Technical report on the software "SIMPLE PICTURE TOOL"

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ABSTRACT

Simple picture tool is a picture editing tool on Android designed to modify existing pictures with a small number of operations. It is very simple to operate and many people can easily use it. We can use it for everyday operations like cropping and resizing images.

The application focuses on user-friendly features, intuitive interface and efficient editing functions that can meet the various needs of individuals navigating the ever-expanding world of digital photography.

Software with simple and easy to understand the operation interface and high-quality picture files to adapt to the android platform system album, so that it reduces the use conditions. It will focus on a tool software standpoint that addresses the user's editing image needs. As more and more users seek simplified solutions to enhance their visual narratives, Simple Picture Tool offers an exciting prospect for bridging the gap between the rapidly evolving editing market and the diverse photographers eager to elevate their images.

This paper is a summary of the software development and completion of the project nature of the article, introduced the author developed a project program Simple Picture Tool (PICTool) project types and the final realization of the function. The completion of this document indicates that the PICTool project has been able to run correctly on the actual platform.

Keywords: Image editing, Tools, mobile software, android, simple, PICTool

INTRODUCTION

Simple picture tool has built-in picture editing options with different functions to help you modify or get the pictures you need. Different from the editor that comes with the phone, this software focuses more on diversified image editing. For example, you can directly set the length and width of the image.

At the same time, as a picture editing tool on mobile phones, Simple Picture Tool will build a new picture sharing platform. Users can create their own account in Simple Picture Tool and use this account to share their edited or photographed pictures with other users. We'll see more users using these images to add a little novelty to their lives. Of course, the copyright of the image belongs to the uploader. In addition, users will be

able to like or comment on other people's works, just like the social media circle of friends. I believe this will inspire more users to create. Even so, the Simple picture tool is very promising in its job - picture editing. I will set up 6 simple editing functions in it: Image Compression; Image size scaling; Picture cutting; Picture stitching; Image inversion; Image colour extractor. These six functions and sharing platform make Simple picture tool less "simple", but I think this is a good development to cope with many powerful similar applications.

Introduction:

Photography, a timeless art form that has evolved over centuries, has experienced a revolutionary transformation in recent years. With the advent of digital technology and the omnipresence of social media, the industry has witnessed an unprecedented surge in photo creation, with an estimated 1.81 trillion photos taken annually, a figure expected to rise to 2.3 trillion by 2030. This explosion in photographic content has paved the way for a burgeoning market in photo editing, as individuals seek to enhance and personalize their visual narratives. So, I thought of creating a mobile picture editing tool that has picture editing capabilities but is simple to get started and easy to operate in this trend - Simple picture tool.

The Photography Boom:

In the digital age, smartphones have become ubiquitous tools for capturing life's moments, with statistics revealing that 90% of consumers exclusively use smartphones for photography. The United States leads the charge, with an average of 20.2 photos taken per day per smartphone user. This trend is mirrored in Asia Pacific (15 photos per day), Latin America (11.8 photos per day), Africa (8.1 photos per day), and Europe (4.9 photos per day). The staggering volume of photos generated daily highlights the need for efficient editing tools to help users refine and amplify their visual stories.

Social Media Dynamics:

Social media platforms play a central role in shaping the contemporary landscape of photography. Research indicates that photos posted on Facebook enjoy a 20% higher engagement rate than videos, making them the preferred content type for sharing. Instagram, boasting over 1 billion active users in 2021, has become a photography powerhouse, with a remarkable 352% difference in engagement between images and text-only posts.

The selfie phenomenon has become an integral aspect of modern photography, with 223 out of 400 surveyed individuals admitting to taking between one and four selfies daily. Google reports a staggering 93 million selfies taken on Android devices each day. As the younger generation embraces the selfie culture, a quarter of Gen Z travellers capture more than 50 photos daily while on vacation, with 40% actively sharing their visual experiences on social media. This cultural shift towards visual expression fuels the need for accessible editing tools to enhance the quality and appeal of these images.

