

A Pragmatic Study of Cue-Based Model for Conversational Moves Interpretation

By : Asst. Prof. Amthal Mohammed A.(Ph.D)

College of Education for Human Sciences

University of Diyala

amthal.mohammed@uodiyala.coehuman.edu.iq

Keywords : cue-based model, conversational moves, speech acts

Abstract

In recent years, a growing interest in the area of computational pragmatics and dialogue analysis revealed initiatives in modelling pragmatic aspects of conversation. This led to improved spoken language conversation systems, which, in turn, announces for the beginning of an era that witnesses human-computer interaction.

The major concern of the current study is to shed light on one model of interpretation in computational pragmatics, i.e. , cue-based model. This model will be investigated through focusing on twofold priority; the first is why it is important to interpret a conversational move for it forms a classical problem, and the other one is the model itself which is constituted of three main cues. The three cues , the lexical , prosodic and discourse , are discussed and treated.

The idea that forms the starting point of this study is that these three cues are viewed the vehicle that leads to interpretation of (particularly) conversational moves and by building such a model, linguistic and context information can be computed to reach the goal of using interactive computers rather than interactive human participants specifically in offices and institutions.

خلال السنوات المنصرمة ، أدى الاهتمام المتزايد في مجال التداولية الحاسوبية و تحليل الحوار إلى محاولات لنمذجة الجوانب التداولية للحوار. وهذا بالنتيجة يقود إلى تطوير أنظمة حوار اللغة المنطوقة ، الأمر الذي يبشر ببداية حقبة من تفاعل إنساني-حاسوبي .

ان هدف الدراسة يكمن في تسليط الضوء على احد نماذج تحليل التداولية الحاسوبية وهو نموذج التلميح والذي ستم دراسته من خلال التركيز على أولوية ذات بعدين : الأول هو لماذا من المهم تفسير الدور في الحوار والذي يشكل مشكلة كلاسيكية ، أما البعد الآخر فهو النموذج عينه إذ يتكون من ثلاثة أنواع من التلميح والتي سيتم مناقشتها وهي المعجمية و البلاغية والنصية .

إن الدراسة تنطلق من فكرة إن هذه الأنواع الثلاثة تعتبر الوساطة لتفسير الدور في الحوار ومن خلال بناء هذا النموذج ، يمكن معالجة المعلومات اللغوية والسياقية حاسوبيا للوصول إلى حاسوب تفاعلي بجانب الناس المحاورين في المؤسسات.

Introduction

The interest in studying conversations, the interaction between two or more participants via spoken and written language, remains an interesting issue within the field of computational linguistics. Conversation has been frequently studied linguistically or psychologically. This study is an added attempt to many other studies being from computational pragmatics perspective. An approach that has proved its usability in conversational analysis is Dialogue Acts (Bunt,1994:19). These acts are very much related to Speech Acts Theory which was introduced by Austin (1962) where each utterance is interpreted via understanding the action that the participant (speaker) is attempting to perform.

In this study, 'utterance' is meant to be a natural unit of speech, as Webb (2010) calls it, that corresponds to a single act. It might be different from the traditional definition to that used in the speech community, in a way that an utterance is a complete unit of speech. It is referred to such a unit as a 'speaker turn' (Schegloff,1988). Thus, a single speaker turn can be comprised of many utterances.

It is to be mentioned that, speech acts deal with the intentions of the speaker, and, as a result, with the actions the hearer conveys. Dialogue acts, or 'conversational moves' ascribe conversation function to the utterances. In other words, our interest is in the role each utterance plays in enhancing conversation at the functional level. That is, our concern is to discover if a particular utterance is functioning as a question, a confirmation or a statement.

This model, 'cue-based', which is the major concern of the study, is also called 'probabilistic' by Jurafsky and Martin (2000). As the term suggests, there is a set of cues to reach the speaker's intentions. Generally, Webb (2010:69) describes this model as that the hearer uses cues, or let's say, indicators, in the utterances for reaching an interpretation.

While speech acts provide a useful characterization of one kind of pragmatic force, more recent work, especially computational work in building dialogue systems, has significantly expanded this core notion; modelling more kinds of conversational functions that an utterance can perform. The resulting enriched acts are often called 'dialogue acts' by Bunt (1994) or 'conversational moves' by Power (1979) and Carrleta *et al.* (1997). So, this study adopts Power's and Carletta's *et al.* term of 'conversational moves' to refer to dialogue acts. Though the term 'dialogue act' might seem ambiguous as Bunt and Black (2000: 65) believe, it has been frequently used to mean 'speech act', in the context of a dialogue, or to mean a combination of speech acts and semantic force.

