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Acquisition of Common Language based on Multi-Agent Model

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As for the formalization of the grammar of the natural language, after that N.Chomsky has been done very much. Though the good formalization of the efficiency is asked to process a natural language sentence, as for the essential character which a natural language has by doing it, the extreme power must not be spoilt. The reason is that the grammar of the natural language is different from it of the formal language, and it is a statistics phenomenon. Because, when it meets with the unknown grammar, the unknown word, it needs to cope with it flexibly. And such a phenomenon that occurs in natural language processing happens frequently.

About the problem of how to express a flexible grammar, we paid attention to the point that how statistical natural language grammar occur by this research. for that reason we must examine the history of that how the grammar of the natural language being spoken at present do and appear

Though a certain language is fixed the word order, why doesn't this happen in all the languages ? and why doesn't it happen in all the time even if it is seen in the time when there is history of the language? As a part of the key which unties these doubts, Research against the phenomenon said as pidgin, creole recently is done very much.

the characteristics of pidgin and creole are as follows.

pidgin The existence of regular relations between two communities speaking different languages often leads to the creation of a mixed language that permits direct communication without recourse to translation. We speak, on the contrary, of pidgin when the result is a grammatically coherent language that satisfies, in the same way that the natural languages and the dialects do, the overall communicative needs of its users.

creole when this language becomes the major (or only) language of a community, we call it creole.

Most definitions of pidgin mention notions such as simplification, reduction, restructuring and mixture as components of the pidginization process, though sometimes creoles are characterized in these terms, too. One feature which is virtually universal to these languages generally classified as pidgins and creoles is the drastic reduction of morphological complexity and irregularity. A pidgin is characterized by a limited vocabulary, an elimination of many grammatical devices such as number and gender, and a drastic reduction of redundant features. This reduction has often been called simplification but it is now considered debatable whether the less redundant pidgin is simpler or more complex than the standard language.

The standard view then sees pidginization and creolization as mirror image processes and assumes a prior pidgin history for creoles. this implies a two-stage development. The first involves rapid and drastic restructuring to produce a language variety which is reduced and simplified with respect to the base language. The second step consists of the elaboration of this variety as its functions expand and it becomes nativized. From a sociological point of view, what linguists call a creole serves as the native or primary language of most of its speakers, while a pidgin is nobody's first language. Because pidgins are used by speakers who have another language, they can get by with a minimum of grammatical apparatus, but the linguistic resources of a creole must be adequate to fulfill the communicative needs of human language users. This raises the question of whether there is an absolute linguistic minimum of features a system must have in order to be a viable language.

Creolization is not a unique trigger for complexity. A pidgin may expand without nativization, and there will be few structural differences between an expanded pidgin and a creole which develops from it. Moreover, it is by no means clear that all of the kinds of changes which typically go on in the expansion for a pidgin under creolization involve an increase in complexity.

Such a change which happened frequently became a cause, and the un-nature of the natural language that it doesn't finish disposing of it by the frame of the form language appeared.

Based on the above thing, if we can simulate that the state that the natural language grammar which actually happens selects it, namely the state that agents in different communities which have independent grammar-sets each other acquire the other grammar to communicate with other communities, then we propose that it is possible that an expression of the self-changeable grammar.

we utilize multi-agent model, in order to simulate a community of common language, and to simulate a message exchange between active, independent human agents. The system consists of a certain number of independent processes, called agents, that can generate sentences by its own grammar-set, and can parse sentences received from other agents. Thus, agents can issue a sentence to other agents, and can receive sentences as messages from other agents. Agents may be regarded objects of object-oriented programming formalism, but are more active, own their own processes, and can issue/ receive

messages asynchronously to/ from other agents. To put it concretely, we put into practice as the model that simulates the process of pidginization or creolization.

Agents have the grammar which is not CFG but TAG. we proposed a new grammar expanded LTAG. It has some deep cases. And the learning system each agents own adopts genetic algorithm. By adopting it, we realized the learning system corresponding to a structural character of LTAG. We proposed the language acquisition model from a combination of these elements, and experimented on it on a parallel environment.