

Division of Electrical, Information and Communication Engineering	Research field		Lab. ID
			EI35
Laboratory web site	https://ccs.w3.kanazawa-u.ac.jp/		
Research subjects			
<p>Computational cognitive science is a research field that aims to understand the intellectual activities (cognitive processes) of humans and other animals by constructing computational models (artificial intelligence). Many animals, including humans, learn from experience, and machine learning can be understood as the implementation of learning as a computational process on computers. However, many cognitive processes remain unexplained by learning alone. Our laboratory seeks to elucidate these cognitive processes.</p> <p>For example, understanding is often associated with moments of insight, sudden realization, or the emergence of novel awareness. The cognitive process of understanding exhibits characteristics that are not typically found in learning, such as its one-shot/ emergent nature and irreversible nature and the involvement of conscious awareness. Elucidating the computational mechanisms underlying such poorly understood cognitive processes may also contribute to establishing new computational principles for next-generation artificial intelligence.</p> <p>More specifically, we investigate fundamental questions about cognitive processes that we encounter in everyday life: Why can we understand three-dimensional structures from two-dimensional images? Why can we perceive three-dimensional space, whereas we do not appear to experience four-dimensional perception in everyday life? How can we extract the meaning of a language from statistical information in strings of characters? And why can we formulate general laws or hypotheses from only a small number of examples? Addressing these seemingly naive questions provides a starting point for uncovering the deeper computational mechanisms underlying these processes. Our research aims to construct computational models that account for such cognitive phenomena.</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>The primary educational goal for students in the master's program is to develop the ability to explain their own research in their own words, while students in the doctoral program are expected to develop the ability to formulate original research questions. To achieve these goals, our core activities consist of weekly seminars in which students report on their research progress, followed by open discussions and question-and-answer sessions.</p> <p>To foster students' ability to formulate original research questions, seminars are generally moderated by students, and the faculty supervisor observes the discussion without intervening until the students have completed their questions and answers among themselves.</p> <p>As part of their annual academic activities, students are encouraged to present their research at academic conferences and other scholarly meetings at least once a year in the master's program and at least twice a year in the doctoral program.</p>			
Daily life in the laboratory, etc.			
<p>In addition to weekly seminars, we aim to hold an off-campus research retreat approximately once a year, providing an opportunity to revisit our research from a fresh perspective. Students also organize informal gatherings, such as tea time and lunch meetings, from time to time. Our everyday academic life involves exchanging ideas, gaining inspiration through these interactions and casual conversations, and then returning to our research with renewed perspectives.</p> <p>Throughout the year, students work toward presenting their research at conferences, including those organized by the Japanese Cognitive Science Society and the Japanese Society for Artificial Intelligence, as well as related international conferences, and toward publishing their findings in academic journals.</p>			
Message or comments by the laboratory faculty staffs			
<p>Our laboratory encourages students' independence and trial-and-error. It is important for students to recognize early on that little progress can be made by having an attitude to wait for instructions, and to cultivate the attitude of predict what should be done next. When students lead themselves, we are fully committed to supporting and guiding them.</p> <p>We welcome students who enjoy hands-on work and are willing to engage in persistent trial and error, tackling problems through their own efforts, even when the goal is challenging.</p>			
Laboratory mail address	hidaka@se.kanazawa-u.ac.jp		