1. An Overview of the Cue-Based Model

By reviewing the related literature, there are two computational models for conversational moves interpretation; the plan-inferential and cue-based models. The plan-inference model is noticeably rigorous, as Jurafsky and Martin (2000:743) believe. This is because it manipulates well-to-do knowledge structure and carefully-planned techniques. The items of the model are built to deal with strict uses of conversational moves. The model also puts into action sort of knowledge about intentions, desire, goals and beliefs of the speaker/hearer that are inevitable for computing the moves. Beside the first-noticed merits of the plan –inference model, still there are few shortcomings that might affect its use.

To reach a final non-literal meaning, according to the plan-inference model, there should be a single literal meaning for each utterance, which is then processed via inference rules (ibid). As is generally known, there is a mismatch concerning the surface form of the utterance and the speaker's meaning intended to be conceived or understood by the hearer. Sticking to this idea, imperatives are not frequently used to express requests. This is the reason why the cue-based model is suggested.

The cue-based model is an alternate means for disambiguation; it implies the use of literal meaning to reach the acts interpretation depending on the surface input. It is thought that the receiver or listener uses a set of cues in the input for deciding an interpretation. Webb (2010:61) states that the hearer uses cues (or simple indicators, either alone or in combination) in the utterances (both individual and in context of the wider conversation) to decide on an interpretation. In the same tone and to concur with Webb, Jurafsky and Martin (2000:743-4) note that the processing algorithm input provides keys for structure-building but not a literal meaning that should be adapted by inferential processes.

Most importantly, the cue-based model complies with and takes on Gazdar's literal meaning hypothesis (1981). This hypothesis is the starting point and a very strong claim for passing cue-based modeling. The key idea for such a model from a computational point of view is that the cues can be probabilistically associated with conversational moves.

The basic idea is that, as Jurafsky and Martin (2000:744) argue, cue-based model heavily relies on the utilization and exploitation of metaphor from packages of linguistic data, specifically, from conversational analysis and intuition. Moreover, the cue-based literature is grounded much more in the analysis of spoken language. To share, Webb (2010: 61) adds that this model might use cues from many domains to recognize a true question, including lexical and syntactic knowledge like aux-inversion, prosodic cues like rising intonation, and conversational structure clues, like the neighboring discourse structure, turn boundaries, etc.

Stolcke *et al.*(2000:213) and Jurafsky *et al.*(1998b:114) agree that the cue-based model, to a large extent, is distinguished through using machine learning models for the purpose of finding association rules between surface linguistic representation of an utterance and conversational moves. In such a way, this characteristic decreases the burden of manual design, which out-rightly, makes such models more promising from computational standing.

On the above mentioned, Shiffrin (2005:115) in her study, states that in addition to focusing on the underlying intentions of the speaker to infer the meaning of an utterance, models have assigned meaning according to hearer's expectations, and by using knowledge of the general structure of a conversation, with clues to interpretation gleaned from typical cue-words.

2. Why Interpreting Conversational Moves!

Conversational move is stand-in concept of the speaker's intention; what speakers try to intentionally perform by their utterances. This phenomenon exists in several language speculations and theories of meaning, particularly speech act theory. Conversational move recognition is an important task for the processing of natural language conversation at discourse level that occurs in various applications such as conversation systems, machine translation, speech recognition, and meeting summarization(Jurafsky and Martin, 2000:736; Allen and Perrault,1980:143). For example, it conditions a successful interpretation of user's utterance which is the main function of natural language understanding unit in conversation systems. Formally, it is defined by Yahya *et al.*(2009:190) as follows: "given an utterance with its preceding context, how to determine the conversational move it realizes." On the other hand, the task is challenging because most often conversational move is not expressed directly in speaker's utterance, and consequently the meaning of the utterance is not the intended meaning.

The problem of conversational move interpretation is a classic one. It is to determine, which move it realizes. This is because some of these moves have surface cues to their form; some questions, for example, begin with *wh*-words or with aux-inversion while they are functionally judged as requests. Gazdar (1981:89) and Levinson (1983:228), in their Literal Meaning and Literal Force Hypotheses respectively, show that every utterance has an illocutionary force which is built in its surface form. These two hypotheses reveal that aux-inverted sentences have question force, while subject-deleted ones have imperative force, etc.

