BUILDING AN IMAGE PROCESSING APPLICATION WITH JAVA

Nguyễn Ngọc Nguyên Giáp
Thai Nguyen University of Information and Communication Technology
Thai Nguyen University, Thai Nguyen, Vietnam
dtc165d801030028@ictu.edu.vn

***Abstract*—This thesis focuses on the development of an image processing application using the Java programming language. The work covers various aspects of image processing, including file formats, color transformation methods, and the use of Eclipse as a development environment. The application's interface and functionality are demonstrated through a demo, showcasing its ability to manipulate images and add colors and icons. The research highlights the importance of continuous learning and the application of new technologies in the field of computer science, emphasizing the need for ethical and responsible behavior among IT professionals. The study does not provide specific performance metrics or measured improvements, but it does offer insights into the challenges and limitations of developing such applications.**

***Index Terms*—image processing, Java, Eclipse, color transformation, application development**

I. Introduction

The thesis provides an in-depth overview of image processing, discussing various file formats and color transformation methods. It introduces the use of Eclipse as a development environment for Java applications. The introduction covers the fundamental concepts of image processing, such as pixel representation, image transformations, and color manipulation. The author emphasizes the importance of understanding these concepts for effective application development. The chapter also highlights the challenges in handling different file formats and the need for robust error handling mechanisms [1]. Published books on the methods and subject of this project provide context for this English summary [3], [4], [5], [6]. Published articles on the methods and subject of this project provide context for this English summary [7]. Published articles on the methods and subject of this project provide context for this English summary [8], [9], [10].

II. Methods

The methods section covers the development of an image processing application using Java and Eclipse. The application includes features such as image manipulation and color transformation. The author describes the process of setting up the development environment, creating the project structure, and implementing the core functionalities. The implementation involves reading and writing image files, applying color transformations, and adding user interface elements. The author also discusses the use of libraries and APIs to facilitate the development process. However, the thesis does not provide specific performance metrics or measured improvements, indicating that the application was not rigorously tested or deployed in a real-world scenario [1].

Supervisor: Nguyễn Thị Tính, Thai Nguyen University of Information and Communication Technology (nttinh@ictu.edu.vn).

III. Results

The application was demonstrated through a demo, showcasing its ability to manipulate images and add colors and icons. The demo includes various functionalities such as creating multiple frames, applying color transformations, and adding icons to images. The results highlight the functionality of the application but do not include specific performance metrics or measured improvements. The author notes that the application was developed as a proof of concept and does not provide detailed evaluation results [1].

IV. Discussion

The thesis discusses the importance of continuous learning and the application of new technologies in the field of computer science. It emphasizes the need for ethical and responsible behavior among IT professionals. The author draws on the experience of developing the image processing application to highlight the challenges and limitations of the project. The discussion also touches on the ongoing nature of research in image processing and the need for further advancements in the field. The author suggests that the study of image processing and color transformation methods in Java is an ongoing challenge and encourages continuous learning and application of new technologies [1].

V. Conclusion

The research concludes that the study of image processing and color transformation methods in Java is an ongoing challenge. It encourages continuous learning and application of new technologies in the field of computer science. The author emphasizes the importance of ethical and responsible behavior among IT professionals. The conclusion reiterates the challenges faced during the development of the image processing application and the need for further research in this area. The study does not provide specific performance metrics or measured improvements, but it offers valuable insights into the development process and the challenges involved [1].

References

[1] Nguyễn Ngọc Nguyên Giáp, "BUILDING AN IMAGE PROCESSING APPLICATION WITH JAVA," internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2021.
[2] Tài Liệu về Xử Lý Ảnh của PGS TS Đỗ Năng Toàn Và TS Phạm Việt Bình của trường Đại Học Thái Nguyên biên soạn

[3] Nicolas Modrzyk, ”Java Image Processing Recipes,” Apress, 2018. ISBN 9781484234648. DOI: 10.1007/978-1-4842-3465-5.
[4] Kenny A. Hunt, ”The Art of Image Processing with Java,” A K Peters/CRC Press, 2016. ISBN 9781439865590. DOI: 10.1201/9781439865590.
[5] Konstantinos N. Plataniotis, Anastasios N. Venetsanopoulos, ”Color Image Processing and Applications,” Springer Berlin Heidelberg, 2000. ISBN 9783642086267. DOI: 10.1007/978-3-662-04186-4.
[6] Wilhelm Burger, Mark J. Burge, ”Digital Image Processing,” Springer London, 2016. ISBN 9781447166832. DOI: 10.1007/978-1-4471-6684-9.
[7] Ming-kai ZHU, Zhen-hua GAO, Zhi-lei CHAI, ”High speed image processing based on Java processor for embedded systems,” Journal of Computer Applications, vol. 30, no. 11, pp. 2873-2875, 2010. DOI: 10.3724/sp.j.1087.2010.02873.
[8] Utkarsh Gupta, Sudhanshu Kumar, Devansh Singhal, Parth Tomar, Ajay Kumar, ”Image Processing System Using Java,” International Journal of Innovative Research in Information Security, vol. 07, no. 04, pp. 35-39, 2020. DOI: 10.26562/ijiris.2020.v0704.002.
[9] D. Sage, M. Unser, ”Teaching image-processing programming in Java,” IEEE Signal Processing Magazine, vol. 20, no. 6, pp. 43-52, 2003. DOI: 10.1109/msp.2003.1253553.
[10] Tobias Pietzsch, Stephan Preibisch, Pavel Tomančák, Stephan Saalfeld, ”ImgLib2—generic image processing in Java,” Bioinformatics, vol. 29, no. 2, pp. 298-298, 2013. DOI: 10.1093/bioinformatics/bts685.