



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : MRIDUMONI PHUKON
Roll Number : 186105102
Programme of Study : Ph.D.
Thesis Title: : Turn-taking in VUIs: Design strategies for achieving entrainment using audio cues
Name of Thesis Supervisor(s) : Dr. ABHISHEK SHRIVASTAVA
Thesis Submitted to the Academic : DESIGN
Division
Date of completion of Thesis Viva-Voce Exam : 09.01.2026
Key words for description of Thesis Work : Human-Computer interaction, HCI, Voice-User Interfaces, VUIs, Turn-taking, speech entrainment

SHORT ABSTRACT

Spoken interactions with machines have become increasingly common in everyday contexts, from virtual assistants to voice-operated service kiosks. While full-duplex technology-allowing simultaneous speaking and listening-it has shown promise in research and select commercial deployments, it remains technically demanding, resource-intensive, and not always the most practical choice for many real-world scenarios. In contrast, half-duplex turn-taking, where the system alternates between listening and speaking, continues to be a highly effective model for enabling interactive conversation -a structured, multi-turn exchange in which the user and system take sequential turns to share information, clarify intent, and progress toward a task goal.

This thesis investigates human user's turn-taking behaviors with a Voice User Interface (VUI) equipped with a novel turn-taking protocol that addresses the inherent constraints of half-duplex systems. By leveraging structured auditory feedback, including non-speech audio cues and explicit system prompts, the protocol sonifies the invisible seam of half-duplex turn-taking, encouraging users to entrain to the system's turn-taking rhythm and thereby enhancing performance. The study controls the VUI's turn-taking behavior by manipulating the temporal parameters of the automatic speech recognition (ASR) system. Through behavioral analysis of human participants, the research demonstrates that users not only respond to the artificial turn-taking cues but also gradually entrain to the VUI's turn-taking patterns. Key metrics, including task completion time, task error rate, and subjective user feedback, are utilized to evaluate the protocol's effectiveness.