

SSI–2021: Scientific Services & Internet

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Abstract

We present a collection of selected materials from the All-Russian Conference “Scientific Services & Internet (SSI–2021), which took place on September 20–23, 2021 at Keldysh Institute of Applied Mathematics in Moscow, Russia. However, because of the worldwide COVID-19 crisis, SSI–2021 had to take place online. The issues discussed at the conference include: digital libraries, information systems, knowledge representation, national bibliographic systems, ontology engineering, parallel computing, Semantic Web, situational modeling.

Keywords

Scientific Services, digital libraries, scientific publication, SSI–2021

1. Introduction

We are pleased to present a collection of selected materials to the All-Russian Conference “Scientific Services & Internet (SSI–2021), which took place on September 20–23, 2021 at Keldysh Institute of Applied Mathematics in Moscow, Russia. However, because of the worldwide COVID-19 crisis, SSI–2021 had to take place online.

SSI has been held annually since 1998 and has been published in CEUR Workshop Proceedings since 2018 [1–3].

SSI–2021 was organized jointly by the Keldysh Institute of Applied Mathematics and Kazan Federal University as the leaders in the field of programming and information processing technologies.

The issues discussed at the conference include: digital libraries, digital mathematical libraries, e-government services, functional programming, geoinformation social networks, information systems, journal citation networks, knowledge representation, metadata of publications, multi-lingual knowledge graphs, national bibliographic systems, ontology engineering, parallel computing, scientometrics, prospective bibliography, scientific activity, Semantic Web, situational modeling, thematic search, virtual exhibition.

All the collected papers have been reviewed by the program committee.

The website of the Conference can be found here <https://keldysh.ru/abrau/index-eng.htm>.

2. Program committee

1. *Vladimir V. Voevodin*, corresponding member of the Russian Academy of Sciences, Lomonosov Moscow State University, Moscow, Russia.
2. *Mikhail M. Gorbunov-Posadov*, Dr. Sc., Keldysh Institute of Applied Mathematics, Moscow, Russia.
3. *Mikhail P. Galanin*, Dr. Sc., Keldysh Institute of Applied Mathematics, Moscow, Russia.
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5. *Andrei V. Klimov*, Keldysh Institute of Applied Mathematics, Moscow, Russia.
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8. *Viktor A. Krukov*, Dr. Sc., Keldysh Institute of Applied Mathematics, Moscow, Russia.
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12. *Sergey I. Parinov*, Dr. Sc., Central Economics and Mathematics Institute of Russian Academy of Sciences, Moscow, Russia.
13. *Andrey A. Pechnikov*, Dr. Sc., Institute of Applied Mathematical Research of the Karelian Research Centre, Russian Academy of Sciences, Petrozavodsk, Russia.
14. *Vladimir A. Serebriakov*, Dr. Sc., Computing Center FRS “Computer Sciences and Control” of Russian Academy of Sciences, Moscow, Russia.
15. *Alexander N. Tomilin*, RAS Institute for System Programming, Moscow, Russia.
16. *Boris N. Chetverushkin*, Academician of Russian Academy of Sciences, Keldysh Institute of Applied Mathematics, Moscow, Russia.
17. *Andrei V. Chugunov*, Cand. Sc., Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University), St. Petersburg, Russia.
18. *Mikhail A. Shifrin*, Cand. Sc., Burdenko Neurosurgical Center, Moscow, Russia.
19. *Mikhail V. Yakobovskiy*, corresponding member of the Russian Academy of Sciences, Keldysh Institute of Applied Mathematics, Moscow, Russia.

3. Contributions

All the collected papers have been reviewed by the program committee. There were 29 papers submitted for peer-review to this conference. Out of these, 19 papers were accepted for this volume, 12 as regular papers and 7 as short papers.

