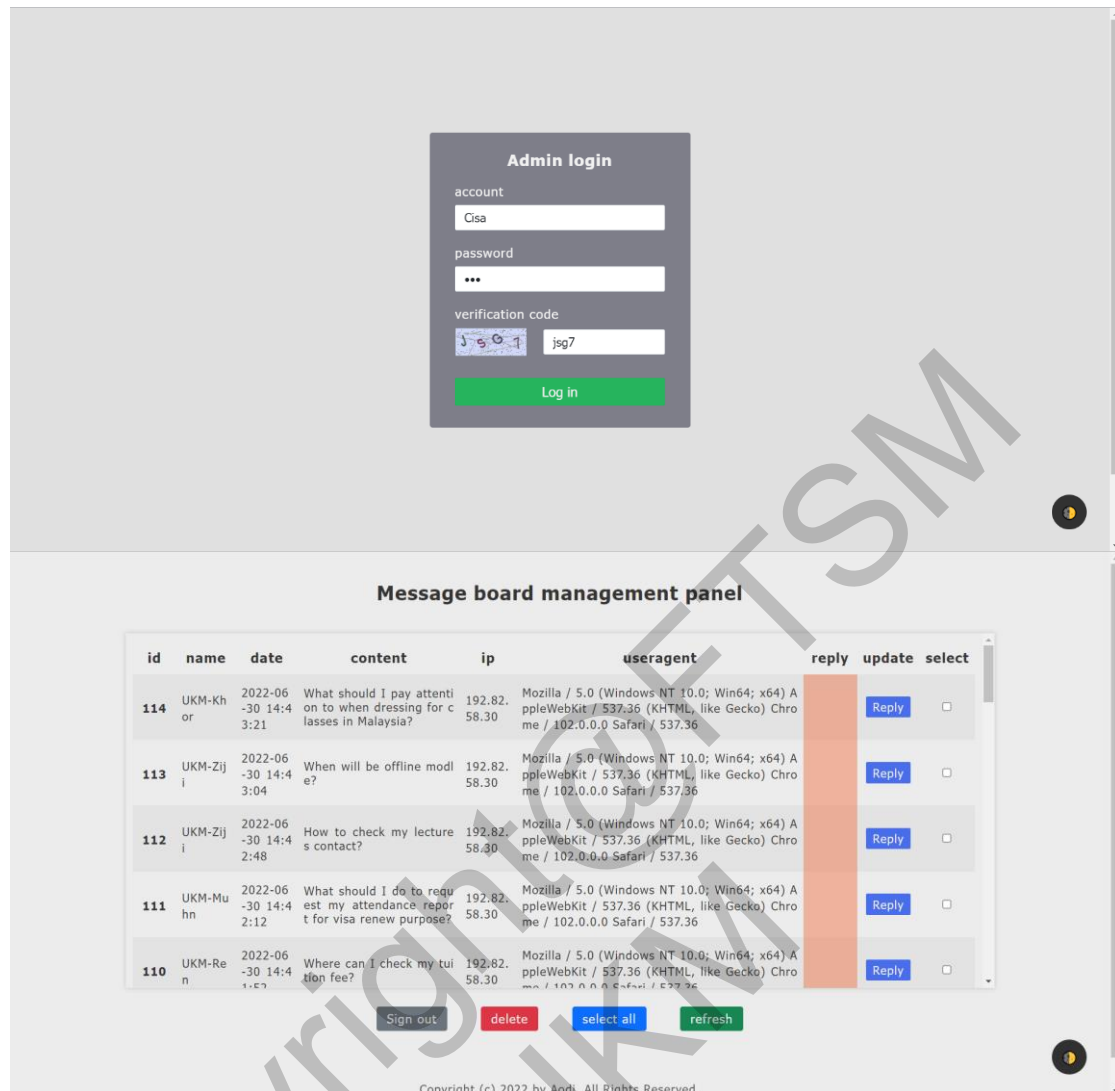


Figure 2 Message Board interface

The following is the question collection system, you can enter the message by visiting ‘<http://114.115.252.12/messageboard/>’. Currently, the system is only open to Chinese students, so there are only Chinese pages. I got in touch with the Malaysian Chinese Student Association, they will help me with the publicity, and they will collect relevant questions

The database collected based on the questionnaire survey, which contains the ID, name, date, content (Answer for question), IP address, user-agent and reply (reply from the administrator) returned by users. This is an upgrade based entirely on Google Form content, gathering data to get the first message.

