









пальтишке. [A little girl in a gray coat appeared from behind the snowbanks] PLACE(выходить [appear], из-за сугроб [from behind snowbank])

## VI. CONCLUSION

In this work we developed and implemented in software a prototype of a system for ontology modification using a database of ontological-semantic rules. This system is employed as a component of a question answering system using data from the ontology. The ontological-semantic rules for ontology modification were constructed, primarily, considering peculiarities of verbs and prepositions of the Russian language. In their description the rules use both morphological and ontological information about described objects. In the future we plan to extend the base of ontological-semantic rules, and employ context information as well as morphological and ontological information about syntaxemes.

## REFERENCES

- [1] R. Sun, J. Jiang, Y. Fan, T. Hang, C. Tat-seng, C. M. Yen Kan, "Using syntactic and semantic relation analysis in question answering", *In Proceedings of TREC*, 2005.
- [2] V.A. Kuznetsov, V.A. Mochalov, A.V. Mochalova, "Ontological-semantic text analysis and the question answering system using data from ontology", *ICACT Transactions on Advanced Communications Technology (TACT)*, vol. 4, Issue 4, pp.651-658, July 2015.
- [3] A. Mochalova, "Search for answers in ontological-semantic graph", *Proceedings of the AINL-ISMW FRUCT*, Saint-Petersburg, Russia, ITMO University, FRUCT, pp. 174-180, 9-14 November 2015.
- [4] M.-H. Hsu, M.-F. Tsai, H.-H. Chen, "Query expansion with conceptnet and wordnet: An intrinsic comparison", *Information Retrieval Technology*, pp. 1-13, 2006.
- [5] A. Panchenko, R. Beaufort, H. Naets, C. Fairon, "Towards Detection of Child Sexual Abuse Media: Classification of the Associated Filenames", *In Proceedings of the 35th European Conference on Information Retrieval (ECIR 2013), Lecture Notes in Computer Science*, vol.7814, Moscow, Russia, 2013.
- [6] R. Mihalcea, C. Corley, C. Strapparava, "Corpus-based and knowledge-based measures of text semantic similarity", *In AAAI'06*, pp. 775-780, 2006.
- [7] G. Tsatsaronis, I. Varlamis, M. Vazirgiannis, "Text relatedness based on a word thesaurus", *Journal of Artificial Intelligence Research*, vol. 37, pp.1-39, 2010.
- [8] M. Mozgovoy, V. Tusov, V. Klyuev, "Using measures of semantic relatedness for word sense disambiguation", *Computational Linguistics and Intelligent Text Processing*, vol. 2588 of LNCS, pp. 241-257, Springer Berlin, 2003.
- [9] S. Patwardhan, S. Banerjee, T. Pedersen, "Using measures of semantic relatedness for word sense disambiguation", *Computational Linguistics and Intelligent Text Processing*, vol. 2588 of LNCS, pp. 241-257, Springer Berlin, 2003.
- [10] H. Li, J. Xu, "Semantic Matching in Search", *Foundations and Trends in Information Retrieval*, vol. 7: No. 5, pp 343-469, 2014.
- [11] M. Gupta, M. Bendersky, "Information Retrieval with Verbose Queries", *Foundations and Trends in Information Retrieval*, vol. 9, No. 3-4, pp. 209 - 354, 2015.
- [12] G. Antoniu, P. Groth, F. Harmelen, R. Hoekstra, *A Semantic Web Primer*, The MIT Press, Cambridge, Massachusetts, London, England, 288 p., 2012.
- [13] V.Sh. Roubashkin, V.A. Kapustin, "Usage of term definitions in encyclopaedic dictionaries for automated ontologies supplement", *XI All-Russian united conference "Internet and the modern society"*, Saint Petersburg, 2008.
- [14] A.V. Mochalova, *Certificate of registration of a computer program 'Expert system for search of semantic relations in a Russian-language text using basic semantic rules with removal'*, No. 2016612038, Russia, 17.02.2016
- [15] A.V. Mochalova, *Certificate of registration of a computer program 'Program for semantic text analysis basing on basic semantic patterns with removal'*, No. 2015613430, Russia, 28.01.2015.
- [16] V.P. Zakharov, A.V. Mochalova, V.A. Mochalov, *Question answering systems. Some problems of automated text processing*, Petrozavodsk: PIN, 40 p., 2015.
- [17] A.V. Sokirko, *Semantic Dictionaries and Natural Language Processing*, PhD thesis, Moscow, Russia, 2001.
- [18] G.A. Zolotova, *Syntactic Dictionary. The repertoire of the elementary units of Russian syntax*, Moscow, Russia: Nauka, 1988.
- [19] S. Ozhegov, N. Shvedova, *Definition dictionary of the Russian language: 80 000 words and phraseological collocations*, Russian Academy of Sciences. Institute of the Russian language named after V.V. Vinogradov. 4th edition, enlarged, Moscow, Azbukovnik, 944 p., 1999.
- [20] V.A. Mochalov, A.V. Mochalova, "Ontology modification using basic ontological-semantic rules containing verbs", *Theory and practice of modern humanitarian and natural sciences. Issue 6: collection of research papers of the annual transregional research and application conference*, Petropavlovsk-Kamchatsky, 08-12 February 2016, pp.192-195, 2016.
- [21] A.V. Mochalova, "Algorithm for semantic text analysis based on basic semantic patterns with removal", *Scientific and Technical Journal of Information Technologies, Mechanics and Optics*, No. 5. pp. 126-132, 2014.
- [22] E.S. Klyshinsky, N.A. Kochetkova, M.I. Litvinov, Maximov V.Yu., "Automatic construction of collocation database on the base of the big corpus. Computational Linguistics and Intellectual Technologies", *Proceedings of the International Conference "Dialog 2010"*, vol. 9 (16), Moscow, pp. 181-185, June 2010.
- [23] A.E. Goldberg, *Constructions at Work: the Nature of Generalization in Language*, Oxford, England: Oxford University Press, 2006.



