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An Arabic Text-to-Picture Mobile Learning System

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Abstract

Handled devices and software applications are susceptible to ameliorate learning strength, awareness, and career development. Many mobile-based learning applications are obtainable from the market but Arabic learning shortage is not taken in consideration. We conduct an Arabic Text-to-Picture (TTP) mobile educational application which performs knowledge extraction and concept analysis to generate pictures that represent the content of the Arabic text. The knowledge extraction is based on Arabic semantic models cover important scopes for young children and new Arabic learners (i.e., grammar, nature, animals). The concept analysis uses semantic reasoning, semantic rules, and Arabic natural text processing (NLP) tool to identify word-to-word relationships. The retrieval of images is done spontaneously from local repository and online search engine (i.e., Google or Bing). The instructor can select the Arabic educational content, get semi-automatic generated pictures, and use them for explanation. Preliminary results show improvement in Arabic learning strength and memorization.

Keywords

Mobile Learning, Natural Language Processing, Ontology, Multimedia Learning, Engineering Education.

I. Introduction

Nowadays, mobile learning environment has been excessively used in diverse fields and has become a common matter in educational movement. In such an environment, learners are able to reach online educational materials from any location. Learners of Arabic language suffer from the lack of adequate resources. In fact, most of the educational software, tools, and web sites use classical techniques of introducing the concepts and explaining the

vocabulary. We present in this paper a text-to-picture (TTP) educational mobile system that promotes Arabic children stories through semi-automatic generated pictures to illustrate their contents in an attractive manner. Preliminary results show that the system enhances the Arabic learners' comprehension, deduction and realization.

II. Background

Natural language processing (NLP) stresses the extraction of useful information and mining natural text. These information can be used to identify the scope of the text in order to generate summaries, classify contents and teach vocabulary. Diverse NLP-based systems that illustrate the text to images have been developed recently [1, 2, 3]. In general, these systems divide the text into segments and single words, access local multimedia resources, or explore the web to get pictures and images to illustrate the content.

All the proposed systems and techniques do not include the Arabic language. In this paper, we propose an Arabic TTP educational system using multimedia technology to teach children in an attractive way. Our proposal generates the multimedia tutorials dynamically by using Arabic text processing, entities relationship extraction, multimedia ontology, and online extraction of multimedia contents fetched from Google search engine.

III. Methodology

In order to develop our system, we have created first the general system artwork, set the end user graphical user interface, design the semantic model that will store all semantic information about terms, and collect educational stories and analyze them. We have gathered 30 educational stories, annotated terms, and associated illustrations manually. Illustrations were gathered from the Internet and educational repository. The semantic model is developed using "Protégé editor", a free open source ontology editor developed by Stanford [4]. The semantic model is composed from many classes that are referred to as concepts.

IV. The proposed system

The proposed system is a client-server application. When the server launched, it loads its packages and components, it loads the defined ontology, text parser components, and finally it opens a connection to listen for users' requests. Upon an effective connection trial, the user will be eligible to enter or open existing Arabic stories and process them. On the client side, the processing request and response of the story is done in a different thread, to keep the user able to continue his work without any interruption. Finally, server reply will be displayed for the user on his mobile device which consists from the processed Arabic story, related images, and different questions about an animal.

V. Conclusion

This study presents a complete system that automatically generates illustrations for Arabic stories through text processing, Arabic ontology, relationship extraction, and illustration generation. The proposed system belongs to learning technology which can be on mobile devices to teach children in an attractive and non-traditional style. Preliminary results demonstrate that the system improved learners' comprehension and realization.

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