MAWL: Mobile Assisted Word-Learning

Abstract
In this paper we describe Mobile Assisted Word-Learning (MAWL): An augmented reality based collaborative interface for learning new words using a smart phone.

Keywords
Augmented Reality, HCI, Computer Vision, Interaction Techniques, Mobile Social-Networking, Mobile Assisted Language Learning

ACM Classification Keywords
H.5.2 Information interfaces and presentation (e.g., HCI): Input devices and strategies; Interaction styles; Graphical user interfaces.

General Terms
Design, Theory

Introduction
Word learning is the one of the basic steps in language learning. Whether someone knows a language and would like to expand vocabulary for educational purposes or someone wants to learn a new foreign language, learning new words is always a troublesome task. A general traditional approach for learning new words is to keep a dictionary and use it whenever new word is faced. Today we are living in the age of computers and hand held devices connected to the
Internet with various rich web service resources. We can introduce new ways of learning.

**Contribution**

In this paper, we present a smart phone based novel collaborative Human-Computer Interaction method for learning new words. Our contributions are: (1) we keep track and save all textual contexts during reading process along with providing augmented reality based assistance. (2) We propose a social-networking based collaborative model to share and rate contexts. (3) We propose to provide social-media streams such as Twitter tweets or Facebook news-feed related to the word as an additional reading material with a rating based model to rank them based on their meaning and quality.

**Prior Work**

In 1997 Levy proposed Computer-assisted language learning (CALL) [5] to study applications of the computer in language teaching and learning. Chinnery presents concept of Mobile Assisted Language Learning (MALL) [6].

Recently, augmented reality [3] is becoming popular for language learning as a sub field of Mixed Reality Language Learning (MRLL). For example, researchers have proposed various augmented reality based methods to translate and recognize text in a given image and real-time video [4].

In addition, researchers have proposed various collaborative methods [2]. Collaborative learning helps to support and motivate each other to achieve a Learning Process

If we were given a list of new words with their meanings, and asked to memorize them, then it seems a difficult task. Human beings can memorize new words in better ways using context in reading, listening or speaking compared to the memorization of their meaning. We need to keep track of words we learned in the past for the purpose of revision.

In addition, we learn new words more conveniently if we are provided some additional information such as image, translation into mother native language, synonyms, antonyms, sentence usage etc related to the new word.

**Prototype**

Our system consists of a mobile device such as iPhone with build-in camera and a physical media such as paper with text. The camera captures current reading portion and computer vision based software tracks finger tip. It uses OCR technology for detecting text. Then displays augmented GUI on phone screen containing meaning of current word pointed by finger tip.

This approach helps to find the meaning of word without use of physical dictionary or without typing a keyword in the browser. We display current context (few lines of text containing that new word) along with associated related reading material such as its synonyms, antonyms, sentence usage, images. Software also saves previously learned words with respective contexts and highlights them, if they are again faced.
Figure 4. An augmented reality based interface with a selected word (highlighted with green color) pointed by finger tip with its meaning and context in right side GUI. Previously learned words are highlighted with red. User can save context. GUI displays previously saved contexts along with friend's contexts.

**Social-Networking**

To increase the quality of contexts, sentence usage, pictures and additional reading material containing that word such as social media newsfeeds, news etc., we can introduce social-networking based collaboration in the aforementioned system. Now, system has Client, Server, Users and Social-Graph metaphors. Client is a computer program runs on the phone as describe in prototype section. Server is web-based service that connects Clients and provides required learning resources. All users have to register on the Server. Using Client they can find and add friends or collaborators. Social-Networking system works as follow: (1) whenever user finds a new word, system displays contexts from their friend circle related to the word underneath their own context. (2) User can share their contexts among friends or all users. (3) User can see friend’s profile containing their contexts. (4) They can suggest sentence usage of word related to friend's context. (5) They can review and rate any context, synonyms, antonyms, pictures or sentence usage.

**Conclusion**

Our work provides an assistance to learn new words in a natural way. HCI helps to find meaning of word without typing in the browser or searching in the dictionary with other usable features. Social-networking provides collaborative learning experience with a high quality of peer-reviewed reading material with the help of rating, recommendation and suggestion process. Each year thousands of students prepare for admission tests such as SAT, TOEFL, GMAT GRE [1] etc. System may be a helpful tool for their preparation.

**References**