The Editing Market Landscape:

As the volume of photos continues to skyrocket, a considerable 48% of Americans engage in photo editing before sharing their images on social media. This marks a pivotal opportunity for editing applications like Simple Picture Tool to provide a streamlined and user-friendly solution for individuals seeking to enhance their visual content effortlessly. With photo editing integrated into every facet of daily life, from personal moments to social media sharing and travel documentation, there is a growing market for tools that simplify the editing process.

Conclusion:

The explosive growth of photography in the digital age has transformed the way we capture, share, and cherish moments. With billions of photos taken daily and social media serving as the canvas for visual expression, the demand for efficient editing tools has never been higher. In this landscape, Simple Picture Tool stands out as a promising solution, offering a user-friendly approach to photo enhancement in a world where simplicity and accessibility are key. As we navigate the future of photography, this application holds the potential to become an integral companion for individuals seeking to make their visual stories truly stand out in the ever-expanding sea of digital images.

Target user group:

The Simple Picture Tool caters to a diverse and dynamic user group, strategically aligning its features with the evolving trends in photography. Bloggers, at the forefront of this target demographic, find in the application a valuable ally for enhancing the visual appeal of their content. With the explosive growth of social media platforms, where photos garner 20% more engagement than videos, bloggers rely on the Simple Picture Tool to effortlessly refine and amplify their visual narratives. Its user-friendly interface and streamlined features make it an ideal companion for individuals who prioritize simplicity and efficiency in their editing process.

The application also resonates strongly with avid selfie enthusiasts, recognizing the cultural significance of self-portraiture in the digital age. With 223 out of 400 respondents admitting to taking between one and four selfies daily, the Simple Picture Tool addresses the needs of this user segment by providing intuitive tools for enhancing and perfecting their self-captured moments.

College students, known for their affinity for simplicity and convenience, represent another key demographic for the Simple Picture Tool. With the fast-paced nature of student life and the constant documentation of experiences, the application offers a quick and easy solution for editing photos before sharing them on social media. As a tool that seamlessly integrates into daily routines, the Simple Picture Tool is poised to become an essential companion for college students seeking hassle-free yet impactful photo editing capabilities.

MODULES AND METHODOLOGY

System Module:

Login Module

Users will register a new Simple picture tool account using their email address and custom password

Picture editing module

The user uploads the picture that needs to be edited on the main menu according to the instructions, and then selects different functions to enter the sub-pages of different functions for editing. After editing is completed, it can be saved locally.

Picture editing and sharing community module

Users can upload their own edited pictures to this module, and can add text or links to express themselves to other users using this software. If you need pictures created by others, you can also find pictures in the 'Create and Share' section.

Methodology:

Software development methodology refers to the structured processes that are used and heavily relied on when working on a project. Since the dawn of technology, this systematic approach has been used religiously by software development companies as it encourages the fusion of design philosophies and pragmatic realism.

I will adopt incremental delivery in the development method of Simple picture tool. The incremental delivery process is shown in the figure. Incremental delivery can be viewed as a software development methodology in which a portion of the developed increment is delivered to and used in the customer's work environment. The implementation of this process gives customers the privilege of categorizing services into those that are most and least important to them. This prioritization paves the way for services with the highest priority to be implemented and delivered first. Incremental delivery therefore enables organizations to gain insights into what is being delivered, reduce risk faster, deliver value faster and change direction faster.

Introduction to Development Mode:

The software development process of PICTool adheres to the iterative development model in the SDLC. The iterative model, also known as the incremental or evolution model, involves breaking down a complete software into different components and developing and testing each component separately. Once a component is completed, it is presented to the customer for confirmation of its functionality and performance against their requirements. This determines whether the component is correct and can be integrated into the software architecture. The entire development effort is organized as a series of short, simple projects referred to as iterations, which involve going through the stages of requirements analysis → software design → coding → testing.

PICTool adopts an iterate+ve model to distinguish between core functionality and user-

specific features. In terms of the project itself, PICTool is designed as a software with instrumental nature, intended for intermittent usage by users. During the initial requirements analysis phase, I recognized that although this approach might reduce user engagement, it aligns well with positioning the software as a straightforward tool. Therefore, incorporating a message board feature in the previous design iteration violated this principle by adding unnecessary complexity to the tool's usability. However, I am aware that future users may find certain functionalities valuable or require additional tools to meet their needs; thus, I anticipate retaining this design while prioritizing its enhancement in subsequent versions.

