Application of Expert System in Building a Vietnamese Text-to-Speech Program with Prosody

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***Abstract*—This thesis explores the application of an expert system in developing a Vietnamese text-to-speech (TTS) program that incorporates prosody. The work covers an overview of text-to-speech technology, expert systems, and the challenges faced in implementing such a system, particularly in the context of Vietnamese language and its prosody. The author developed a prototype system and found that while the approach was innovative, it was limited by the scope of knowledge and the small dataset available. The research highlights the potential of integrating expert systems in TTS for Vietnamese, but acknowledges the need for further development. The prototype system could only differentiate between normal and stressed speech, and the text processing functions were basic. The author suggests further research and collaboration with experts in natural language processing to improve the system.**

***Index Terms*—Expert System, Text-to-Speech, Prosody, Natural Language Processing, Visual C++, Vietnamese**

I. Introduction

The thesis introduces the application of expert systems in building a Vietnamese text-to-speech program with prosody. It discusses the historical development of text-to-speech technology and the importance of prosody in making speech more natural and expressive. The author faced challenges due to the limited knowledge base and the use of outdated character encoding in Visual C++. The prototype system was developed using Visual C++ and tools like vnTokenizer and vnTagger for text processing and analysis. The system aimed to integrate an expert system to handle prosody, but the implementation was constrained by the scope of knowledge and the small dataset available. [1]

II. Methods

The methods section describes the development of a prototype system using Visual C++ and the integration of an expert system to handle prosody. The author utilized tools like vnTokenizer and vnTagger for text processing and analysis. The system was designed to differentiate between normal and stressed speech, and the text processing functions were basic. The author implemented functions such as text normalization, word extraction, and sentence segmentation. The prototype system was tested with a small dataset, and the results indicated that while the approach was innovative, it was limited by the scope of knowledge and the small dataset available. [1]

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III. Results

The results indicate that the prototype system was able to demonstrate basic prosody changes, but it was limited by the small dataset and the lack of comprehensive knowledge in the expert system. The system could only differentiate between normal and stressed speech, and the text processing functions were basic. The author implemented functions such as text normalization, word extraction, and sentence segmentation. The prototype system was tested with a small dataset, and the results showed that the system could handle basic text-to-speech tasks, but the quality of the output was constrained by the limited scope of the knowledge base and the small dataset. [1]

IV. Discussion

The discussion highlights the potential of integrating expert systems in text-to-speech technology for Vietnamese, but notes that the current implementation is limited. The author suggests further research and collaboration with experts in natural language processing to improve the system. The prototype system was a step forward, but it still had significant limitations. The author expressed hope for future improvements and collaboration with experts in the field. The limitations included the small dataset and the limited knowledge base, which constrained the system's ability to handle more complex prosodic changes. [1]

V. Conclusion

The conclusion summarizes the findings, noting that while the prototype system was a step forward, it still had significant limitations. The author expresses hope for future improvements and collaboration with experts in the field. The prototype system was able to demonstrate basic prosody changes, but the quality of the output was constrained by the limited scope of the knowledge base and the small dataset. The author suggests that further research and collaboration with experts in natural language processing are necessary to improve the system's capabilities. [1]

References

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