<center>論 文 内 容 の 要 旨</center>

博士論文題目

<center>Language-aware code-switching speech recognition
（言語を意識したコードスイッチング音声認識）</center>

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（論文内容の要旨）

The phenomenon where a speaker mixes two or more languages within the same conversation is called code-switching (CS). Handling CS is challenging for automatic speech recognition (ASR) because it requires coping with multilingual input. There are many challenges for the CS ASR, but this thesis focuses on the following three problems for the CS ASR's development: language coverage, training mechanism, and usability.

The first is the language coverage. Most of the previous researches only focused on a single-pair CS. However, when we want to handle multi-pair CS beyond a single-pair CS, developing multiple systems per single-pair CS can be an exhausting task. Therefore, the unified system for multi-pair CS is desirable to simplify the process of training, deploying, maintaining, and the recognition task. To realize the multi-pair CS system, we introduce the language-aware mechanism by utilizing a language identification system. It enables to handle multi-pair CS better by providing language information. Various approaches utilizing language identification systems were

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（論文審査結果の要旨）

The phenomenon where a speaker mixes two or more languages within the same conversation is called code-switching (CS). Handling CS is challenging for automatic speech recognition (ASR) because it requires coping with multilingual input. The thesis research tackled three problems in CS ASR.

The first is the language coverage. The language-aware mechanism by utilizing a language identification system is proposed to cover multi-pair language CS. It enables to handle multi-pair CS better by providing language information.

The second is the training mechanism. The datasets of CS speech and the corresponding CS transcriptions are hard to obtain. To solve the CS data problem, the thesis utilizes the framework called the machine speech chain. The machine speech chain is the mechanism inspired by the human communication mechanism called the speech chain.

The third problem is usability. The common aim of developing a CS ASR is merely for transcribing CS-speech utterances into CS-text sentences. The thesis research constructs a system that can recognize code-switching speech and translate it into monolingual texts to support monolingual speakers. The three contributions are evaluated and confirmed with comparison with state-of-the art technologies with open speech corpus.

The thesis research provides a general framework for multi-pair code switching ASR and machine translation. A series of his research resulted in two high-quality peer-reviewed journal papers, four peer-reviewed international conference papers. As a result, the thesis is sufficiently qualified as a Doctoral thesis of Engineering.