I consider the following advantages and disadvantages when using the iterative model for project planning:

Advantages

Enhanced utilization of user feedback: With an iterative model, I was able to collect user feedback at the end of each development phase. Especially for my project "SIMPLE PICTURE TOOL", this model enables users to try out the software at an early stage and provide feedback on the interface ease of use and functionality. This ensures that the final product more closely matches the expectations and needs of the target user.

Gradually improve the features: My plan mentioned that the software will include image compression, resizing, cropping, stitching, inversion and color extraction. Using an iterative model, I was able to develop and improve these features one by one, focusing on a small set of features each iteration, building the entire application incrementally. This approach helps to guarantee the quality and performance of each feature.

Flexible response to changing requirements: In the project plan, I mentioned the consideration of market trends and the analysis of competitive tools. The iterative model offers the possibility to flexibly adjust the development focus so that the project can adapt to the latest trends in the market and the development of technology to better cope with the competition.

Identifying risks early: By committing and testing in stages, I can identify potential technical and design issues earlier, reducing the need and cost of large-scale changes later in the project.

Disadvantages

Resource management Challenge: The iterative model requires me to have high organizational and coordination skills, as well as precise control of resources. For the SIMPLE PICTURE TOOL, this means that I have to constantly assess progress and priorities and ensure that resources are being used effectively.

Possible iteration fatigue: A long iteration process can lead to team fatigue, especially when faced with complex and changing requirements. This can affect team morale and

productivity.

Risk of bloating requirements: While iterative models allow flexible change of requirements, without strict change control, the project scope may continuously expand, leading to budget and schedule overruns.

Application of the iterative model in the "SIMPLE PICTURE TOOL" project:

Analysis phase

User study: Specific needs for image editing tools were collected through surveys and user interviews.

Competitive analysis: Evaluate the existing image editing apps in the market and understand their strengths and weaknesses.

Functional Definition: Based on the collected information, the functional and performance requirements of the software are defined.

Expected result: A detailed requirement specification is formed to provide a basis for the next stage of design.

Design phase

UI/UX Design: Designing intuitive and easy-to-use user interfaces and user experience flows.

System architecture Design: Determine a modular system architecture suitable for iterative development.

Expected outcome: The system design document and interface prototype are completed and approved by users and stakeholders.

Implementation phase

Coding and unit testing: Code from the design document, and unit testing to ensure code quality.

Function implementation: Gradually complete the development of core functions such as image compression and size adjustment.

Expected result: Each iteration ends with a working version of the software, including new features.

Testing phase

Integration testing: Testing how well different parts of the software work together.

User testing: Invite users to participate in testing and collect feedback to improve the product.

Expected results: The stability and performance of the software are verified, and the user feedback shows that the product meets the requirements.

The iterative model is crucial for me as it allows me to incorporate user feedback and actual performance, thereby enabling me to make necessary adjustments to my software. This undeniable advantage of the iterative model empowers me to enhance my software design requirements effectively. Currently, I have successfully completed the initial iteration of PICTool, encompassing six fundamental image editing functions that align precisely with my original vision.

PROJECT DEMONSTRATION AND RESULTS

This section will introduce and show the standard usage and UI display of my project "SIMPLE PICTURE TOOL" from the user's perspective.

Firstly, launch the software and observe the splash screen which will be displayed for a duration of 3 seconds. This page can serve as an advertising platform for investments once the app is launched. Users have the option to click on "SKIP" located in the top right corner to bypass this page.

