INDEPENDENT COMPUTER PRESENTATION OF KAZAKH LANGUAGE

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Supra, investigating and learning a living language were implemented with the assistance of persons who had a complete command of it, or with bilingual texts. Invention of recording sounds gave possibility to fix examples of an oral language objectively. Invention of talking pictures fixed examples of phrases with connection to situations and actions. Computer games gave the user the opportunity to choose actions with corresponding phrases. Existing well-known software to learn languages base on languages native to the user, nevertheless some notions (for instance, colors) are presented independently.

The authors put the problem of completely independent presentations of natural languages and proposed to involve interactive actions with feedback. With such software the user begins to think in learned language, without translation in mind. The authors propose to develop such software for Kazakh language.

Remark. Turkic languages are more convenient for this purpose because predicate (command word) stands at the end of phrase and attract attention of the user.

Definitions and hypotheses for independent presentation

Definition 1. If a computer presentation of an object does not depend on the user's knowledge and skills on similar objects then we call it independent. In our opinion, such presentations are more effective because the user can learn inductively - without referencing other objects in mind. In regards with learning a language, the user begins to thinking in it, without translation in mind.

The following definitions describe a language (both of human and computer) and its users from the authors' standpoint.

Definition 2. If low energetic outer influences can cause sufficiently various reactions and changing of the inner state of the object (by means of inner energy of the object or of outer energy entering into object besides of commands) at any time then such (permanently unstable) object is an almost-closed or affectable object, or a subject, and such outer influences are commands.

Definition 3. A system of commands such that any subject can achieve desired efficiently various consequences from other one is a language.

Hypothesis 1. A human's genuine understanding of a text in a natural language can be clarified by means of observing the human's actions in real life situations corresponding to the text.

Definition 4. Let any notion (word of a language) be given. If an algorithm acting at a computer: generates (randomly) a sufficiently large amount of instances covering all essential aspects of the notion to the user, gives a command involving this notion in each situation, perceives the user's actions and performs their results clearly on a display, detects whether a result fits the command, then such algorithm is said to be a computer interactive presentation of the notion.

Definition 5. A mathematical model of a notion consists of description of media (objects presented as sets on display); permitted and prohibited relations between objects (overlapping, intersection, inclusion) and the user's actions (moving and transforming objects); command involving the notion with random generation of auxiliary words; temporal sequence of relations between objects to be done by the user in order to guess and fulfill the command.

The following techniques are proposed for the user's guessing:
G1) uniqueness of the action (or the sequence of actions) which subdues the command and the situation naturally;
G2) similarity (some objects have the same property and this property is mentioned twice);
G3) alternation (new notion and new word appear together as an alternative to preceding notions);
G4) relation (new notion or two notions appear with an obvious relation between the new one and preceding ones or between them);
G5) using a narrative phrase that is naturally connected with the situation;
G6) the new noun only has a learned attribute;
G7) consolidation of knowledge;
G8) "if this task has a solution then the only action can solve it".

Proposed content of the software

The software consists of a series of tasks. Firstly, commands are given both in written and voice forms, further for (G7) some commands are given in voice form. In learning mode according to *Windows* software customs: if the user tries to take a wrong *Thing* then the computer permits its small shift only and returns *Thing* to its starting-position; if the user tries to move a fitting *Thing* onto a wrong spot then the computer also returns *Thing* to its starting-position. If additional entities (for instance, *Gravitation, Attraction, Repelling*) are on then the computer can move *Thing* to other (not starting) position. In the testing mode, the announcement *Joq (No)* outputs only.

Main learned words are denoted by capital letters; auxiliary and random learned words are denoted with italic capital letters; auxiliary random words are denoted with italic letters.

The proposed software must contain thousands notions. Some examples of mathematical models:

Example 1. Main verb SALU and some nouns.

Environment: A *BALL*(movable) and a (large) *BOX*(fixed).

(G1) Command: *DOPTY QORAPQA* SALYÑYZ.

Additional environment: A *BOOK*.

(G3) Command: *KITAPTY QORAPQA* SALYÑYZ.

Additional environment: A *BOWL*.

(G3) Command: *KITAPTY YDYSQA* SALYÑYZ.

Example 2. Colors.

Environment: A *RED ball,* A *GREEN ball* and a *RED box*.

(G2) Command: *QYZYL dopty QYZYL qorapqa* salyñyz.

(G3) Command: *JASYL dopty QYZYL qorapqa* salyñyz.

Example 3. Sizes.

Environment: A BIG *ball,* a LITTLE *ball* and a BIG *box.*

(G2) Command: ÜLKEN *dopty* ÜLKEN *qorapqa* salyñyz.

(G3) Command: KIŞKENTAY *dopty* ÜLKEN *qorapqa* salyñyz.

Additional environment: A LITTLE *box.*

(G7) Command: KIŞKENTAY *dopty* KIŞKENTAY *qorapqa* salyñyz.

Example 4. Second main verb ALU.

Environment: A *ball* on a *chair* and a *box.*

(G1) Command: *Dopty oryndyqtan* ALYÑYZ jäne *qorapqa* salyñyz.

Example 5. Verb BERU (related to animated objects only).

Animated objects are moving (stirring) slightly.

Environment: A *SQUIRREL* and an *APPLE.*

(G1) Command: *ALMANY TİYNGE* BERIÑIZ.

By the authors' experience of testing of sketches of proposed software, some children of 7-8 years old having a good command in using a computer mouse can adequately understand commands the first time in an unknown language, can learn some dozens of words and pass a simple test with these words without mistakes. Adults are less careful and they try to ask: "*I have guessed what I am to do, but how can this word be translated?*"

The authors hope that such software would be interesting and useful for people to learn and to check knowledge in Kazakh language and can be used to develop corresponding software for other Turkic languages.

THANK YOU FOR ATTENTION!