UKM INTERNATIONAL STDENT Q&A

Messages

Your: How are you?  
Bot: Hi there, how can I help? If you have any question, you can just type your question over here. I'll try to figure them out.

Ask chatbot

Send

Figure 3 Chatbot user interface

The chatbot knows the answer simply because his or her name is in the relevant pattern. Similarly, the chatbot responds to anything related to the relevant pattern. But not beyond relevant patterns. Algorithms can help improve performance.

```

Epoch 1/20
657/657 [=====] - 147s 218ms/step - loss: 3.5111 - acc: 0.4339
Epoch 2/20
657/657 [=====] - 144s 219ms/step - loss: 3.0959 - acc: 0.4767
Epoch 3/20
657/657 [=====] - 144s 219ms/step - loss: 2.9302 - acc: 0.4948
Epoch 4/20
657/657 [=====] - 144s 219ms/step - loss: 2.8291 - acc: 0.5022
Epoch 5/20
657/657 [=====] - 143s 217ms/step - loss: 2.7567 - acc: 0.5059
Epoch 6/20
657/657 [=====] - 144s 219ms/step - loss: 2.6948 - acc: 0.5088
Epoch 7/20
657/657 [=====] - 143s 218ms/step - loss: 2.6375 - acc: 0.5123
Epoch 8/20
657/657 [=====] - 145s 221ms/step - loss: 2.5829 - acc: 0.5150
Epoch 9/20
657/657 [=====] - 144s 220ms/step - loss: 2.5279 - acc: 0.5181
Epoch 10/20
657/657 [=====] - 143s 218ms/step - loss: 2.4735 - acc: 0.5203
Epoch 11/20
657/657 [=====] - 143s 217ms/step - loss: 2.4184 - acc: 0.5232
Epoch 12/20
657/657 [=====] - 144s 219ms/step - loss: 2.3640 - acc: 0.5260
Epoch 13/20
657/657 [=====] - 144s 219ms/step - loss: 2.3090 - acc: 0.5301
Epoch 14/20
657/657 [=====] - 143s 217ms/step - loss: 2.2575 - acc: 0.5343
Epoch 15/20
657/657 [=====] - 143s 217ms/step - loss: 2.2059 - acc: 0.5397
Epoch 16/20
657/657 [=====] - 143s 218ms/step - loss: 2.1571 - acc: 0.5456
Epoch 17/20
657/657 [=====] - 144s 219ms/step - loss: 2.1102 - acc: 0.5514
Epoch 18/20
657/657 [=====] - 145s 220ms/step - loss: 2.0661 - acc: 0.5579
Epoch 19/20
657/657 [=====] - 144s 219ms/step - loss: 2.0207 - acc: 0.5640
Epoch 20/20
657/657 [=====] - 144s 219ms/step - loss: 1.9781 - acc: 0.5710
<keras.callbacks.History at 0x7f7223b4710>

