

ABSTRACT

Explanatory note size – 154 pages, contains 38 illustrations, 27 tables, 3 applications, 33 references.

Topicality. The paper addresses the problem of the current lack of a specialized 3D printing marketplace, despite the rapid development and proliferation of this technology in recent years. Through analyzing existing solutions, the main advantages and disadvantages of existing marketplaces and printing centers have been identified. The main qualitative characteristics of 3D printing have been identified. A proposed solution takes into account the specificity of the industry based on the identified characteristics.

The aim of the study is to identify the main qualitative characteristics of 3D printing and to improve the interaction between the client and the service provider in 3D printing by creating a special architectural solution for an online 3D printing marketplace that takes into account the specific characteristics of the industry.

The object of research: the processes of developing architectural and software solutions.

The subject of research: methods, tools, and technologies for creating an architectural and software solution for a 3D printing marketplace.

To achieve this goal, the **following tasks** were formulated:

- identify the main qualitative characteristics of 3D printing;
- conduct an analysis of software solutions similar to the one being developed;
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The scientific novelty of the Master's thesis results lies in the further development of the use of the microservice architectural approach, along with such software development technologies as .NET, ASP.NET, Entity Framework, Identity, Angular, Bootstrap, and Fontawesome, for the development of the architectural solution of a 3D printing marketplace, taking into account the quality characteristics of 3D printing identified in the work. The mentioned technologies are widely used and free tools, which allowed to accelerate the development process due to a large number of tutorials on these technologies and to minimize development costs. In addition, a mathematical model was proposed for the first time to solve the problem of determining suitable manufacturers for 3D printing, taking into account the characteristics of the object being printed. A manufacturer is considered suitable if he has at least one printer model that has sufficiently large dimensions for printing the application and, at the same time, he has at least one type of material necessary for the application. The developed model allows obtaining a set of suitable manufacturers.

The practical value of the obtained results lies in the fact that software for a 3D printing marketplace has been developed using the proposed approach, which allows customers to place orders for 3D printing. A review of functions provided by the user interface has also been conducted. The considered functions include: role selection, registration and login of a manufacturer and a customer, creation and viewing of orders, viewing and editing of a manufacturer's profile, and acknowledgment of readiness to fulfill an order.

Relationship with working with scientific programs, plans, topics. Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky».

Approbation. The scientific provisions of the dissertation were tested at the Fifth International Scientific and Practical Conference of Young Scientists and

Students "Software Engineering and Advanced Information Technologies (SoftTech-2023)" dedicated to the 125th anniversary of Igor Sikorsky Kyiv Polytechnic Institute.

Publications. The scientific provisions of the dissertation were published in:

- 1) Kulyk D.V., Architectural Solution for a Cloud-Based 3D Printing Marketplace / D.V. Kulyk, K.I. Lischuk // Proceedings of the Fifth International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies (SoftTech-2023)". - Kyiv: NTUU "KPI them. Igor Sikorsky", December 19-21, 2023.

Keywords: 3D Printing, Marketplace, .NET, Azure, Microservice, Angular.