**Attendance system based on face recognition**

Project Name: Attendance system based on face recognition

Project Team: Group 1

Project time: 2020.3.18-2020.5.08

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# 1 Introduction

## 1.1 Document Purpose

The goal of this plan is not only to assit the project members to know how to proceed, but also to clarify our respective responsibilities and ensure that the collaboration between the project teams is more methodical, enable the various processes of the project work to be carried out in a reasonable and orderly manner. Meanehile, this plan allows communication between the inside and outside of the team to act as a guide, the scope of work between the teams, the relationship between the development modules, and a general description of development progress, budget, allocation of human resources, risks and etc.

In order to improve and complete the quality of the face recognition attendance system, the systematic and standardized quality management activities have been promoted to ensure that the delivered system can meet specific requirements. The project's quality management plan includes all quality objectives and specific measures related to the design and development of the interface-based sign-in system, including the requirements analysis phase, design phase, coding phase, testing phase, as well as implementation phase.

## 1.2 Background

Face recognition attendance system is a system that software project management courses require us to complete. The main function is to rely on face recognition algorithms to capture and recognize matching faces. When the recognition is passed, the system will input relevant information to represent the successful check-in. In addition, the system also includes the user's face registration to open the deletion and modification of user information for the administrator. The project cycle is about 10 weeks. In order to achieve the goal, this system will greatly simplify the user login process. Generally speaking, for companies or organizations that require sign-in, the relevant employees only need to wait a few seconds in front of the camera to complete the sign-in, which is convenient and time-saving. The company or organization only needs to obtain the employee's check-in status through the background record, and there is more than one background record.

## 1.3 References

[1] T. Ojala, M. Pietikäinen, and D. Harwood (1996), "A Comparative Study of Texture Measures with Classification Based on Feature Distributions", Pattern Recognition, vol. 29, pp. 51-59.

[2] Ding C, Choi J, Tao D, et al. Multi-Directional Multi-Level Dual-Cross Patterns for Robust Face Recognition [J]. IEEE Transactions on Pattern Analysis & Machine Intelligence, 2014, 38 (3): 518- 531.

[3] J. Chen and Y. Zu, "Local Feature Hashing With Binary Auto-Encoder for Face Recognition," in IEEE Access, vol. 8, pp. 37526-37540, 2020.

[4] M. Awais et al., "Real-Time Surveillance Through Face Recognition Using HOG and Feedforward Neural Networks," in IEEE Access, vol. 7, pp. 121236-121244, 2019.

# 2 Project Overview

## 2.1 Project objectives

(1) Algorithm learning: Based on two application scenarios of face recognition area detection and person recognition feature point calibration, the algorithm principle and implementation mechanism of face area detection and face feature point calibration allow everyone to face recognition and machine learning , deep learning for effective association.

(2) Model training: Based on the two application scenarios of face recognition area detection and face recognition feature point calibration, the process of data sample collection, algorithm model training and algorithm model testing is introduced, so that everyone has a complete and intuitive face recognition understanding

(3) Program design: Starting from real-time video collection, it covers code design, running demonstration and execution result output of all technical links such as face area detection, face feature point calibration, face alignment, face comparison and live detection.

## 2.2 Workflow

(1) Analyze business requirements and technical details

(2) Formulate project development plan

(3) Determine development tools and configuration management procedures

(4) Plan to track and ensure software quality

(5) Accept the periodic inspection plan

(6) Deliver test group to implement software testing

(7) Deliver the final product

(8) Project implementation summary

(9) Project acceptance

## 2.3 Project scope distribution

### 2.3.1 Members and tasks

The project team is responsible for the design, development, acceptance and implementation of a team. The responsibilities and division of labor of project participants are shown in Table 2.3.

