

Data Gardens: Complexity Made Perceptible

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Abstract

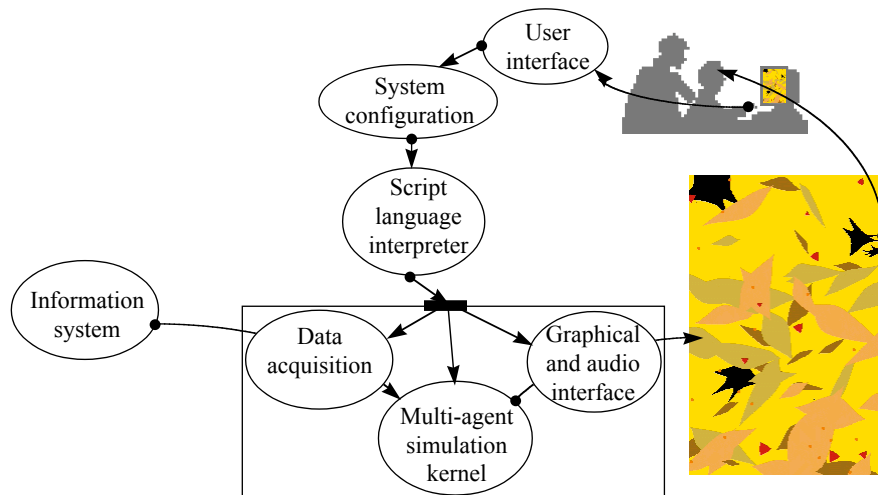
We suggest in this article a new paradigm for the representation of complex dynamic data, which is best suited for the real-time visualization and sonorisation of complex systems, real or simulated. The basic idea lies in the use of the garden metaphor to represent the dynamic evolution of interacting and organizing entities, in relation with complex incoming data, which we call *Data Gardens*.

Topics:

garden metaphor, data visualization, virtual ecosystems

Following abstract painter P. Klee who used to consider that art shouldn't aim at reproducing the real world but rather at making hidden aspects of the reality become visible, we develop with *Data Gardens (DG)* an artistic-inspired paradigm designed to make the functioning of complex systems available to direct perception.

Keeping a close watch on meteorological data in order to secure airplanes landings, monitoring the physical condition of a patient during surgical operations, observing Stock Exchange fluctuations so as to determine the best options, are examples of situations where decisions are subjected to the real-time understanding of complex systems, which is not well handled by traditional visualization paradigms.



DG constitute an attempt to construct a new type of man-machine interface, devoted to the interaction with complex systems, from which one receive information, and in which one has to make decisions. The garden metaphor is used to map between complex data sets and their visual and sonorous representation. Very complex in its functioning, and yet familiar to anybody, the metaphor enables a fast and intuitive perception. Moreover, it doesn't require a sustained attention, since it relies for the most part on peripheral perception mechanisms. Like human perception systems, *DG* are simultaneously data-driven and concept-driven, closely associating man and machine in a single complex perception system. Data-driven, information received is organized spatially, temporally and hierarchically by a multi-agent system whose evolution is directed both by the real-time arrival of data and by its endogenous dynamics, reproducing or not the dynamics of the complex system to represent. Concept-driven, the user can interact dynamically with the system so as to make it focus on specific aspects of the complex system to monitor or change the granularity of the representation.

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