



**Acoustics'08
Paris**
June 29-July 4, 2008

www.acoustics08-paris.org

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Understanding of Enouncing by the Concepts' Way

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The purpose of this paper is to present a new analysis method for user's speech in view to reach the comprehension.

We can consider that the sentence comprehension is realizable through 2 main operations:

- 1) The semantic decomposition of the lexical words that let appears the elementary predicates as well as the arguments which will be searched in the enouncing.
- 2) The re-arrangement of the arguments around the elementary predicates that lead to the complete comprehension of the speech.

This Understanding method is based on the decomposition of the enouncing in a series of conceptual segments.

Each conceptual segment achieves one or more language acts.

In our case these segments are relevant to the school management, that are segments expressing notions of student's jobs like marks in the Electronic and computer faculty of Beb Zouares USTHB Algiers

Keys words: Human machine dialog, Language acts, concepts, conceptual vectors, language recognition, comprehension

1. Introduction

The implementation of a machine of automatic language recognition able to understand a dialog in natural language and to produce the relevant answers is a very important field of application. Since the sixties several such machines were developed with more or less success.

The purpose of these systems is to provide a dialogical interface between the human and the machine allowing him the getting of information. The function of this system is to manage jointly several tasks.

- 1) To process the applicative operations for which the machine is developed. (Assistance, providing of information, solution for problems etc).
- 2) To treat linguistic aspects which enable him to capture, to process speeches in natural conversation?
- 3) To manage the dialogical acts in correct conditions playing the role of an interlocutor.

Coherence of dialog, detecting of errors and correcting them in acceptable conditions.

Our main Job consist in treating of the aspect mentioned in point 2 related to the linguistic aspect of our system. The understanding of the speech can be explained as a relation of a words chain issued by a user and a succession of words belonging to a restricted language containing the main ideas of this enouncing .The dialog manager will treat this wordings

By associating the words of sentence at the input of system to messages in other intermediary semantic language (concepts).The system will convert the gotten concepts in actions or responses. This step is the interpretation of the sentences. The objective of the analysis of the enouncing is to define und extract those concepts or segments required by our application.

A conceptual segment encompasses a words group having a common sense and each enouncing can be decomposed in a set of segments.

The advantage of this method is to allow a global view of the possible existing semantic structures. Thus can the system processes the more enouncements possible.

Furthermore this model allow the recognition of words out the vocabulary library that mean

those not stored in the system data base. Some of these idioms are not necessary for the comprehension, but some others are essentials. The comprehension of a word is depending where the conceptual segment it is. This principle can processes ambiguous words having

several significations depending on which conceptual language are related.

This principle then makes it possible to treat the ambiguous words, i.e. of the words which always do not have the same direction according to their membership of a conceptual segment or another.

2. General architecture of the system of analysis

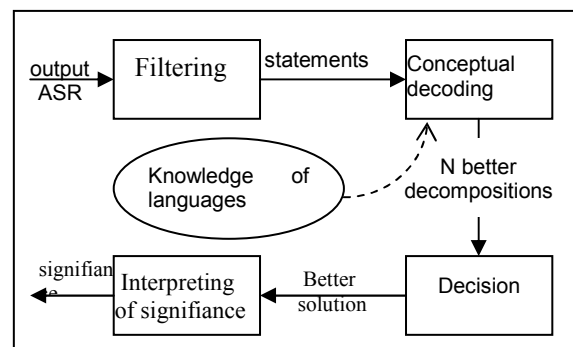


Fig 1. Structure of the semantic analyzer

The role of the recognition module is to transcribe the vocal signal in orthographical message.

The filtering module allows the adaptation of the output in the voice recognition stage to the conceptual decoding system. The words considered as useless are removed. Only the expressive statements are preserved. Then each statement is broken up into a succession of conceptual segments using the module of decoding. It is on this level that the knowledge of languages related to the application intervenes. The module of decision then adopts the best

solution by holding account at the same time score of the conceptual decomposition, that of the context and voice recognition possibly. This solution is then interpreted in order to provide the direction of the statement.

3. The conceptual decoder

Once the statement is formatted, a morphological analysis is made and one has the canonical form of this sentence. The method of recognition of concepts which we implemented presupposes a communicative intention and guides the analysis by search of segment-keys or key words.

For example with the goal presupposed TO REQUIRE (NOTE), the statement "Gives me the note of EMD1" will be analyzed like give me = TO REQUIRE, note = RESULT, EMD = EMD1, the other words of the statement not being consumed by the analysis. The structure of features (attributs/valeurs) resulting from the analysis will be thus: USER (TO ASK (RESULT (EMD = EMD1))). We observe that the words of connection are important in French: "As opposed to what one could think, the economy of the connectors is a bad calculation, because the connectors correctly determine the relations existing between the various terms employed, whereas the economy of the predicates can rather often be done without damage" [PRINCE 96].