```

Figure 4 Chatbot Training Result

After the model is built and the data is input in, the final accuracy can be more than 50%.

```

1 {
2   "intents": [
3     {
4       "tag": "greeting",
5       "patterns": [
6         "Hi", "How are you", "Is anyone there?", "Hello", "Good day", "Whats up"
7       ],
8       "responses": [
9         "Hi there, how can I help? If you have any question, you can just type your question over here. I'll try to figure them out."
10      ],
11      "set": ""
12    },
13    {
14      "tag": "goodbye",
15      "patterns": [
16        "bye", "See you later", "Goodbye", "I am leaving", "Have a good day"
17      ],
18      "responses": [
19        "Farewell, hope I was of help! :)"
20      ],
21      "set": ""
22    },
23    {
24      "tag": "identity",
25      "patterns": [
26        "who are you?", "what are you", ""
27      ],
28      "responses": [
29        "I am an AI Chatbot for UKM International students, my work is to talk to you after analyzing what you have asked me and give you information about us."
30      ],
31      "set": ""
32    },
33    {
34      "tag": "information",
35      "patterns": [
36        "what is Oxygen to Innovation?", "what do you do at Oxygen to Innovation?", "what is done at this company?"
37      ],
38      "responses": [
39        "I am an AI Chatbot, my work is to talk to you after analyzing what you have asked me. I can be programmed."
40      ],
41      "set": ""
42    },
43    {
44      "tag": "visa",
45      "patterns": [
46        "how can I check my Visa?", "what is my visa progress?"
47      ],
48      "responses": [
49        "The visa information should be saw in EMOS website."
50      ],
51      "set": ""
52    },
53    {
54      "tag": "Miss course registration",
55      "patterns": [
56        "what should I do if I missed the course registration?"
57      ],
58      "responses": [
59        "pay the fine MYR 50 at https://ekwangan.ukm.my."
60      ],
61      "set": ""
62    },
63    {
64      "tag": "Miss examination verification",
65      "patterns": [
66        "what should I do if I missed the examination verification?"
67      ],
68      "responses": [
69        "pay the fine MYR 15 at https://ekwangan.ukm.my."
70      ],
71      "set": ""
72    },
73    {
74      "tag": "Personal issue",
75      "patterns": [
76        "what should I do if I am facing some personal issue or education problem?"
77      ],
78      "responses": [
79        "You may contact Dr. Esther (+60102188488) for FTSM Students"
80      ],
81      "set": ""
82    },
83    {
84      "tag": "Tuition fee",
85      "patterns": [
86        "where can I check my tuition fee?"
87      ],
88      "responses": [
89        "https://www.ukm.my/pkp/ukm-international-programme/ (Click on Fees Structure and look for Faculty of Information Science and Technology)."
90      ],
91      "set": ""
92    },
93    {
94      "tag": "Attendance report",
95      "patterns": [
96        "what should I do to request my attendance report for visa renew purpose?"
97      ],
98      "responses": [
99        "Please email to Dr. Esther (esther@ukm.edu.my) and Pn. Noorsham (noorsham@ukm.edu.my) and attached the course name, course code you took during the semester and your COPA for FTSM students."
100     ],
101     "set": ""
102   },
103   {
104     "tag": "VPN Issues",
105     "patterns": [
106       "how can I get free VPN?", "where can I download the VPN?", "how can I set my VPN?"
107     ],
108     "responses": [
109       "For Chinese interantional students(Government Does Allowed Used IN OIEMA), you can got to 'http://paopaocloud.com/' to register and get free VPN"
110     ],
111     "set": ""
112   },
113   {
114     "tag": "University Staff contact",
115     "patterns": [
116       "how to check my lectures contact?", "How to check my tutorial contact?", "where can I find lectures contact?"
117     ],
118     "responses": [
119       "Please go to Google and search your lectures and add 'UKM' in the end. Then you can find the information in Google "
120     ],
121     "set": ""
122   },
123   {
124     "tag": "LearningTeaching state",
125     "patterns": [
126       "when will be offline mode?", "Can I choose offline or online mode next sem?", "Do we need go back to university next sem?"
127     ],
128     "responses": [
129       "From now on, these is no official information about LearningTeaching, probably it will be offline next sem and every student need to back to faculty "
130     ],
131     "set": ""
132   },
133   {
134     "tag": "Notes on clothing",
135     "patterns": [
136       "what should I pay attention to when dressing for classes in Malaysia?"
137     ],
138     "responses": [
139       "When you study in Malaysia, you will usually be more active in the campus, shopping malls and other places, except for serious places such as churches, you can dress appropriately in other occasions."
140     ],
141     "set": ""
142   }
143 ]
144 }

