Haibin Zhu

Lecture 1:

Title: E-CARGO/RBC: Enabling Research Innovations in the Era of AI

ABSTRACT

In the tie of AI (Artificial Intelligence), many AI tools, such as LLMs (Large Language Models), can help people accomplish many low-level intelligence tasks, such as coding and reporting. Many low-level routine jobs have a high potential to be replaced by such LLMs. Researchers and practitioners need to master powerful high-level modelling tools to meet these new challenges. E-CARGO/RBC (Environments - Classes, Agents, Roles, Groups, and Objects /Role-Based Collaboration) is a modelling methodology, which helps people deal with complex problems by designing systematic strategies other than using low-level algorithmic skills.

RBC is a computational methodology that uses roles as the primary underlying mechanism to facilitate collaboration activities. It consists of a set of concepts, principles, models, processes, and algorithms. RBC and its E-CARGO model have been developed into a powerful tool for investigating collaboration and complex systems. Related research has brought and will bring in exciting improvements to the development, evaluation, and management of systems including collaboration, services, clouds, productions, and administration systems. RBC and E-CARGO grow gradually into a strong fundamental methodology and model for exploring solutions to problems of complex systems including Collective Intelligence, Sensor Networking, Scheduling, Smart Cities, Internet of Things, Cyber-Physical Systems, and Social Simulation Systems.

E-CARGO assists scientists and engineers in formalizing abstract problems, which originally were taken as complex problems, and finally points out solutions to such problems including programming. The E-CARGO model possesses all the preferred properties of a computational model. It has been verified by formalizing and solving significant problems in collaboration and complex systems, e.g., Group Role Assignment (GRA). With the help of E-CARGO, the methodology of RBC can be applied to solve various real-world problems. E-CARGO itself can be extended to formalize abstract problems as innovative investigations in research. On the other hand, the details of E-CARGO components are still open for renovations in specific fields to make the model easily applied.

In this lecture, the speaker examines the requirement of research on collaboration systems and technologies, discusses RBC and its model E-CARGO; reviews the related research achievements on RBC and E-CARGO in the past years; illustrates those problems that have not yet been solved satisfactorily; presents the fundamental methods to conduct research related to RBC and E-CRAGO and discover related problems; and analyzes their connections with other cutting-edge fields. This talk aims to inform the audience that E-CARGO is a well-developed model and has been investigated and applied in many ways. The speaker welcomes queries, reviews, studies, applications, and criticisms.

Keywords: Collaboration, Methodology, Model, E-CARGO, Role-Based Collaboration, Object, Agent, Role.

Audience

Decision-makers, researchers, practitioners, graduate and senior students of computer science, computer engineering, information systems, systems engineering, industrial engineering, management, and computational economics and social science.

Lecture 2:
Title: Team Intelligence: An E-CARGO Perspective

ABSTRACT
Humans live in societies and cannot exist in isolation. Consequently, social intelligence (SoI) is essential for every individual, yet it remains largely neglected by current Artificial Intelligence (AI) systems. Although Artificial General Intelligence (AGI) aims to equip machines with the full spectrum of human intelligence, many important forms of intelligence beyond individual cognition—such as social intelligence (SoI), emotional intelligence (EI), and systems intelligence (SI)—have not yet been adequately modeled or formalized. Team Intelligence (TI) has also been discussed in the literature; however, most existing studies on SoI, TI, and related concepts adopt primarily humanistic or qualitative perspectives. This has made it difficult to define these forms of intelligence as rigorous, widely accepted scientific concepts with concrete computational mechanisms. Moreover, much of the current research focuses on the intelligence of individuals in social contexts, while largely overlooking the idea that a team itself can possess intelligence as a collective entity.

RBC is a computational methodology that employs roles as the primary mechanism for enabling and coordinating collaborative activities. It comprises a systematic set of concepts, principles, models, processes, and algorithms. Together with its underlying E-CARGO model, RBC has evolved into a powerful framework for investigating collaboration and complex systems. Ongoing and related research has already led, and will continue to lead, to significant advances in the development, evaluation, and management of a wide range of systems intelligence, including Collective Intelligence, Collaborative Intelligence, Computational Social Systems. With the introduction of the E-CARGO/RBC, it becomes possible to formally specify a unified and computationally grounded concept of team intelligence.

In this talk, a real-world scenario is presented to motivate the need for explicitly defining and evaluating team intelligence, and to demonstrate how TI can be naturally supported within the E-CARGO/RBC framework. Building on this foundation, the speaker proposes a quantitative indicator for team intelligence—analogous to IQ (Intelligence Quotient)—termed TIQ (Team Intelligence Quotient). By reviewing and synthesizing related work, the talk further clarifies the concepts of social intelligence, systems intelligence, and team intelligence, and integrates them into a coherent perspective under the proposed approach.

Keywords: Intelligence, AI, AGI, Social Intelligence, Systems Intelligence, Team Intelligence, Environments – Classes, Agents, Roles, Groups, and Objects (E-CARGO), Role-Based Collaboration (RBC).

Audience
Decision-makers, researchers, practitioners, graduate and senior students of computer science, computer engineering, information systems, systems engineering, industrial engineering, management, and computational economics and social science.