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Title of the doctoral thesis: The method for aiding the design process with the use of augmented reality

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Summary:

The dissertation deals with a new approach to design knowledge acquisition from many sources and to use this knowledge in a product development process.

The goal of research was to elaborate an effective method for knowledge acquiring from different sources, a method for knowledge representation and a method for effective presenting knowledge with the use of augmented reality techniques. Modern visualization techniques, such as AR, allow to enrich real environment thanks to computer generated virtual objects and can be an effective way for presenting knowledge.

The presented method uses Unified Modeling Language diagrams in acquisition and knowledge representation. It is important that the method also use multimedia representation of knowledge, especially interactive animated 3D CAD models, photos, drawings, movies etc. Knowledge is delivered to the user by use of augmented reality techniques. AR allows the user to understand the presented virtual data and knowledge in a more comprehensive way, thus making the design process more efficient than that presently supported by conventional present-day CAD systems.

To prove the correctness of the hypothesis, the AR system with implemented methods was elaborated. The results proved the correctness of the formulated hypothesis. Results of research confirm particular advantages derived from the presented method using AR techniques for acquired knowledge (in form of UML) in the design domain.