Directed and undirected computer assisted language learning, collaboration, and lifelong learning

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Introduction

Concrete implementations, large studies, and undirected learning have been highlighted as areas of further research for approaches to instruction which draw inspiration from the framework for Lifelong Learning (L4L).

The L4L system is designed to assist learners in learning the mandatory Chinese language and two main parts of the system are highlighted.

Every action of the learner is recorded in the form of "trails" which allows them to record & revisit past learning actions and examine those of other learners. This re-usage can be the visual (e.g. math's graphs) or textual (e.g. graphs, graphs).

The system can also examine these trails and suggest future courses of action to the learner which have proved fruitful to other learners. By providing a portable, complete record of the learners the system sees to avoid it being made the same mistakes again.

The 2nd part continues with the theme that visual, interactive interfaces assist with learning by exposing the syntax tree structure of the target language to the learner and encourages them to think in terms of grammar blocks and formal transformation rules to understand the structure of their chosen language. Sentences can be built from blocks or can be imported from finished text to analyse the grammatical structure of the sentence.

As on going work, several questions are raised which could be answered by extensions to the system.

Architecture

Lifelong learning programs that ad hoc learning is frequent and important as formal classroom learning at this architecture of C4L has been designed with this in mind. A central server stores the global knowledge database (KDS) and trial provides and generates log-on and authentication services to maintain confidentiality. All client communications is via the server (rather than peer-to-peer) using a text-based protocol.

Large scale architecture

Every user has access to the trail graph and KDS forever and there is a local cache of all their personal data. Even if the central servers suffer data loss the user does not lose data, and server data can be rebuilt from caches. The same applies should the user lose local data.

Trail Graph & Collaboration

At it's lowest level the trail graph is just a database table which stores the L4L data in the form of a type of event, and parameter's data. This makes it easy to store and browse 'users' actions. By adding, manipulating long term events, the system can display what is happening in the system, and therefore hopefully appealing to the target language.

Comparing to Google Maps, which gives extensive summary information about physical objects such as images, trail graphs and KDS contain information about objects such as words, grammar structures, etc. are being examined by other users due to their use in popular, world events and possibly attempts to pre-emptively integrate them into the users vocabulary.

Grammar Mapping & Visual interaction

The majority of language software focuses on the word level of the target language but L4L attempts to support all levels of the language. Although language and above are still the subject of future work, aspects of the trail graph and KDS are not restricted to just words. The grammar mapping feature of L4L stores grammar blocks into two forms: text and tree. The text form provides a textual description of the grammar block while the tree form provides a visual representation of the grammar blocks. In a visual, interactive manner, allows the user to experiment with different grammar structures in a way that is guaranteed to be correct. A sentence can be given to the system and it will automatically parse similar sentences. These can then be visualized as a tree and displayed on screen. The grammar mapping feature is integrated with the trail system to suggest new trail objects which may be appropriate for the current situation.

When the user enters a sentence into the grammar mapper, the tool will parse the sentence and tell the user the grammatical structure of the sentence. It is proposed that undirected learners will make heavier use of this facility than directed learners as they will not have an instructor to correct previous sentences. Regardless of type, should the user have entered a sentence with incorrect grammar the mapper can in some situations highlight and map corrections to the user. It is also possible that undirected learners who make heavy use of this facility will all develop a similar grammatical style.

Conclusions & future work

The L4L system is a multi-user research work. Prototypes of parts of the system have shown that trail graphs can be constructed at adequate levels of detail to create a detailed multi-user trail graph without encountering storage problems. This detail is sufficient to create detailed history tools for the user. Indeed, the history is currently too detailed to be generally useful because the relevant filtering algorithms have not yet been explored. The grammar mapping tool can currently only cope with a relatively simple subset of Mandarin but this should be improved by testing components from groups whose primary research is Mandarin grammar.

The most pressing point of future work is to clean the system up so more people can use the system without assistance. This will help in gathering more usage data to further develop the system. After this, the system should be made available to other researchers and students for further refinement.

Selected bibliography

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