An Intelligent Personal Assistant for Language Learning — Elia

BACKGROUND

Nowadays, language learners increasingly use their non-native languages through digital media. These new digital contexts and practices not only represent a valuable resource for language learning but also reflect the new needs of language learners. Nevertheless, they remain largely unexplored and neglected by educational practice which could be attributed to their private and heterogeneous nature. Despite the obvious challenges, there is an urgent need to create language-learning solutions which would unlock and maximize the potential of these emerging contexts of language learners. Not only could it meet the individual intrinsic needs of learners, but also contribute to lifelong learning.

This ongoing project attempts to design, develop and evaluate an intelligent personal assistant Elia which could support learners in the context of their digital foreign language use and subsequently create a learning plan to enhance their language learning. Elia takes the form of two interconnected parts, a browser plugin and a mobile app, both interacting with the learner and any digital content of choice.

The main function of the browser plugin is to provide real-time individualized assistance in reading and writing in the target language by responding to the learner's immediate needs and problems, and also by proactively drawing the learner's attention to the most useful language expressions given the learner's long-term goals. Additionally, the browser plugin's task is to monitor the learner's interactions and map it to the learning process using Learning Data Analytics.

On the other hand, the mobile app primarily aims to provide additional learning opportunities in the form of various tasks and exercises. These are based on the long-term learning objectives and previous experience of the learner and are constructed to map the incremental learning process to increase efficiency. Similarly, as the browser plugin, it continuously tracks the learner's performance in order to evaluate the progress and adapt the learning plan.
**TASKS**

As might have become obvious, the nature of this project is highly interdisciplinary, and thus entails a wide range of mini goals and tasks in the areas of linguistics, psychology, didactics, natural language processing (NLP), machine learning, data analytics, software engineering, among others. Below is a brief overview of possible technical tasks divided into three categories:

**Language Data Processing**
- Collocations (word combinations) extraction using dependency parsing
- Synonyms extraction using deep learning approaches
- Hybrid (lexico-grammatical) patterns extraction using n-grams and regex
- Automatic text genre and text complexity identification
- Automatic lexical substitution and text simplification
- Automatic question and distractor generation
- Automatic evaluation of non-native language, automatic error detection

**Software Development**
- Developing a back-end mobile application (web API, server, DB)
- Developing a front-end mobile application (platform-specific or cross-platform)
- Developing a browser plugin (scripts)

**Learning Data Analytics**
- Creating a tracking model of logging learner activities using xAPI
- Analytics of network structures (actor-artefact interactions)
- Analytics of learning processes using sequential mining algorithms
- Creating learning dashboards using data visualisation tools

**MILESTONES**

**Introductory phase**
- Introduction to the whole project (including team)
- Selection of an area of interest from the above listed tasks
- Setting realistic assignment(s) in line with the area of interest

**Pre-study phase**
- Reading recommended literature related to the assignment(s)
- Attending one-to-one sessions with team members to discuss and exchange ideas
- Drafting a concrete plan for the execution phase

Execution phase
- Carrying out the plan partly individually and partly in a team
- Documenting the work and sending bi-weekly status mails
- Attending regular team meetings

Final phase
- Completing and submitting the assignment
- Writing a final report
- Review of the work by the team at a final team meeting

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