Alexei Adamovich and *Andrei Klimov* discuss in their article the problem of adequate formalization of local names in mathematical formulas and semantics of references in object-oriented languages. The concept of referential transparency is analyzed, in which contextual equivalence is used instead of the usual value equality. The authors argue that modified referential transparency, along with many other valuable properties, can also be preserved for mutable objects that change to a limited extent.

Olga Ataeva, *Vladimir Serebryakov*, and *Natalia Tuchkova* propose a method for constructing a vector representation of documents in relation to the data array of the digital semantic library LibMeta. The task of enriching user queries with synonyms was solved. A search model is proposed, which, in conjunction with word2vec algorithms, uses the “indexing first, then learning” approach, which allows obtaining more accurate search results.

Alexander Elizarov, *Polina Gafurova*, and *Evgeny Lipachev* present methods for forming digital collections of the Lobachevskii Digital Mathematical Library. To refine and enrich the metadata of digital collections documents, queries to Wikidata are used.

Aleksey Ermakov explores the issues of improving the quality of metadata of scientific publications placed in the Crossref bibliographic database.

Lidia Gorodnyaya presents the results of the analysis of current trends in the field of functional programming. A paradigm analysis of languages and functional programming systems is included. A variety of paradigmatic characteristics inherent in the preparation and debugging of parallel computing programs are indicated.

Alexander Kozitsin, *Sergey Afonin*, and *Dmitriy Shachnev* discuss thematic analysis methods for analytical processing of large amounts of information. An algorithm for searching experts in scientometric systems is proposed.

Aleksandr Marchuk, Sergey Troshkov, and Irina Krayneva propose approaches to the integration/disintegration of isolated electronic scientific resources. The experience of using proprietary and open source software, their advantages and weaknesses is presented.

Andrey Pechnikov, Dmitry Chebukov, and Anthony Nwohiri present a study of bibliographic references cited in journal articles of the All-Russian Portal Math-Net.Ru.

Tatiana A. Polilova, Mikhail M. Gorbunov-Posadov discuss the problems of forming the Academic rating of scientific journals. The technology of formation of reference groups “from the bottom up” is considered as a more reliable basis for thematic ratings.

Gulnara Sahibgareeva, Vlada Kugurakova investigate the issues of visualization of branched narrative structures of computer games. The analysis of approaches to plot visualization and other important components of a video game is carried out. Variants of automatic generation of sequels for story branches are proposed, allowing to increase the replay ability of the final product.

Natalia Tuchkova, Konstantin Belyaev, Gury Mikhaylov, and Alexey Salnikov present the results of atmospheric pressure studies in the Arctic region of Russia. Probabilistic and statistical analysis of the time series of the pressure field is used as the main research method. Numerical calculations performed on the Lomonosov-2 supercomputer are presented.

Svetlana Vlasova, Nikolay Kalenov describe a web-system developed by the authors, containing services for the formation and visualization of multifaceted information about the results of scientific activities.

Zinaida Apanovich proposes a method for integrating information from multilingual data sources. Experiments on the comparison and integration of information about Russian research organizations into international and Russian data sources are indicated.

Olga Ataeva, Vladimir Serebryakov give a description description of the information system for the implementation of the functionality of the semantic library for a certain subject area.

Vladislav Belyi, Andrei Chugunov analyze the features of the development of e-government services based on the residents’ surveys results.

Mikhail M. Gorbunov-Posadov describes the specifics of reverse bibliography – is a dynamically updated list of works published after the publication in question and containing a reference to it.

Nikolay Kalenov, Irina Sobolevskaya, and Alexander Sotnikov describe the basic principles of constructing the educational component of the Common Digital Space of Scientific Knowledge.

Mikhail Mikhaylyuk, Dmitry Kononov, and Dmitry Loginov propose methods for setting various situations, as well as possible tasks of situational modeling in virtual environment systems.

Boris Nizomutdinov, Vladimir Kazak, and Petr Begen present a method developed by the authors for assessing the availability of urban improvement facilities for low-mobility groups of the population based on the analysis of text data from social networks.

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