Additionally, it is known that many sentences do not have the speech act type associated with their syntactic form. In the light of this statement, it is an indirect request which looks like a question according to the surface structure, as in the following most common example:

1. Can you pass the salt ?

It is a polite form to perform an action. The utterance begins with an aux-verb , so , it can be meaningfully considered as a yes-no question to check the hearer's ability to do something (passing the salt), and so all the indirect speech acts behave in the same way. Let's have a look at other examples:

2. Why can't you shut up ?
3. It's so cold in here.

When considering these two examples, number 2 reveals a command to someone to shut his mouth up; it is not a question about the reason why someone can't shut up , while example 3 is a request to someone to close the door or light a fire as the weather is cold. Hence, it is not functionally declarative since people know that the weather is cold.

Yahyaet *al.*(2009:191) best elaborate the idea that each move or act has a function in the following extract example.

4. Speaker Utterance Conversational Move

- | | | |
|----|----------------------------------|-------------|
| A. | Hello. | (greet) |
| A. | I want to see you today at 2:00. | (suggest) |
| B. | I' m busy at this time. | (reject) |
| B. | but I' m free at 3:00. | (suggest) |
| A. | Okay, that sounds fine to me. | (accept) |
| A. | I'll see you then. | (bye) |

In fact, almost all those who are concerned with the study of speech acts theory are very much accustomed to the idea that the surface form of an utterance does not match its function. Like the '*align move*' , as it is stated by Carletta *et al.*(1997:16), which seeks the partner's attention, agreement and readiness for the next move, the issue of '*checkmove*' targets the partner's confirmation for previously mentioned data. This kind of question is a statement in its surface form which can be understood as a question. Consider the following:

5. A. I need to buy a pair of gloves.
B. Ok, what color do you prefer ?
A. I prefer black.
B. Oh yeah, let me check it.
B. *And you said you prefer black.*
A. Uh yes.

By looking at what B says (the second turn) , it is a question that has a word order of a declarative. Take another example of the kind:

6. A: Where would you like to go?

B: Edwinstowe.

A: Edwinstowe?

B: Yes.

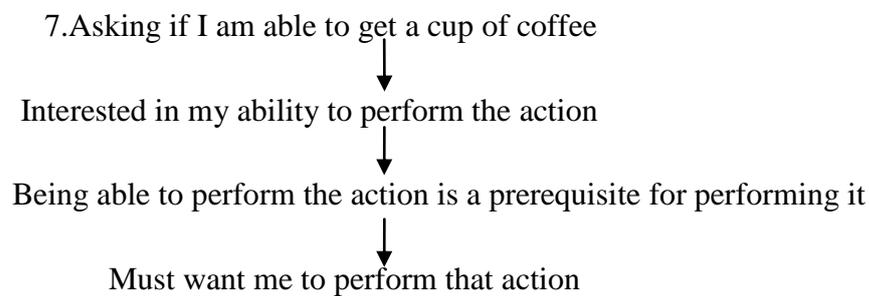
A: Please wait.

A: Is that Edwinstowe in Nottingham?

B: Yes.

(Schiffrin,2005:87)

The order that a conversational move follows may take the following hierarchical formula:



3. Cues (Items of the Model)

Cues are those features by which participants try to indicate and interpret what's going on in a conversation (Gumperz ,1992:230). In this respect, not only he focuses on linguistic features like prosodic , choices of code and lexical forms, and formulaic expressions but also on non-verbal signs.

Similarly, Jurafsky and Martin (2000:734) state that cues are surface features which are associated with conversational moves. On the other hand, Jurafsky *et al.* (1998b:5) classify them into three types , namely, *lexical* or *syntactic* , *prosodic* , and *discourse* or *summary*.

Moreover and beside the above taxonomy, Webb *et al.* (2005:61) classify cues into *lexical*, *collocational*, *syntactic*, *prosodic* or based on deeper conversational structure. Webb argues that the model captures the fact that the surface representation of an utterance provides all manner of cues.

The current study adopts Jurafsky's *et al.* three fold taxonomy to be dealt with in the current study. The following diagram reveals the model and number of cues as suggested by them.

