

FuturICT in Crete

A first organizational meeting of the FuturICT-Hellas, Crete chapter, took place in Heraklion on Monday 19 December 2011 hosted by the Institute of Computer Science of FORTH. There were 18 participants in total, two came from Chania (Technical University of Crete at Chania, and TEI of Chania) and one from Rethymno (Univ. of Crete, Economics). The remaining researchers were from Heraklion (University of Crete, FORTH and TEI). There were five oral presentations that grouped relevant research performed in Computer Science, Economics, Physics, Computational Chemistry, Materials Science, Earth Science. Vivid discussions took place regarding the scientific ideas around FuturICT, practical aspects of the Greek participations and efforts for a local organization structure.

The following outlines aspects of local expertise:

1. ICT

High performance computing, big-data storage, scalable stream processing
Information systems, data mining, machine learning
Social network analysis, visualization
Human connection, ambient intelligence

2. ECONOMICS

Characterization of Technology
Natural Resource Economics
Socio-economic Indicators
Risk and Uncertainty

3. EARTH SCIENCE

Geostatistics and study of environmental data
Emergency mappings
Earthquakes
Global environmental changes including global climatic changes

4. CHEMISTRY

GRID Computing

5. PHYSICS

Complex systems and nonlinear networks
Extreme events
Statistical mechanics of agents

There was discussion on the possible projects that the local teams may propose and/or involved in. The following are three general themes where participants competent in:

(a) **Economic Complexity**

- (i) Integration of micro behavior as foundation to modeling it's impact on the macroeconomic complex mechanism by developing economic tools for analyzing and modeling reactions to complexity driven events.
- (ii) As a case study it is suggested the development of a simulation tool to evaluate whether financial products adequately explain complex systems like natural resources including agricultural and non-agricultural commodities.
- (iii) One idea here is to go beyond linear "cause-effect" relationships and try to identify a nonlinear function that links them in specific cases.
- (iv) Take economic models that are based on simple physical phenomena and "improve" them by increasing complexity. Can there be a real time aspect?
- (v) Study of statistical mechanics models that include competing socioeconomic interactions and investigate real time processing.

(b) **Environmental Complexity**

- (i) Use large scale environmental data and relate to human reactions
- (ii) Connect earthquake human response to general extreme event behavior
- (iii) Model population responses to global climate change

(c) **Information and Communication Technologies**

Use ICS capabilities for

- (i) Large-scale simulations of complex socio-economic system models
- (ii) Big-data storage, continuous stream processing (e.g., social network or sensor –such as earthquake and environmental- data sources)
- (iii) Knowledge integration and semantic data retrieval, causal analysis of heterogeneous datasets and prior knowledge
- (iv) Social network graph analysis and visualization, etc.

General comments

There appears to be local interest in the study of the complex socio-economic dynamical systems. The group has multiple and complementary expertise. Presently, it lacks sociologists. Future local meetings will clarify further topics and modes of mutual interaction.

Participants

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