ABSTRACT

Explanatory note size – 70 pages, contains 27 illustrations, 3 applications, 25 references.

Topicality. As of today, DDS is the most widely used texture format for any software that utilizes 2D or 3D graphics. However, converting an image to a DDS texture is a time-consuming operation. As the requirements for computer graphics quality continue to grow over time, original images mages can be a quite large. When it comes to hundreds or often thousands of such images, time performance becomes one of the main requirements for image-to-DDS texture conversion software. Therefore, the improvement of software tools and methods for converting images to DDS textures is an important scientific and applied problem.

The aim of the study. The aim is to improve the software tool for converting images to textures to provide better performance metrics compared to existing solutions.

The object of the research: software for converting images to DDS textures.

The subject of the research: techniques for software development for converting images to DDS textures.

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

- analysis of the problem and existing solutions for converting images to DDS textures;
- development of a method for writing efficient and fast multithreaded software code;
- implementation of software tools for converting images to DDS textures based on the developed method;
- investigation of the efficiency of the developed software.

The scientific novelty of the results of the master's dissertation consists of the following results:

- for the first time, a technique for automating the development of multithreaded software code using C++ has been developed, which utilizes high-level abstractions to break down the process into individual tasks and execute them asynchronously, taking into account established dependencies and efficiently utilizing program resources;
- the software tool for image-to-texture conversion has been improved by utilizing the proposed method for automating the development of multithreaded software, which provides better performance compared to existing solutions.

The practical value of the obtained results is the development of a fast and efficient software tool for converting images into textures, which significantly reduces the time and effort required by end-users compared to similar software tools.

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 thesis were tested at the IV International Conference "Software Engineering and Advanced Information Technologies (SoftTech-2023)" – Kyiv.

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

1) Nesterenko K.P., Stetsenko I.V. Method of automating the development of a multithreaded program in C++ on the example of conversion of images into the DDS texture // Adaptive Systems of Automatic Control. – Kyiv, 2023. - №1(42) – p. 160 –170. (category "B").

Keywords: MULTITHREADING, PERFORMANCE, TEXTURE, DDS, BC, SOFTWARE TOOL, IMAGE CONVERSION.