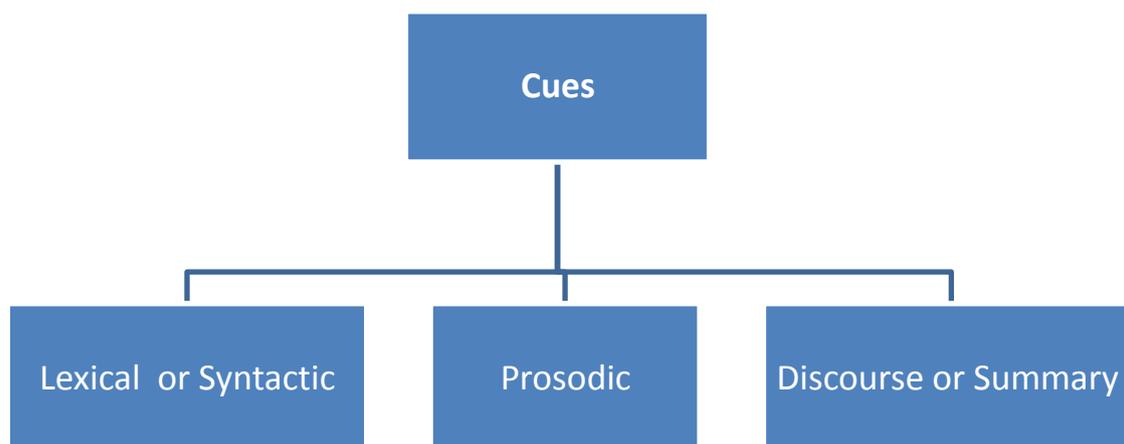


Figure (1) Jurafsky's *et al.* Model

The cues mentioned above are discussed respectively as follows:

3.1 Lexical or Syntactic Cue

The 'lexical or syntactic' cues are the most frequently realized set of cues in languages. This type of cues represents specific words and phrases (Cohen, 1984:225). Kohl (1999:149) states that syntactic cues can be viewed as those aspects of language that enable readers to analyze sentences correctly and to identify parts of speech, like suffixes, articles, prepositions, auxiliary verbs as well as word order that helps make grammatical sense. Kohl, in his study, lists a number of benefits syntactic cues can deliver. He believes that this type of cues enables readers, translators, and machine-translation systems to analyze sentence structure more quickly and accurately. They also help readers predict the structure of subsequent parts of a sentence. Additionally, they eliminate ambiguity.

Sadock and Zwicky (cited in Horn and Ward, 2006 : 596) put their criteria for using this type as they can be used for 'declarative' acts as declarative particles, or different inflectional forms used specifically in declarative acts. Some common lexical - syntactic cues for imperatives may include sentence-initial or sentence-final particles and special verb morphology. Sadock and Zwicky add that with the verb stem, subject-deletion and some pronouns of the subject can be used for imperative.

As is the case with yes-no questions, lexical or syntactic cues can also be applied to exclamatives. Exclamatives are viewed as a subset of exclamations and are analogous to declaratives, interrogatives and imperatives (Zevakhina, 2013:159). She adds that conventional association exists between an illocutionary force and a syntactic form. Clear as it may be, yes-no questions like *Could you raise this heavy box?* denotes an illocutionary force of asking for information which is a natural consequence of a question, while interrogatives of the same form like *Could you pass the salt?* conveys

an illocutionary force of a request and/or command which is a usual use of imperatives.

Pursuing this further, Quirk *et al.* (1985:825) state that the exclamatory question has the illocutionary force of an exclamatory assertion. Such kind of questions invite the hearer's agreement to something that the speaker has strong feeling about. Besides the exclamatives, rhetorical questions also have the force of a strong assertion.

To restore the declarative word order, sometimes, *rephrasing* or *reformulation* can be used to repeat back some focused version of the interlocutor's speech. It is a way for asking "is this an acceptable summary of your talk?" as Jurafsky and Martin (2000:735) state. Rephrasing of the interrogative part of questions has some interesting characteristics which are distinct from rephrasing of the sentence part or declarative sentences, basically, rephrasing of interrogatives are strongly lexical. Mostly, they often begin with 'you', 'so', or 'oh' and end with 'then'.

- 8 So, you're John's brother.
- 9 Oh, you can do it then.
- 10 You fancy it then.

Keisanen and Karkkainen (2014: 655), additionally, suggest another type, i.e., 'assessment', that is used to ascribe positive or negative properties. Consider the following examples:

- 11 It was funny.
- 12 That was amazing.
- 13 Oh yeah, it was awful.