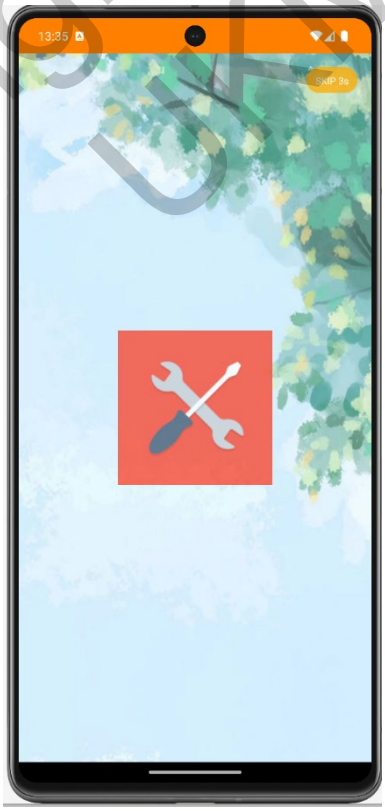

FIG. 1, the startup interface

If you are using Simple picture tool for the first time, we will go to the user login page first. This is the interface to register the account of the software or fill in your previously registered ID and password to ensure that you use the same account to log in to the software on different devices.

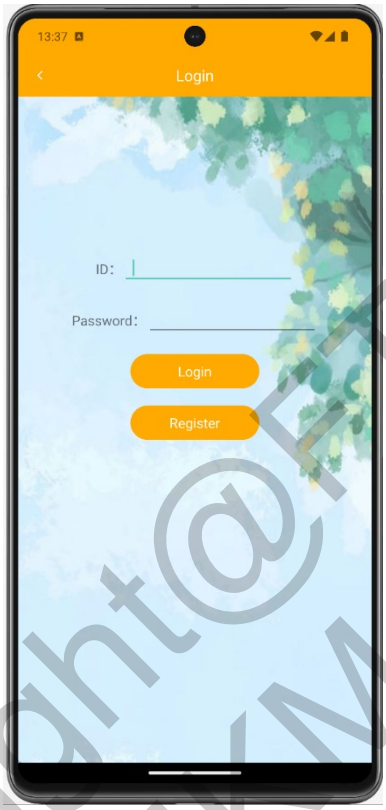

FIG. 2, the login screen

Click the register button, and we come to the new page. The first two items here are the basis for your login account. nickname is the display name of your message function, which will be introduced in detail later. After successful registration, we will return to the login interface after filling in the ID and password you just registered, and we will enter the main interface.

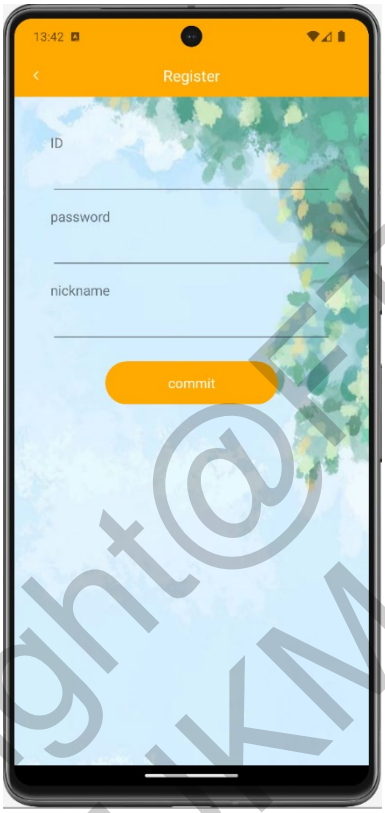

FIG. 3, the registration interface

Now let's start with the main interface, where we can see the software has 7 main modules, 6 functions related to editing pictures and a user message board. Then we can see the favorites and footprints left by previous test users. In general, when users think the feature is good, I recommend them to click the star to show their appreciation for the feature. Otherwise, click on the footprints to express dissatisfaction with the feature. I think this is a very clear little design to show the user's preference, and it also lets me know which feature is popular or which feature is having problems.

FIG. 4, the main interface

Let's show the first function, image compression is a dedicated to large file capacity of the picture according to the size of the compression function, first we need to click open photos from your album to select the size of the picture you need to compress, and then we fill in the compression percentage of the ratio you need, the default is 80% of the quality of the original picture, Then we click SAVE PICTURE to save the compressed image.