One thus sees all the importance of: - To make the good assumptions on the communication goals; - To make a good selection of the relevant segments in the statement. The assumptions on the communication goals do not raise of the module of comprehension him even but rather of the module of control of the dialogue: It is the latter which is indeed able to predict the statements of the user to each turn of word. On the other hand, the selection of the relevant words of the statement concerns the module of comprehension well

4. Base data concepts.

Our data base of concepts is divided into various files, according to the type of concept which they contain. Indeed, certain concepts are common to all the possible situations (acceptance, refusal...) and others are specific to the task.

5. Modulate comprehension.

The module of comprehension has as an entry a text resulting from the module of recognition. It must transmit to the module of dialogue a message which must account for the direction of the statement according to the continued task. One proceeds for that in two stages: 1. Search for expressions typified using files of concepts, to build assumptions of structures of features; 2. Search for grammatical markers (prepositions, negations, etc.) being able to supplement or direct the structure of features. Our module of comprehension of statements thus uses an

algorithm of identification of concepts in two stages. On the canonical form of the statement, the first phase consists to identify isolated words and to replace them by their concept (noted xxCONCEPTxx). For example, the words 'note', 'résultat', 'évaluation', etc, can be the co-ordinates of the vector concept xxRESULTATxx. The second phase consists in replacing groups of concepts by a concept of a higher nature (noted yyCONCEPTyy). They are then conceptual vectors. For example, yyUNDOyy will have like co-ordinates the concepts xxANNULERxx xxREQUETExx xxPRECEDENTxx. That the user says "I want to erase the request of front" or "cancels the preceding order", the module of comprehension will return the concept yyUNDOyy. Thus, even if the ideas expressed in the sentence are formulated in chaotic manner - and it is often the case with the oral examination - this method is likely to make emerge a principal idea. It is for example the case with this sentence "ouais, it is well that of before request which I want to remove". Here still, and in spite of an order differ compared to the two preceding examples, the system will find the sequence xxPRECEDENTxx xxREQUETExx xxANNULERxx, and the higher concept to him yyUNDOyy will substitute.

The following figure shows an example of the structure of the various concepts in the shape of a tree.

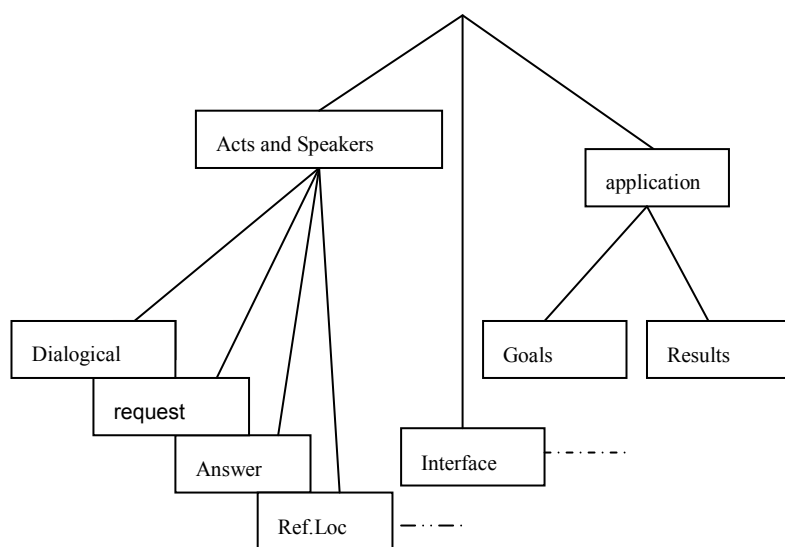


Fig2. Tree of the concepts

Another advantage of the method lies in the easy maintenance of under lexicons which can be modified in an incremental way at the end of session of dialogue, in comparison with the corpus thus generated. One thus has just shown how our system allows an identification of the conceptual vectors representing a statement. It is now a question of going up within the meaning of this statement, it will be necessary to carry out the composition of these vectors to form a structure of features. One uses a semantic grammar with left sweeping right-hand side.

Knowing that the possible acts are as follows: To order, Suggest, Confirm, Cancel, Ask, Help, Greet, Insult, Thank, Alert, Justify, Order, Promise, and Inform. Thus the statement "yes of agreement, thank you, I wish to seek a note" will take the action pursuant of following structured acts: USER (TO CONFIRM) + USER (TO THANK) +

USER (TO ASK (CRITERE=note)) these three acts will be carried out in sequence in the course of the dialogue. One will notice that this technique makes it possible to treat the auto corrections yes ", of agreement, wait... not" by USER (TO CONFIRM) + USER (TO CANCEL), but does not allow to treat ambiguities or contradictions like "yes and not", "yes, but I do not agree conflict".

6. Conclusion

It is the manager of dialogue which will have to manage this type of In this work we raised the various types of difficulties to which a module of comprehension used within the framework of a finalized task must face. These difficulties have several causes, the difficulties related to the linguistic system, the variability of the natural language and the behaviours of the user, the characteristics of the spontaneous oral examination and the errors produced by the module of voice recognition used.

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