HOKKAIDO UNIVERSITY

| | |
|---|---|
| Title | Study on Optimal Spoken Dialogue System for Robust Information Search in the Real World [an abstract of dissertation and a summary of dissertation review] |
| Author(s) | 徐, 昕 |
| Degree Grantor | 北海道大学 |
| Degree Name | 博士(工学) |
| Dissertation Number | 甲第12405号 |
| Issue Date | 2016-09-26 |
| Doc URL | https://hdl.handle.net/2115/63361 |
| Rights(URL) | https://creativecommons.org/licenses/by-nc-sa/2.1/jp/ |
| Type | doctoral thesis |
| File Information | Xin_Xu_abstract.pdf, 論文内容の要旨 |




Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

学　位　論　文　内　容　の　要　旨

博士の専攻分野の名称　　博士（工学）　　氏名　徐 昕

学　位　論　文　題　名

Study on Optimal Spoken Dialogue System for Robust Information Search in the Real World
（実環境下におけるロバスト情報検索のための最適音声対話システムに関する研究）

Recently, the spoken dialogue systems that enables users to intuitively and directly operate services and smart phones with voice commands and information search becomes popular, such as Apple's "Siri" and NTT Docomo's "Shabette Concier". However, there is still a great remaining issue that there are not many users with the habit and continual use of the spoken dialogue system in the real world, though most of their devices are implemented. Some key improvements are investigated to give the possibility to solve this issue: 1) create attractive characters and interface which make users feel like to speak to. 2) avoid failures in voice search or dialogue communication mainly caused speech recognition errors. 3) emphasize of spoken dialogue interfaces to present superiority and differentiation to other modalities such as mouse or touch screen. The study in this thesis is focusing on three approaches to solve these challenges: first, to promoting the daily use of the spoken dialogue interface, my study takes advantage of the gamification theory to design a dialogue agent and dialogue scenario The real-world data also proved the novelty of our design, in which over 23.3% users were keeping speaking continually. Second, to improve the user experience optimally for information search, my study proposes two strategies: I. a dialogue management strategy of optimal question selection has been verified to be effective to assistant users' operation in a knowledge-based spontaneous dialogue system, II. a fast and robust search method based on phoneme strings matching decreases the failures caused by the queries containing incorrect parts. Experimental results show that the proposed search method reduced processing time by more than 86.2% compared with the conventional methods for the same search accuracy. Third, my study proposes high-accuracy voice pitch extraction technology against noise, preparing for recognizing speaker's emotion which helps generate the appropriate dialogue action. Even in a variety of noise type and level of the experimental environment, the proposed pitch extraction method is able to verify the high robustness compared with existing methods. Furthermore, based on the above researches of my study, this thesis proposes a dialogue structure to build a personal-preferred dialogue system applying emotion and multi-device interface for further real-world use in the future.