



3D GRAPHICS AND SOFTWARE: STEPS INTO THE FUTURE

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A B S T R A C T	K E Y W O R D S
<p>This article is dedicated to studying the role of technologies in software engineering and the field of 3D graphics, as well as exploring the problems that arise during software development. The author, drawing on her scientific experience, evaluates the use of tools such as Blender and Figma, and demonstrates new opportunities in animation and technical design. The article also examines trends in the development of this field and proposes solutions for contemporary issues.</p>	<p>Software Engineering, 3D Graphics, Blender, Figma, Animation, Technical Design, Technological Solutions, Future Trends.</p>

Introduction

Software engineering is a technological field that encompasses the process of creating and developing software. Particularly, the development of software related to 3D graphics requires specialized skills and attention. With the advancement of technologies, this field is progressing and gaining significant importance for modern business processes. This article discusses the key principles of software engineering, the progress of modern technologies, the interrelationship between 3D graphics and software, as well as important steps towards the future. Today, 3D modeling and animation play a crucial role not only in gaming but also in the film industry, architecture, and interactive applications. These technologies enrich creative processes and provide users with a more engaging experience. Among the youth, there is a growing interest in studying 3D graphics and software. This article provides insights into the future of this field and the steps that will help young professionals master it. Our goal is to inspire the younger generation and stimulate their creative thinking.

I, Chorshanbieva Sarvinoz Berdimurod qizi, was born on March 19, 2000, in the city of Termez, Surkhandarya region, Uzbekistan. I am currently studying in the 4th year of the “Software Engineering (Computer Science)” program at Chonnam National University in South Korea. Previously, I completed three years of study in information technology at a college in Uzbekistan, achieving excellent grades. I am now deeply exploring various areas of programming, particularly mastering tools such as 3D Blender and Figma.

Working alongside my scientific advisor, Professor 김규림 (Kim Gyurim), I have gained extensive knowledge and experience. Under her guidance, I have received valuable insights on the connection between 3D graphics and software, as well as on the principles of developing solutions that meet user needs. Professor Kim consistently emphasizes that design should be not only aesthetically pleasing but also functionally oriented to enhance user experience. Thanks to her mentorship, I strive to develop in this field.

During my studies, I have worked on practical projects using 3D Blender and Unity, which allowed me to create innovative solutions and gain a deeper understanding of the software development process. Currently, I am working on a project titled “Mobile Robot-Based Trade Route System,” conducting research under the guidance of Professor Hoeng Jung. Due to its relevance and innovative approach, our project has been recognized as one of the best and will be published by our university.

Experience and Projects:

I am currently involved in several projects with Korean students, using 3D Blender and 3D Unity programs. Last semester, together with my advisor, we developed a program titled “Navigation System for Trade Routes Using Mobile Robots.” This project was highly praised by our university and published. Throughout this experience, I gained practical skills in the field of 3D technologies and software.

1. Fundamentals of Software Engineering

Software engineering is a set of knowledge, skills, and methodologies required for the successful development of complex systems and software. It includes the following key components.

1.1 Requirements Gathering: Gathering and analyzing requirements from clients and users is crucial for the successful development of software. At this stage, functional and non-functional requirements necessary for the project are defined. For example, when creating a mobile application, user requirements for a user-friendly interface and quick response time must be considered.

1.2 Design: Planning the architecture of the software and its internal structure. At this stage, the software’s structure and the relationships between its components are established. During high-level design, elements such as architectural design and interface design are of great importance.

1.3 Development: The process of programming and writing code for the software. At this stage, developers write code based on the planned design. During the coding process, developers learn new technologies, libraries, and programming languages.

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1.5 Support and Maintenance: After the software is launched, it is important to regularly update it and take into account new user requirements. At this stage, there is a need to monitor the performance of the software and resolve any issues.

2 Programs: 3D Blender and Figma

In software engineering, design skills and interface creation are of great importance. Therefore, programs like Blender and Figma are indispensable tools for developers and designers.

2.4 Blender:

Blender is an open-source program for 3D modeling and animation that allows the creation of complex 3D objects and their animation. Blender is widely used for creating films, games, and commercials. With this program, I have developed my skills in 3D design and have used it to create 3D objects in various projects. For example, during the creation of 3D games, I implemented my creative ideas through characters and environments modeled in Blender.

2.5 Figma:

Figma is an online program designed for designing web and mobile interfaces. It simplifies collaboration between designers and developers, as it allows everyone to see and edit designs in real time. I have learned to create interfaces using Figma and have improved my skills in UX/UI design. Designs created with this program must always be optimized according to user needs.

