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A Model of Knowledge-Based Health Dialogue System With VoiceXML

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Abstract. VoiceXML enables the building of dialogue systems that users can interact with through the use of dual tone multi frequency (DTMF) key input and speech. The VoiceXML standard features output of synthesized speech, output of audio files, recognition of spoken input, recognition of dual tone multi frequency (DTMF) key input, recording of spoken input, but none of natural language understanding (NLU), natural language generation (NLG) and natural language knowledge representation. The standard does not also support building expert or knowledge-based systems. Although previous work have successfully integrated intelligent components into VoiceXML-based systems to make them intelligent to handle NLU and NLG, this paper investigated the viability of integrating intelligent component technologies suitable for knowledge-based systems into VoiceXML-based systems. In achieving the objective of the work, the paper proposes integration of Java expert system shell into health dialogue system to enable the building of expert system for diagnosis of diseases. The results showed that it is possible to build knowledge-based systems with VoiceXML.

Keywords: Health dialogue system, diagnosis, screening, knowledge-based system, VoiceXML, intelligence

1 Introduction

VoiceXML is a markup language for specifying interactive voice dialogues between a human and a computer [1, 2]. The VoiceXML standard requires provision of speech recognition and text-to-speech (TTS), but not of any natural language processing (NLP) techniques such as natural language understanding (NLU), natural language generation (NLG), or natural language knowledge representation [3]. The standard does not also support building knowledge-based systems. Previous work have successfully integrated intelligent components into VoiceXML-based systems to make them intelligent to handle NLU and NLG [3, 4, 1]. This work is however concerned with the integration of intelligent component technology suitable for knowledge-based or expert systems into VoiceXML-based systems to make them smarter. In achieving this objective, the paper proposes the integration of Java expert system shell (Jess) into health dialogue system to enable them diagnose diseases based on expert knowledge. Health dialogue systems