Ontology Model of Concept “Microsensor” in Microelectromechanical System

Vasyliuk Iaroslav, Teslyuk Vasyl, Denysyuk Pavlo

Abstract – **in the article the ontological approach for description of concept “microsensor” of microelectromechanical systems (MEMS) on the basis of four-layer ontology model is used.**
Keywords: **ontology, MEMS, microsensor, concept.**

I. INTRODUCTION

Nowadays it is well-known that lots methods are implemented and examined for improvement of automated process of microelectromechanical systems design and their components [1]. One of the most optimal approaches is considered the block-hierarchical approach which describes in detail the design process of complex systems and the hierarchy of components, from which these systems consist of. However, it is proposed to use the ontology models for rise of MEMS design automatization. Therefore, the development of ontology models is actual issue.

II. ONTOLOGY MODEL OF MEMS MICROSENSOR

The automation of MEMS design process and its components foreknows the use of deep expert knowledge of the specified field. Although, it causes the problem of reuse of obtained knowledge of MEMS area that stipulates the additional expenses of time at repeat experiments and attraction of experts [1]. The ontology models enable to reduce the time delay, reuse the gained knowledge in MEMS and accordingly fasten the MEMS design automated process. In the article it is described the example of ontological approach use for development and presentation of microsensor, MEMS component, which is based on the four-layer ontology model [2].

Micorsensor is the input transformer which is applied to define the changes or influence of environment on integral device. For example, such devices convert the pressure change, tension change or deformations of electric parameter change, which can be estimated by the device that processes, transmits and accumulates the data. For instance, it can be considered the microprocessor [3].

During the ontology model development of microsensor previously the description of microsensor’s subtypes accordingly to some criteria classification should be done. They are defined as classification for assignment, for physical effects that use in the operation process etc. At Fig.1 the fragment of internal ontology model of concept “microsensor” where the class-concepts hierarchy(microsensors of different types) are demonstrated

At Fig.2 the fragment of concept “microsensor” description is viewed via two annotations: 1) assignment; 2) characteristics.

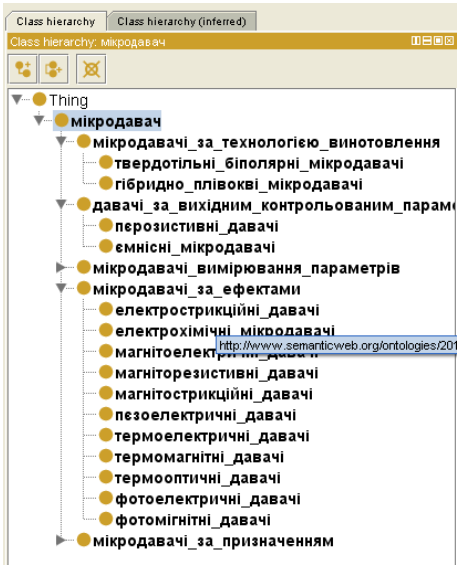

Fig.1 Fragment of internal ontology model of concept “microsensor”

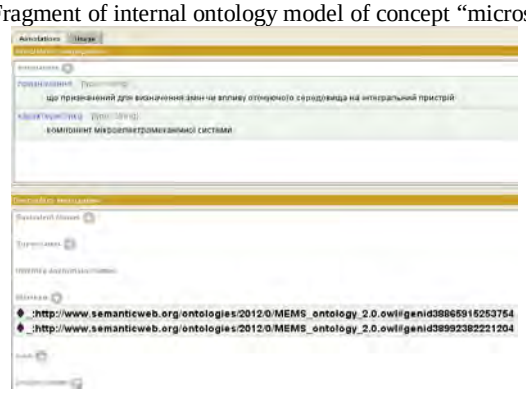

Fig. 2 Fragment of annotations of concept “microsensor”

The usage of annotations enables to outline and explain the crucial issues concerning the concept “microsensor” in ontology model.

III. CONCLUSION

In the article the example of ontology model for concept-MEMS component “microsensor”. On the basis of such model the component level in microelectromechanical systems can be formed the whole level via block-hierarchical approach.

REFERENCES

[1] В.М. Теслюк, П.Ю. Денисюк «Автоматизація проектування мікроелектромеханічних систем на компонентному рівні», Монографія – Львів: Видавництво Львівської політехніки, 2011. – 192 с.

[2] Ia. Vasyliuk, V.Teslyuk, A.Kernitsky, P. Denysyuk “ Knowledge-Based Model in Fourth-Layer OWL Ontology”, Proc.of the VI th International Conference MEMSTECH’2011 – Lviv – Polyana, – pp. 219-220.

[3] Теслюк В.М. Розроблення та аналіз структурних схем МЕМС // Вісник Національного університету «Львівська політехніка»: Радіотехніка та телекомунікації. - Львів, 2008. - № 618. - С. 58 - 62.

Iaroslav Vasylyuk - Lviv Polytechnic National University , S. Bandery Str., 12, Lviv, 79013, UKRAINE, E-mail: yaroslav.vasylyuk@gmail.com