FIG. 5, Image compression

The second image editing function is very common image editing function, to change the size of the image according to the width and height of the image, we also open the image, and then set the width or height of the image we want to adjust, we can lock the scale so that the image will not be deformed. Then click the ZOOM button to check if the PICTURE is satisfied, and finally remember to press SAVE PICTURE to save it. Unlike the previous feature, it focuses on resizing images in cases where the image needs to be of a specified width and height, whereas the previous compressed image feature focuses on some cases where the image file size is limited.

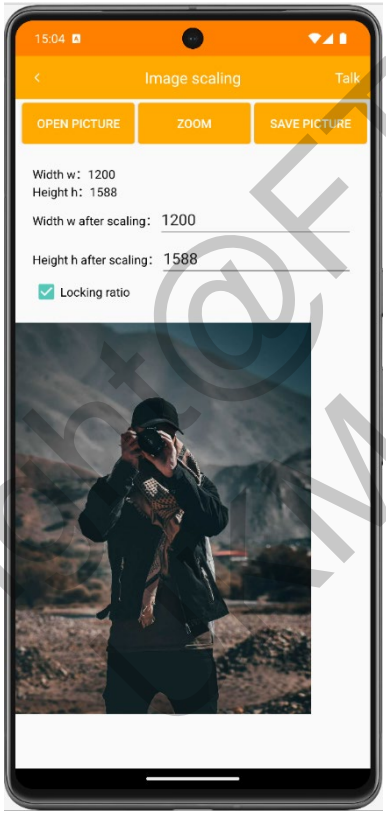

FIG. 6, Image Scaling

The image segmentation function is suitable for some bloggers with OCD on social media, because some social software is used to display thumbnails of pictures when Posting messages. However, when bloggers want to send a larger picture to attract attention, they need to use the image segmentation tool to segment a picture into multiple copies to achieve the effect of publishing a larger picture. We first click SELECT to select the image we want to split, then we input the image to be divided into width or height, and finally click SLICE to split the image. So we can show what we want on social media.

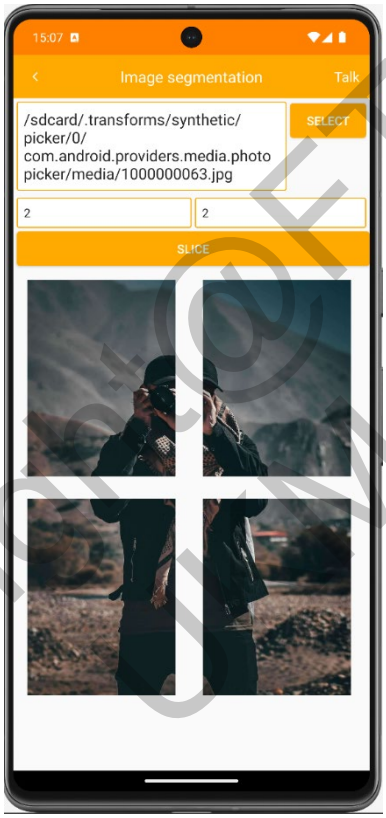

FIG. 7, Image segmentation

Image suture tool is the opposite of the tool introduced above, it is suitable for composing some similar images to achieve the effect of publicity. Once again, click on "Add picture". Before doing this, you can use the image width and height adjustment tool described earlier to align the images, and then choose how to splice the images of your choice. We use the image shown below to adjust our selection, and finally we save the image via the splice button, so we have an image suitable for our use.

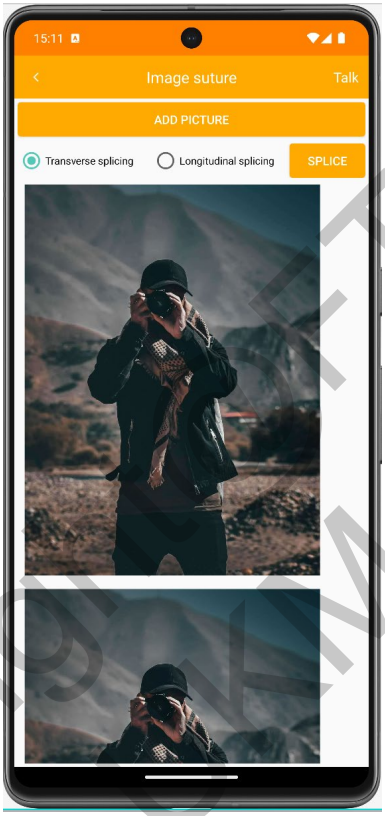

FIG. 8, Image suture

The next tool is the image inversion tool, which is also a very common tool. The specific operation is to open the image, select the image to be INVERTED and click INVERTED PICTURE. After confirming the inversion, you can save the image.

