

Institute for Informatics and Mathematical Modeling

(IIMM KSC RAS)

The Institute was established in January 31, 1989, by decree 103 of the Presidium of the USSR Academy of Sciences.

The main researches carried out at the IIMM KSC RAS are aimed at development of perspective and significant for the Russian Federation research areas connected with the problems of formation of electronic (digital) economics of Russia, development of problem-oriented information technologies, methods and tools for computer-aided design, presentation and processing of interdisciplinary data and knowledge, man-machine interaction, information-analytical systems for decision-making support in implementing of different activities in the Arctic zones of the Russian Federation (AZRF). The original techniques of modeling and forecasting of processes, which occur in the various spatial-distributed AZRF systems, have been developed and used at the Institute. These techniques are based on the system analysis methodology.

The developed theoretical methods and software tools provide:

- forecasting of the regional and municipal socioeconomic systems development;
- modeling of complex industrial-and-natural systems and technological processes in industry;
- information and analytical support of regional and state management for the AZRF development;
- design and analysis of distributed information systems.

Information technologies and software based on the theoretical results are developed in the following fields:

Big data intelligence analysis

- a) data mining and knowledge discovery;
 - b) computer-aided knowledge bases (logical schemes) formation based on an unstructured or semi-structured data;
 - c) consistency analysis of normative-and-legal documents;
 - d) analysis of the social networks data for different applied problems including monitoring of social medium safety on the basis of the network communities state, sentiment analysis and community mining.
2. Information-and-analytical support of managing the functioning and safety of industrial-and-natural systems
 - a) GIS-based management support software systems;
 - b) adaptive user interfaces for workstations;
 - c) access technologies for heterogeneous data sources and data warehouses;
 - d) service software for distributed information systems and server platforms;
 - e) software for the telepresence systems, including computer vision and augmented reality.
 3. Predictive modeling of various systems and processes
 - a) simulation models of the regional socioeconomic systems;
 - b) information technologies and software tools for both industrial-and-natural systems and technological processes development forecasting;
 - c) techniques and software tools for interactive visual analysis using artificial intelligence techniques. These techniques and tools allow solving the problems of discovering new information (knowledge) on the basis of interactive visualization of spatial data from heterogeneous sources, and applied problems of marine spatial planning.

The achievements of the Institute have been repeatedly awarded with medals, diplomas and certificates at the international and All-Russia exhibitions, congresses and showrooms of innovative developments.

The Institute carries out educational activity within the post-graduate programs on training the scientific-and-pedagogical staff in the field 09.06.01 – informatics and computer engineering (05.13.18 – mathematic modeling, numerical methods and software complexes).

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