The range of assessment adjective was quite small, consisting only of the following: *great, good, nice, wonderful, cool, fun, terrible, exciting, interesting, wild, scary, hilarious, neat, funny, amazing, tough, incredible, awful* (Jurafsky *et al.* 1998b:6).

Goodwin (1996:392) states that sentences with the assessment structure provide prototypical examples of what Lyons (1972:471) refers to as '*ascriptive sentences*' which "are used characteristically to ascribe to the referent of the subject-expression a certain property.

He (ibid:394) proceeds to add that the talk before the ascriptive sentence consists of a single non-lexical sound like "Uhoo : : eh : : : ". The lexical components are drawn from a very narrow subset of the lexicon, essentially *expletives*. The semantic resources used in the sentences that follow them to shape and characterize the referent being commented upon are completely absent. Indeed these particles are instances of what Goffman has analyzed as '*response cries*'; bits of speech that "externalize a presumed inner state" (Goffman 1981: 89). Let's consider the following example:

14 She said oh yeah.

3.2 Prosodic Cue

The second cue in the model of the current study is prosodic. Prosody is a very distinguished feature of a conversational move; it plays a respectable part in any move. It has been widely used in many speech-related applications and fields like conversational moves detection.

Prosody, in general, deals with elements of speech that are not individual segments like vowel and consonants but with properties of larger units of speech. These elements have much to do with linguistic function like intonation, tone, stress, rhythm, etc. In addition to these, features of other kinds can be reflected within prosody like the emotional state of the speaker and the form of the utterance (statement, question or command) (Traci and Bell, 2001:15).

As it is treated in the previous cue, prosodic features have a lot to do with the final pitch of a question, which is one of the discriminating properties in detecting a conversational moves. Like the case of 'yes-no' question, the realization of final lowering in 'declarative' and 'wh-question' should be studied (Pierrehumbert and Hirschberg, 1990:271).

Pitch features are significantly-considered peculiarities in determining whether a particular sentence is a question. These features are not accurate and precise enough to be extracted, that is why they are not measurable (Stolcke *et al.* 2010:170). In the same tone, Pierrehumbert and Hirschberg (1990:273) argue that pitch accents convey information about the semantic relationship between intermediate phrases and boundary tones. They also convey information about the directionality of interpretation. They add that intonational meaning cues, and others, such as, the rejection contour or the uncertainty / incredulity contour, could be used to build a model of prosodic cues specifically for conversational moves.

Prosodic features are extracted in the region of each word transition. The features are designed to capture breaks in temporal, intonational, and energy contours. Features are identified locally since the segmentation into conversational move units is not known; one knows only that conversational move boundaries are constrained to occur at word transitions (Shriberget *al.* 2009:443). In their study, Shriberget *et al.* measured the prosodic features through measuring the four sub-features, which are discussed as follows:

1. *Pause features* could occur optionally between words. Features included the pause duration (or 0, for no pause) at the transition, as well as that at the immediately preceding transition. Pause durations were not used for the following transition, because the presence of single-word conversational move (such as backchannels)

means that such locations may correspond to a different conversational move than that at the current word transition.

2. *Duration features* are intended to capture final lengthening before boundaries. The features include the duration of the last or maximum-duration vowel or rhyme in the word (since lexical stress could be on other than the final syllable).

3. *Pitch features* : the frame-level pitch is processed to smooth out microintonation and pitch tracking errors, using median filtering followed by fitting using a piecewise linear model. Measures were combined to create two types of features: those that look only at pre-transition speech, and those that look at differences in pitch before and after the transition.

4. *Energy features*: like the pitch features, energy features include mean, maximum, minimum, starting, and ending energy in the word as well as values and signs of fitted energy contours in boundaries.

3.3 Discourse or Summary Cue

The third cue is 'discourse' which is important for conversational move identity. Self-contained discourse does not work well especially in conversational move environment.

According to Webb (2010:63), a discourse cue is a word or a phrase which can indicate the surface structure of a discourse or conversation, and then, is manipulated to determine the intention of the speaker. He adds that such type of phrases include single word cues like 'well' or multiword cues like '*in any case*', 'for example', etc. Cue phrases can play a role in disambiguating the structure, for instance, the cue '*now*' indicates a return to a previous topic, or the introduction of a new sub-topic, as in:

15 Now, if you look at this next example.

and when the same cue is used in sentential form indicating a specific span of time including the duration of the utterance, as in:

16 I'm not free now, but I may be later.

where the cue phrase '*but*' delivers a significant discourse role.

