
安徽科大讯飞信息科技股份有限公司

Anhui USTC iFLYTEK CO.,LTD.

Speech Suite

Semantic processing protocol certificate

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1. Regulation definition

1.1 The method of semantic structure protocol.

The protocol adapts XML as the description and has version information.

1.2 Semantic structure protocol:

The protocol was made of labels:

- 1) <rawtext>: original text input by user
- 2) <parsedtext>: user input the information which was processed by NLU
- 3) <version>: version of protocol
- 4) <result>: results of semantic understanding
 - a) <focus>: business category
 - b) <action>: operation
 - i. <operation>: movements
 - ii. <channel>: tools of movements
 - c) <object>: object
 - i. <name>: object's name
 - ii. <code>: code of object
 - iii. <location>: address
 1. <country>: Country
 2. <province>: Province
 3. <province_s>: short name of Province
 4. <city>: City
 5. <city_s>: short name of City
 6. <area>: area
 7. <area_s>: short name of area
 8. <landmark>: landmark
 - iv. <datetime>: datetime
 1. <date>: date
 2. <time>: time
 - v. <category>: category
 - vi. <modifier>: modification
 - vii. <price>: price
 - viii. <amount>: amount
 - ix. <person>: person
 - x. <singer>: singer
 - xi. <actor>: actor
 - xii. <director>: Director
 - xiii. <special>: special

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- xiv. <airline>: airline
- xv. <theatre>: theatre
- xvi. <topic>: topic
- d) <content>: content
- e) <audio_id>: audio file of content
- f) <receiver>: receiver

Focus means the interest point, it was used to identify the businesses.

Action means movements, operation and the tools of operation.

Object means the objects, it is the object of operation and also the user's interest point.

Others are content, receiver, etc.. Content means the contents (SMS content、reminder content、answering content, etc.) .Receiver means the object receiving.

Action, object and other sub labels will be mentioned in later chapters.

1.3 Regulations of interested point describe

The description of Point of interest, mark the name of POI directly, such as :<focus>map</focus>.

Currently, the Focus contains :telephone, message, contact, stock, music, weather, etc.. New businesses are to be added . Here is the defined list.

Focus Name	Description	Typical user input
telephone	User wants to make a phone call	Call Jack....
message	User wants to send SMS	Send sms to Jack: I will come to office tomorrow.
contact	User wants to do contacts-related operation (except phone call and SMS)	Add new contact: Jack 13303310331
app	Open APPs or download APPS	Activate "Calculator"
schedule	Add new reminder or check reminder	Remind me there is meeting 3:00 o'clock P.M.
weather	Search weather in XXX city	What's the weather like in Shanghai
stock	Search the stock information	What's stock price for Iflytek?
map	Search locations	How can I get to the National Conference Center?
restaurant	Search the restaurant nearby	Any hotpot restaurants near the People Square?
flight	Flight information from xxx to xxx	Find me the flight info.fromBeijing to Shanghai.
train	Train information from xxx to xxx	Find me the train info. from Hefei to Shanghai

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lbs	Facilities nearby	Any gas station nearby?
music	Play music	Play me <Rolling in the deep>
traffic	Search road condition	How is the road condition around Park Avenue?
Location reminder	Location reminder	Remind me when I get to the Chang'an Street
radio	Select radio	I want to open Beijing Music Radio
cmd	Many commands	OK, Cancel

1.4 Regulations about action description

Sub-labels for action description are: operation、channel. Such as : send Jack's number to Ruby. Operation is the action, channel is the tool for operation.

```
<action>
  <operation>send</operation>
  <channel>message</channel>
</action>
```

1.5 Regulations for object description

1.6 There are many decorations for object, each decoration will be treated as a single sub-label and be written in the next level of the object label.

The core part of the object will be described by label<name>. There are different meanings of <name> based on different businesses. Such as: <name> means "apps' name" if those are related to applications, <name>means "film's name "if those are related to film business. In that way it can avoid additional definition, like <app_name>、<film_name>etc..

Another core part of object was described as<code>, it is unique format way to describe<name>. Such as "search the stock price of 002230", <code>is the code of 002230。

Please refer Chapter1.2 to check the common use sub-label of object. New added business can produce new sub-label.

