灰度图像彩色化一直是图像专业中较为热门的研究方向，而且越来越多的灰度图像彩色化技术已经被应用到人们日常生活中的许多领域，特别是在医疗成像、古物复原、夜视仪成像等领域发挥着至关重要的作用，但是由于现有的彩色化系统只是依靠单一彩色化算法支持，在图片渲染效果不佳时无法进行弥补。

该课题将设计并实现一个集成多种深度学习彩色化算法的系统以优化用户对彩色化渲染结果的选择。主要研究内容为设计多种彩色化算法，分析各自的实用性以及不同算法之间的差异，将各算法的优点展示出来，并搭建出适合所有用户使用的简单实用的交互式操作平台以及不同的图片处理选择，可使用户在使用中选择最为合适的处理图作为结果。采用的方法为面向对象开发的研究思路，先制定需求分析，对系统整体功能模块进行设计，如上传下载图片、图片彩色化操作、登录注册及个人中心等，设计数据库的表结构，定义各接口的名称，再使用快速原型软件制定系统的界面元素。设计完成后采用Django框架进行系统的实现，并预留彩色化操作接口，再查阅文献资料等，进行基于深度学习的多种不同的彩色化算法实现，并对其效果进行测试，再将技术与保留接口对接，在整体功能完成后对所有功能进行测试，避免回归错误的产生。

该系统集成多种彩色化方法，且能够为使用者提供简单高效的交互体验，较为明显地改善了目前已有系统的缺点，使得用户的选择更加多元，实现结果更加符合预期。

关键词：深度学习；灰度图像彩色化；Django

The color conversion of grayscale image has always been a popular research direction in the field of image, and more and more gray image colorize technology has been applied to People's Daily life in many fields, especially, it plays a vital role in the fields of medical imaging, antiquities restoration and night vision imaging, however, the existing colorized system only relies on the support of a single color algorithm, which cannot be made up when the image rendering effect is not good.

This project will design and implement a system integrating a variety of deep learning colorization algorithms to optimize the user's choice of colorization rendering results. The main research content is to design a variety of colorize algorithms, analyze their practicability and the differences between different algorithms, and show the advantages of each algorithm, and build a simple and practical interactive operation platform suitable for all users and different image processing options, so that users can choose the most appropriate processing picture as the result. The method adopted is the research idea of object-oriented development, firstly, make demand analysis and design the whole function module of the system, such as uploading and downloading pictures, color operation of pictures, login and registration, personal center, etc, design the table structure of the database, define the names of each interface, then use rapid prototyping software to specify the interface elements of the system. After the design is completed, the Django framework is used to implement the system, and colorize interface is reserved, then consult the literature materials, carry out a variety of different color algorithm based on deep learning, and test its effect. Then connect the technology with the reserved interface and test all the functions after the completion of the overall function to avoid regression errors.

The system integrates a variety of color methods, and can provide users with a simple and efficient interactive experience, which significantly improves the shortcomings of the existing system, making users' choices more diverse and the results more in line with expectations.

Key word: deep learning; Grayscale image colorization;Django