**Anastasia Mochalova** was born in Petrozavodsk, Russia, in 1987. She received the bachelor's degree at Petrozavodsk State University, the master's degree in St. Petersburg State University of Aerospace Instrumentation. She is an external PhD student in technical sciences at Petrozavodsk State University. Her research interests include automated processing of natural language texts, development of question-answering systems, automation of ontologies creation, and development of the semantic analyzer.



**Victor Zakharov** – born Leningradskaya region, USSR, 17.07.1947. Graduated from Leningrad State University (Specialist in Structural and Applied Linguistics, 1970). PhD (Saint-Petersburg State University, Applied and Mathematical Linguistics, 1997). Major field of scientific research is Corpus Linguistics.

He is an Associate Professor, Saint-Petersburg State University. Previous positions included Deputy Director of the Leningrad Center for Scientific and Technical Information, Automation Department Chief in the Russian Academy of Sciences Library. The main publications are as follows: "Corpora of the Russian Language", Text, Speech and Dialogue: Proceedings of the 16th International Conference (TSD 2013, Plzen, Czech Republic), Springer-Verlag (Lecture Notes in Artificial Intelligence, 8082), Berlin-Heidelberg, pp. 1-13, 2013. "Set phrases: a view through corpora", Computational Linguistics and Intellectual Technologies: Proceedings of the International Conference "Dialog 2009", vol. 14 (21). Moscow, pp. 667-682, June 2015. Current and previous research interests include information retrieval, natural language processing, and computational lexicography.

Dr. Zakharov is a member of the Russian Society of Information Specialists and a member of the Special Interest Group on Slavic Natural Language Processing.



**Vladimir Mochalov** was born in Lyubertsy, Russia in 1985. He received the Ph.D. degree in electronic engineering from Moscow Technical University of Communications and Informatics. His research interests include networks structure synthesis, artificial intelligence, bio-inspired algorithms, query answering systems, and Big Data.