2. Business function description

2.1 phone call

semantic structure of phone call:

lebel	value	meaning	remark
-------	-------	---------	--------

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focus	telephone		required
action.operation	call		required
object.name	name	Could be name in contact or other	optional
object.code	any number	The number people want to dial	optional
object.category	mobile phone 、 fixed line 、 office 、 home		optional
object.tele_operator	China mobile 、 China Unicom 、 China telecom	operator	
object.location	Anhui、 Hefei	Number location area	
object.head_num	139,186	head number	
object.tail_num	1234	tail number	

dial semantic structure:

label	value	meaning	remark
focus	telephone		required
action.operation	view		required
object.category	missed, dialed, received	missed dialed received	optional

Example: call Zhangsan Hefei China mobile number

<rawtext>call Zhangsan Hefei China mobile number </rawtext>

<result>

<focus>telephone</focus>

<action>

<operation> call</operation>

</action>

<object>

<name>Zhangsan</name>

<tele_operator>China mobile</tele_operator>

<location>

<city>Hefei</city>

<city_s>Hefei</city_s>

</location>

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```

    </object>
  </result>
Example: dailZhangsan's189 number
<rawtext>dailZhangsan's 189 number </rawtext>
<result>
  <focus>telephone</focus>
  <action>
    <operation> call</operation>
  </action>
  <object>
    <name>Zhangsan</name>
    <head_num>189</head_num>
  </object>
</result>

```

After telephone semantic processing. Example。

Example1: call Zhangsan

```

<rawtext>call Zhangshan</rawtext>
<version>1.0</version>
<result>
  <focus>telephone</focus>
  <action>
    <operation> call</operation>
  </action>
  <object>
    <name>Zhangsan</name>
    <name>Zhangxiaosan</name> // either-or, suppose these two name in the contact already
  </object>
</result>

```

Example2: I want to make a phone call

```

<rawtext>I want to make a phone call</rawtext>
<version>1.0</version>
<result>
  <focus>telephone</focus>
  <action>
    <operation> call</operation>
  </action>

```

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</result>

Example3: show missed call

<rawtext>how missed call</rawtext>

<result>

<focus>telephone</focus>

<action>

<operation>view</operation>

</action>

<object>

<category>missed</category>

</object>

</result>

2.2 Contact

Contact semantic structure:

Label	Value	Remark
focus	contacts	required
action.operation	query	required
object.name	Any text	optional, if lake, suggest transfer to contact
object.category	fixed line 、 mobile phone 、 office 、 home	optional
object.tele_operator	China mobile 、 China Unicom 、 China telecom	operator
object.location	Anhui 、 Hefei	Number location area
object.head_num	139,186	head number
object.tail_num	1234	tail number

Semantic structure of send contact card:

lebal	value	meaning	remark
focus	contacts		required
action.operation	send		required
action.channel	message	Send by SMS	required
object.name	name	Could be member of contact or other	required

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object.category	mobile phone 、 fixed line 、 office 、 home		optional
object.tele_operator	China mobile 、 China Unicom 、 telecom	operator	
object.location	Anhui 、 Hefei	Number location area	
object.head_num	139,186	head number	
object.tail_num	1234	tail number	
receiver	People in contact		required
category	mobile phone 、 fixed line 、 office 、 home		optional
tele_operator	China mobile 、 China Unicom 、 China telecom	operator	
head_num	139,186	Head number	
tail_num	1234	Tail number	

After semantic process return content. Example:

Example1: Zhangsan

```
<rawtext>Zhangsan</rawtext>
<version>1.0</version>
<result>
  <focus>contacts</focus>
  <action>
    <operation>query</operation>
  </action>
  <object>
    <name>Zhangshan</name>
    <name>Zhangsan</name>
  </object>
</result>
```

Example2: check contact

```
<rawtext>heck contact</rawtext>
<version>1.0</version>
<result>
```

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```

    <focus>contacts</focus>
    <action>
      <operation>query</operation>
    </action>
  </result>

```

send contact

Example 3: send zhangsan' number to Lishi

```

<rawtext>send zhangsan' number to Lishi</rawtext>
<version>1.0</version>
<result>
  <focus>contacts</focus>
  <action>
    <operation>send</operation>
    <channel>message</channel>
  </action>
  <object>
    <name>Zhangsan</name>
  </object>
  <receiver>Lishi</receiver>
</result>

```

3. Other rules

3.1 Business priority

Current business priority:

Phone call>SMS>check contact>open app>search internet>search app>new remind>weather information>stock research>map location>cate>flight>train>LBS>web search>chat

