Innovating Computer Science by Algebraic Topology

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Summary

This lecture in on a few decade researches to innovate computer science as the core science of information technology to expand it such that it becomes capable of modeling and architecturally designing information worlds called cyberworlds as well as the real world we live and conceptual worlds. Cyberworlds as information worlds have been grown fast and in an extremely large scale to encapsulate the real world activities including financing, commerce, education and manufacturing as e-financing, e-commerce, distant education and e-manufacturing without a firm scientific ground. Examples of its consequence are seen as troubles of information systems at financial and trading centers, and failures of digital government projects internationally. Information systems consisting of information is a part of cyberworlds. Further, people around them have been failing to conceptualize the source of such troubles to make the situation worse because of the lack of science to model conceptual worlds and associate them to the real worlds and cyberworlds.

The lecture presents an incrementally modular abstraction hierarchy that is grounded on algebraic topology and demonstrates that the problems stated above are solvable by it through a wide range of examples in cyberworlds, conceptual multiresolution analysis, computer graphics and information systems including database management systems.

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