Furthermore, Jurafsky *et al.* (1998b:4) notes that a conversational move, which functions as the second part of an adjacency-pair, in '*yes-no*' question, doubtlessly, depends on the presence of the first part (a question).

On the other hand, Allwood (1995:47) argues that rules are formulated which attempt to state sequential dependencies between speech acts such as question–answer. In the light of this, he puts the following speculations:

1. How do we extend the analysis from question–answer to other such sequences?

How common are such sequences?

2. How firm is the connection between the members of the sequence? Can a conversational grammar generate or accept sequences such as:

17 A:What time is it?

B: Shut up.

3. Can the rules of a conversational grammar be modified to allow for context dependence and multifunctionality in conversational moves?

That's why Allwood claims that the utterance

18 a, “No it isn't”

is an 'agreement' after a negative statement like

b. “It isn't raining”

but a 'disagreement' after a positive statement like

c. “It is raining”.

Traditionally, investigating the discourse cues has frequently been a goal in the field of conversational detection. In order to put this into effect, Schegloff (1988:75) stresses the idea of understanding and interpretation in a conversation. He gives the following example:

19 Do you know who's going to that meeting?

which also occurs in this conversation :

20 Mother: Do you know who's going to that meeting?

Russ: Who?

Mother: I don't know

Russ: Oh:: Prob'ly Missiz McOwen. . . (ibid)

In these two examples, 16 is understood as a request, but the idea that Russ misinterprets the utterance as 'pre-announcement' where he gives a suitable response by asking a question. Then , the mother makes it clear that what she means is a request. That forces Russ to give the appropriate response.

Conclusions

To conclude, it is hoped that the cue-based model will continue to play a respectable role in future computational modelling. Computational pragmatics should be paid

more interest, that's why this study is concerned with modelling because, as a matter of speculation, the future of linguistics will be very much involved in how to model and process languages without having a large number of participants, or without having face-to-face human interaction. Instead, the forthcoming future is subject to have human-to-machine interaction.

The cue-based model focuses on statistical examination of the surface cues to the realization of conversational move. Agents have to be able to make use of the rich lexical, prosodic, and discourse cues to interpretation. But the breadth and coverage of this model come at the expense of depth; current algorithms are able to model only very simplistic and local heuristics for cues.

The cue-based model shows one way in which the probabilistic paradigm can inform our understanding of the relationship between linguistic form and linguistic function. Scholars are invited to investigate this field of knowledge, computational pragmatics, for it is in need for every effort and contribution to reach an intensive use of technology in interaction.

Bibliography

- Allen, James and C. Raymond Perrault. 1980. *Analyzing intention in utterances*. *Artificial Intelligence*. CA: Benjamin. 15.143–178.
- Allwood, Jens. 1995. *An activity-based approach to pragmatics*. Gothenburg Papers in Theoretical Linguistics 76
- Bunt, Harry . 1994. *Context and dialogue control*. *Think* 3.19–31.
- , and Bill Black. 2000. *The ABC of computational pragmatics*. *Computational pragmatics: Abduction, belief and context*, ed. by Harry c. Bunt and William Black. Amsterdam: John Benjamins.
- Carletta, Jean, Amy Isard, Stephen Isard, Jacqueline C. Kowtko, Gwyneth Doherty-Sneddon, and Anne h. Anderson. 1997b. *The reliability of a dialogue structure coding scheme*. *Computational Linguistics* 23.13–32.
- Cohen, R. 1984. A Computational Theory of the Function of Clue Words in Argument Understanding. In *Proceedings of the 1984 International Computational Linguistics Conference*, California.
- Curl, Traci s., and Alan Bell, 2001. Yeah, yeah, yeah: Prosodic differences of pragmatic functions. Submitted manuscript.
- Gazdar, G. 1981. *Speech act assignment*. *Elements of discourse understanding*, ed. By Aravind Joshi, Bonnie Webber, and Ivan Sag. Cambridge, MA: Cambridge University Press.