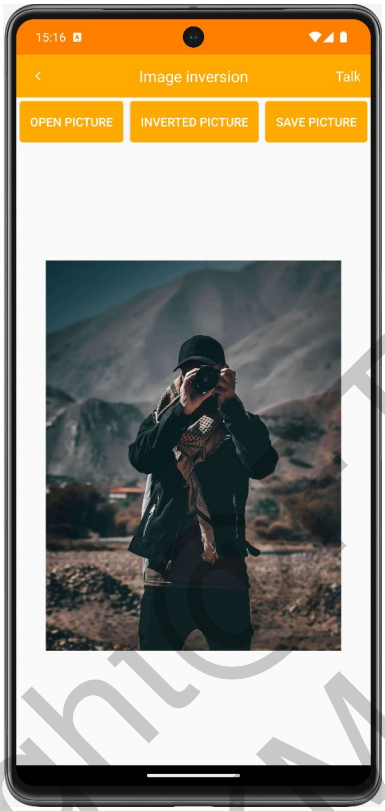

FIG. 9, image inversion

The last image editing feature is the Color Extractor, which is used when you need to know the color number of a certain color. You can take a photo and use this extractor to extract the color number of that color so that you can find information about that color on the Internet accurately. The color extractor only needs to open the picture you want to identify the color, and then drag the crosshair to the color you need, and the serial number of the color you need in the network is displayed on the top.

FIG. 10, Color extractor

This is the user message board, we can post some information in our account to chat with other users in the message board. You can discuss news or tips related to photo editing. You just send what you want to share to the chat box, and anyone who uses the software can see it.

FIG. 11, Message board

Test plan planning

The test plan was designed to share the software installation package to Google Cloud Drive for testers to download, and then a questionnaire was designed to give testers feedback on using experience and bugs encountered after testers had used the software. Therefore, this test plan is an open test, and the testers are composed of members of the online social community and random people in the school.

Test objectives:

The purpose of this test is as follows

a, Test whether the application supports multiple logins

b, whether all functions of the software are in normal use

c, whether there are malicious bugs such as flash withdrawal

For detailed test report and results of the program, please refer to the FYP file **-6.0 Software test plan report section**. This technical report is not presented in detail due to space issues.

Conclusion

The development process of the simple picture tool encountered initial challenges in the V1 version due to the inherent modular tendencies of the original code and unresolved bugs when adding user comments. To address these issues, I have introduced user-specific modules in V2. Issues such as these often arise in prior work, but they are decreasing thanks to iterative model updates. In addition, user feedback that the provided features were too simple prompted me to plan to enhance the tool with more utility features, including potential video editing capabilities. Using a modular programming approach and an iterative model, these enhancement modules are manageable. I have always believed that SIMPLE PICTURE TOOL has a more convenient use process and a simpler interface design than other image editing tools, which are the key advantages to help this software enter more users' Android phones. For a utility, what it is implementing is a reduced image editing class domain

The entry threshold process. It will be easier to realize the user's image editing needs in the future, so that more interesting pictures appear on the Internet!

Acknowledgement

The authors of this study express their deepest appreciation and gratitude to

DR. NOORAYISAHBE MOHD YAACOB, the supervisor of the authors of this study, for her invaluable guidance and support throughout the successful completion of the project. The successful completion of this study is inseparable from her help.

In the testing process of this study, the software questionnaire released by the author received a total of 23 users' responses within the survey statistics time. Thanks to the participation of these users, they helped the program to be displayed with better performance.

The authors of this study would also like to thank all parties that directly or indirectly helped to complete the project. All the assistance provided is greatly appreciated, as without their help this project would not have been properly implemented.

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