```

Figure 5 Chatbot user Database Model



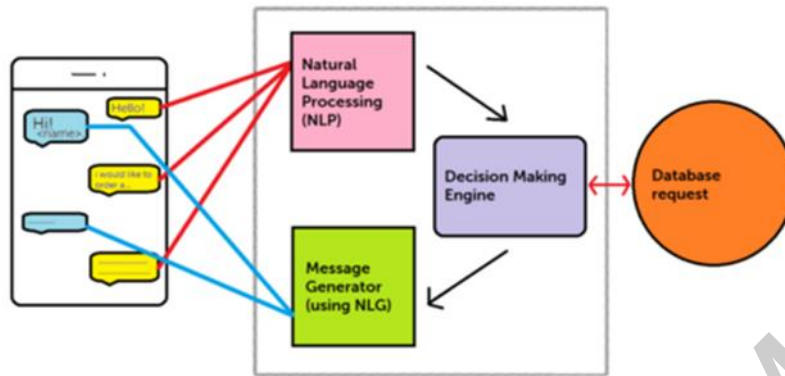


Figure 6 Chatbot working way

Chatbots basically need to identify the entity and intent of a user's message. To do this, we need to build an NLP model for each entity to implement an intent. For example, we could build an NLP intent model for a chatbot to identify when a user wants to know the business hours of a place. We can build an NLP entity model for the chatbot to recognize location and orientation. We can then use these NLP models with chatbots to provide open times anywhere based on the user's location. NLP flow is a core part of chatbot architecture and flow, as it is the foundation for transforming human natural language into structured data.

```

{
  "tag": "greeting",
  "patterns": [
    "Hi", "How are you?", "Is anyone there?", "Hello", "Good day", "Whats up"
  ],
  "responses": [
    "Hi there, how can I help? If you have any question, you can just type your question over here. I'll try to figure them out."
  ],
  "set": ""
}

```

Figure 7 A simple pattern matching example

The chatbot knows the answer simply because his or her name is in the relevant pattern. Similarly, the chatbot responds to anything related to the relevant pattern. But not beyond relevant patterns. Algorithms can help improve performance.

## 6 CONCLUSION

The entire project aims to introduce the preparation, process, and results of Web development; It's a long process from problem collection to software development. After a preliminary understanding of the requirements, use Excel or Word to list the large functional

modules of the system to be developed, and what small functional modules each large functional module has. You can define a small number of interfaces in this step for interfaces that have specific requirements. Identify interface and functional requirements and outline the system design for each interface or functional iteration. The project will address the problems students encounter and may encounter and identify relevant potential software development markets while helping students. Identify and solve problems from the students' point of view, effectively bring information value to students through software development programs, and drive UKM to attract international students' attention in the Chinese market. The UI, database and algorithm design of Web are the key issues in this update. The renewed focus on Web functionality and UI design has made my future goals clearer. The project realizes the function of collecting user questions. Students can fill in Google Form to me or directly feedback the information to me. After I collect the information, they can pack the data into model training. Today, most companies do business online through websites or social media channels. I also had to take advantage of this and use custom chatbots to easily communicate with my target audience. Thanks to advances in natural language processing, chatbots can now communicate with consumers just like humans. Businesses are saving resources, costs and time by using chatbots to get more done in less time. After a year of designing, developing, and implementing these features, the project has been perfected. However, for Chatbot, the current database is separated from the NLP model and cannot be trained in real time. That is to say, Chatbot can only collect data intermittently and then pack the data. After receiving the data, it can be trained locally and then uploaded to the cloud. I have an idea about that, but I'm still working on it

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