- Goodwin, Charles. 1996. *Transparent vision. Interaction and grammar*, ed. by Elinor Ochs, Emanuel A. Schegloff, and Sandra A. Thompson. Cambridge: Cambridge University Press.
- Gumperz. J.J., 1982, *Discourse Strategies*. Cambridge, Eng.: Cambridge University Press.
- Horn, Laurence R. and Gregory Ward. 2006. *The Handbook of Pragmatics*. Oxford: BlackWell Publishing.
- Jurafsky, Daniel, Rebecca Bates, Noah Coccaro, Rachel Martin, Marie Meteer, Klaus Ries, Elizabeth Shriberg, Andreas Stolcke, Paul Taylor, and Carol van Ess-Dykema. 1998a. *Switch board discourse language modeling project report*. Research Note 30, Center for Speech and Language Processing, Johns Hopkins University, Baltimore, MD.
- Jurafsky, Daniel, and James H. Martin. 2000. *Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition*. Prentice Hall.
- Jurafsky, Daniel, Elizabeth E. Shriberg, Barbara Fox, and Traci Curl. 1998b. *Lexical, prosodic, and syntactic cues for dialog acts*. In *Proceedings of ACL/COLING-98 Workshop on Discourse Relations and Discourse Markers*, 114–120. ACL.
- Keisanen, Tiina and Elise Karkkainen. 2014. *A Multimodal Analysis of Compliment Sequences in Everyday English Interactions*. *International Pragmatics Association* 649-672.
- Kohl, John R. 1999. "Improving Translatability and Readability with Syntactic Cues". *Technical Communication*, Second Quarter, P:149-150
- Levinson, Stephen C. 1983. *Pragmatics*. Cambridge: Cambridge University Press.
- Lyons, J. 1972. *Human language*. In *Non-verbal Communication*. Cambridge :Cambridge University Press.
- Pierrehumbert, J., and J. Hirschberg. 1990. *The meaning of intonational contours in the interpretation of discourse*. *Intentions in communication*, ed. by P. R. Cohen, J. Morgan, and M. Pollack, 271–311. Cambridge, MA: MIT Press.
- Power, R. 1979. *The organization of purposeful dialogs*. *Linguistics* 17.105–152.
- Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech, and Jan Svartvik. 1985. *A Comprehensive Grammar of the English Language*. London: Longman.
- Sadock, Jerrold M., and Arnold M. Zwicky. 1985. *Speech act distinctions in syntax*. *Language typology and syntactic description*, volume 1, ed. By Timothy Shopen, 155–196. Cambridge University Press.
- Schiffrin, Amanda. 2005. *Modelling speech acts in conversational discourse*. Leeds : University of Leeds.

Schegloff, Emanuel A. 1988. *Presequences and indirection: Applying speech act theory to ordinary conversation*. *Journal of Pragmatics* 12.55–62.

Shriberg, Elizabeth, Rebecca Bates, Paul Taylor, Andreas Stolcke, Daniel Jurafsky, Klaus Ries, Noah Coccaro, Rachel Martin, Marie Meteer, and Carol van Ess-Dykema. 1998. *Can prosody aid the automatic classification of dialog acts in conversational speech?* *Language and Speech (Special Issue on Prosody and Conversation)* 41.439–487.

Stolcke, Andreas, Klaus Ries, Noah Coccaro, Elizabeth Shriberg, Rebecca Bates, Daniel Jurafsky, Paul Taylor, Rachel Martin, Marie Meteer, and Carol van Ess-Dykema. 2000. *Dialog act modeling for automatic tagging and recognition of conversational speech*. *Computational Linguistics* 26.339–371.

Stolcke, Andreas, E. Shriberg, R. Bates, N. Coccaro, D. Jurafsky, R. Martin, M. Meteer, K. Ries, P. Taylor, and C. Van Ess-Dykema. 1998. *Dialog act Modeling for conversational speech. Applying Machine Learning to Discourse Processing*. Papers from the 1998 AAI Spring Symposium. Tech. rep. SS-98-01, ed. by Jennifer Chu-Carroll and Nancy Green, 98–105, Stanford, CA: Press.

Webb, Nick . 2010 . *Cue-based dialogue act classification*. Sheffield: University of Sheffield.

_____, Ting Liu, Mark Hepple, Yorick Wilks . (2005) *Cross-Domain Dialogue Act Tagging*. Sheffield: University of Sheffield.

Yahya , Anwar Ali, Ramlan Mahmud B, AbdRahman Ramli. 2009. *Dynamic Bayesian networks and variable length genetic algorithm for designing cue-based model for dialogue act recognition*. Malaysia: University Putra Malaysia

Zevakhina , Natalia , 2013. *Syntactic Strategies of Exclamatives*. Moscow: National Research University Higher School of Economics. 157-178