

Cerebella and Generating Virtual Character Performance from Audio

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Cerebella was designed to fundamentally change the economics of creating virtual humans, lowering the barriers of entry to creating virtual human applications. It automates the generation of physical behaviors for virtual humans, including nonverbal behaviors (such as gestures, posture shifts and facial expressions) accompanying the virtual humans dialog, responses to perceptual events (such as gazing at objects that pass by) as well as listening behaviors (such as nodding to signal that one is attending to the speaker). Modular processing pipelines transform the input into behavior schedules, written in the Behavior Markup Language and then passed to a character animation system.

Designed as a highly flexible and extensible component, Cerebella realizes a robust process that supports a variety of use patterns. For example, to generate the character's nonverbal behavior for an utterance, Cerebella can take as input detailed information about a character's mental state (e.g., emotion, attitude, etc.) and communicative intent. On the other hand, in the absence of such information, Cerebella will analyze the utterance text and prosody to infer that information. It can be used online to generate behavior in real-time or offline to generate nonverbal behavior schedules that will be cached for later use. Offline use has allowed Cerebella to be incorporated into behavior editors that support mixed initiative, iterative design of behavior schedules with a human author, whereby Cerebella and the human author can iterate over a cycle of Cerebella behavior schedule generation and human author modification the schedule.

At its simplest, one only need pass Cerebella the text of what the virtual human should say. Cerebella analyzes the dialog audio and text and then generates appropriate nonverbal behavior, thereby greatly reducing development time.

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For questions about Cerebella and usage, please contact Stacy Marsella, Ph.D. at marsella@ict.usc.edu.

At the University of Southern California Institute for Creative Technologies leaders in artificial intelligence, graphics, virtual reality and narrative advance low-cost immersive techniques and technologies to solve problems facing service members, students and society.