The processes of software engineering are based on various methodologies and models. One of the most common methodologies is Agile, which focuses on developing high-quality products in a short period. The Waterfall model is also used, where each stage is precisely planned, and the transition to the next stage does not occur until the previous one is completed. Each methodology has its advantages and disadvantages, and programmers choose one based on the requirements of the project.

3 Modern Problems in Software Engineering

In software engineering, there are several contemporary issues, including:

3.4 Security:

Hacker attacks and data breaches require software engineers to develop innovative solutions to ensure security. For example, encryption methods must be used to protect personal data stored in databases.

3.2 Rapid Changes:

Rapid changes and innovations compel developers to constantly adapt to updates. The fast-paced growth of technology requires developers to learn new programming languages and technologies.

3.3 Adaptability:

Quickly changing market demands and a growing level of competition require the software development process to be fast and flexible. In such conditions, developers must quickly create new products and respond promptly to user needs.

4 The Role of 3D Modeling and Animation in Software Engineering

3D modeling and animation are essential parts of software engineering, especially in creating games, simulations, and interactive applications. This process includes several stages, each requiring specific attention and expertise.

4.2 Planning:

Events of the animation, the models, and characters used are determined. This initial stage lays the foundation for a successful 3D development process. For example, a script must be written for the games, and it is necessary to define how it will be visualized. Defining each character and its actions is significant for the developers' creative process.

4.4 Modeling:

At this stage, characters, environments, and other objects are created in 3D format. Programs like Blender are perfect for this process as they offer extensive functionality and can be used in a free software environment. During modeling, it is essential to focus on quality. Careful detailing of each element creates a sense of realism for the user in the 3D environment.

4.4 Animation:

Once modeling is complete, the animation process begins. At this stage, the models are brought to life and interconnected. Techniques such as skeletal animation, simulation, and other methods are used to create movement between frames in Blender. For example, ensuring interactivity between characters and objects provides users with a more engaging experience.

4.5 Visualization:

In the final stage, the created 3D models and animations are prepared for high-quality visualization. This process involves studying lighting, materials, and colors. Good visualization helps users have a better experience in the 3D environment.

Conclusion

The future of 3D graphics and software is bright and full of immense possibilities. In these fields, not only technical knowledge but also a creative approach is essential. Inspiring the youth and assisting them in mastering new technologies is key to future technological development. The use of tools like 3D Blender and Figma allows developers and designers to reach new heights. By educating young people in 3D design and software, we can expand their creative potential, advance technologies, and take important steps toward shaping the future. Young people can succeed in these fields by realizing their ideas and creative works. We must help them create innovative ideas by inspiring and supporting them.

References:

1. Blender Foundation. Blender Documentation. Retrieved from <https://Docs.blender.org/>: Official Blender documentation containing techniques and instructions for modeling, rigging, and creating animations.
2. Figma, Inc. Figma Design Platform Documentation. Retrieved from <https://Help.figma.com/>: Detailed documentation on the Figma tool for effective interface design and visual graphics creation.
3. Eberly, D. H. (2001). 3D Game Engine Design: A Practical Approach to Real-Time Computer Graphics. Morgan Kaufmann Publishers. This book provides insights into the techniques of 3D game engines, modeling, and graphical algorithms.
4. Kerlow, I. V. (2009). The Art of 3D Computer Animation and Effects. John Wiley & Sons. A work that thoroughly explains the art and techniques of 3D animation.
5. Hart, J. C. (2006). Mathematical and Algorithmic Foundations of 3D Computer Graphics. Wiley-IEEE Press. The mathematical foundations necessary for graphic rendering and animation.

6. Autodesk, Inc. Autodesk Maya User Guide. Retrieved from <https://Knowledge.autodesk.com/>: Technical guide for creating 3D modeling and animations using Autodesk Maya software.
7. Goldman, R. (2003). Pyramid Algorithms: A Dynamic Programming Approach to Curves and Surfaces for Geometric Modeling. Morgan Kaufmann. A detailed book on geometric modeling and 3D surfaces.
8. Blender.org – Guide resources and materials related to the Blender program.
9. Coursera, “3D Modeling and Animation Specialization” – Courses on 3D modeling.
10. Udemy, “Complete Blender Creator: Learn 3D Modelling for Beginners” – A tutorial on the Blender program.
11. YouTube channels: CG Geek, Blender Guru – Tutorials on 3D modeling and animation. The article utilizes various sources for studying 3D modeling and animation, including tutorials on Blender and Figma programs, video courses, and educational resources. These resources will help you develop and deepen your knowledge in the field of 3D modeling and animation.