3.2 the last processing

the last processing separate into two part:

1. under all scene, if there is no match result of business, no result of contact card、cyclopedia、and dialog, the result is null, the last processing result will be output by semantic model, like:

```

<rawtext>sdfsdfsdf</rawtext>
<result>
  <focus>dialog</focus>
  <object>
    <topic>unknown</topic>
    <name>sdfsdfsdf</name>

```

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```

    <object>
    <content>I cant hear clearly</content>          /
    <audio_id>xxxxxxx</audio_id>
</result>

```

2. under specious scene, if no match, only return <focus>label。For example under specific, input “call Yanhang” :

```

<rawtext>call  Yanhang</rawtext>
<result>
    <focus>app</focus>
</result>

```

3.3 The lack of elements processing for each business

When lack of business elements, separate into two methods

1. Phone call、SMS、internet, suggest handle by business logic and client.
2. Open app、new remind、search stock, output remind message by semantic model, for tell customer how to say。Add <prompt> label save remind message, <prompt> and <focus>in same level.

List of process in business lack of elements。

Business Name	Lack of information	Process of lack of information
telephone	Have no name and code	Transfer to dial scene
message	Have no name and code	Transfer to SMS scene
contacts	Have no name	Transfer to contact list
website	Have no name and code	Open browser
app	Have no name	<prompt>please say “ open app angery bird” or “ download app angery bird” </prompt>
schedule	new remind(create)have no datetime	<prmopt>xxx</prompt>
weather	Have no location, and do not obtain user’s location information	<prmopt>xxx</prompt>
stock	Do not have name and code	<prmopt>xxx</prompt>
map	Route, no destination, or have no start point and user’s configuration	<prmopt>xxx</prompt>
restaurant	Do not have name and category, or location information	<prmopt>xxx</prompt>
flight	No destination or start point	<prmopt>xxx</prompt>
train	No destination or start point	<prmopt>xxx</prompt>
other	Have no name	<prompt>xxx</prompt>
lbs	Have no name	null

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music	Have no name and category	Random play
cinemas		null

Example: I want to search stock

<rawtext>I want to search stock </rawtext>

<parsedtext>I want to search stock </parsedtext>

<result>

<focus>stock</focus>

<action>

<operation>query</operation>

</action>

<prompt>股票大盘尽管问我！比如，你可以说“科大讯飞的股价”我就会告诉你了。</prompt>

</result>

3.4 Interested point clearly, have no processing for object

to “I want to make phone call”、“check contact”、“I want search map” and so on statements which do not include clear object, in part of semantic, separate into “phone”, “contact”, “map” as determine interested point, will as object set to null;

but “weather search” is exception, user say “search weather”, the implicit intent is to search weather information of user’s location.

Example 1: search contact。

<rawtext> Search contact<rawtext>

<version>1.0</version>

<result>

<focus>contacts</focus>

<action>

<operation>query</operation>

</action>

</result>

Example 2: I want to make a phone call。

<rawtext>I want to make a phone call<rawtext>

<version>1.0</version>

<result>

<focus>telephone</focus>

<action>

<operation>call</operation>

</action>

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</result>

3.5 The customer service number

Support general customer service number。

Example 1: Call China mobile

<rawtext>打 call China mobile<rawtext>

<Version>1.0</version>

<result>

<focus>telephone</focus>

<action>

<operation>call</operation>

</action>

<object>

<name>China mobile</name>

<code>10086</code>

</object>

</result>

3.6 Mapping of name and code

Stock and web business, users input name and code at the same time, and two do not have mapping:

- 1.one in collection and one not: in collection has higher priority, base on in collection search the one outside the collection。
- 2.both in collection, name has higher priority, base on name to search code。
- 3.both outside the collection, combine name and code to be a string in tag of name, do not have tag of code

3.7 Specific scene, support simple statement (only support phone call and message)

3.7.1 Phone call

<rawtext>Jianfeng Li</rawtext>

<result>

<focus>telephone</focus>

<action>

<operation>call</operation>

</action>

<object>

<name>Jianfeng Li</name>

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</object>
</result>

3.8 Example for no action object semantic

3.8.1 Phone call

<rawtext>I want make phone call</rawtext>
<result>
 <focus>telephone</focus>
 <action>
 <operation>call</operation>
 </action>
</result>