Table 2.3.1Project participant responsibilities

|  |  |  |
| --- | --- | --- |
| **Name** | **Position** | **Duties** |
| Ma Haifeng | Leader | Environment deployment and programming |
| Bai Chunguang | Member | Overall project process and design |
| Chen Yingzhao | Member | Model training and algorithm learning |
| Xiao Xiao | Member | Information management and server construction |

### 2.3.2 Constraints

Must be completed by May 8, 2020

### 2.3.4 Development environment

Provide two versions of C++ and Java programming languages, system introduction to project development environment overview, DLib framework source code compilation, project project file creation, project development environment configuration, project performance optimization settings;

### 2.3.5 Basic documentation

To ensure that the software meets the requirements specified in the approved requirements specification, the following documents need to be edited:

(1) Software Requirements Specification (SRS)

(2) Software Design Specification (SDD)

(3) Software Test Plan (STP)

(4) Software Test Report (STR)

(5) User Manual (SUM)

(6) Project Development Summary (PDS)

## 2.4 Acceptance standard

### 2.4.1 System check

For the entire system and each subsystem, the evaluation work should be completed regularly or periodically in accordance with the provisions of GB 8566 (Computer Software Development Specification). At least the following eight aspects should be reviewed and inspected:

(1) Software Requirements Review

(2) Summary design review

(3) Detailed design review

(4) Software verification and validation review

(5) Function check

(6) Physical inspection

(7) Comprehensive inspection

(8) Management review

### 2.4.2 Architecture Evaluation

(1) The programming format should ensure that all coding uses the specified working language programming style in accordance with GB 8566.

(2) The unit structure test that the statement covers all projects of the company must be equal to 100%, and the branch coverage rate C1≥85%.

# 3 Project feasibility

## 3.1 Economic feasibility

The so-called economic feasibility refers to the investment cost of the system to evaluate whether the system or software can generate profits. Economic feasibility analysis is to analyze whether this system can bring good economic benefits to the company, and decide whether to design and implement this system. The development of this system is completed by a team of 4 persons, and it takes about two months. The software used in the design can be downloaded free of charge on the Internet. The cost of the investment is low, and the C/S architecture is adopted. It takes too much time and effort to upgrade and maintain the software, so it can be performed economically.

## 3.2 Technical feasibility

The development of the FRAS system mainly includes two aspects: one is the design of the database, and the other is the design of the visual graphical interface. In the design of the database, through consulting information and books, mastered a series of steps in database design, combined with system design, constructed a variety of stored data tables suitable for this design. As the latest version of SQL Server, SQL Server 2008 has policy-based management, multiple service query functions, data collection and efficient data processing. Although we also encountered many problems in the process of designing the system, the technical difficulties were overcome in a timely manner through online Baidu, consultation with students and teachers, etc., so the completion of the system is technically feasible.

## 3.3 User feasibility

The user's feasibility is mainly to evaluate the FRAS system from the user's perspective. This system is mainly designed for students to sign in for classes or to check in by employees of the company. When an operator uses the system, he only needs to log in and use it. The software is operational and meets the feasibility of operation. At the same time, the system is divided into two roles: top-level administrator and operator. The top-level administrator can realize the entry and modification of member information in the system, increase the operator or modify various information of the operator, and has the feasibility of management. All in all, the system meets the feasibility of users.

# 4 Project schedule

## 4.1 Development process

### 4.1.1 Demand analysis

Increase the attendance machine attendance procedures and adopt the face recognition attendance system, avoiding the embarrassment of forgetting to bring a card, and eliminating the loopholes of punching cards. Its outstanding feature is to overcome the shortcomings of card punching time attendance, and because of its non-contact time attendance method, it avoids many other weaknesses of other biometric time attendance such as the wear of fingerprint collection equipment of fingerprint time attendance machines, fingerprints affecting the attendance effect, etc. Face recognition attendance is widely used in high-end business places such as national government agencies, hotels, and hotels. The team members conducted a detailed analysis of the company's organization and customer service needs, and drafted a demand analysis plan. At the same time, it designs the modules that the system should have, as well as the basic functions and additional functions that should be included.

### 4.1.2 System design

According to the planned date, the team members complete the design and implementation of the detailed functions of each module. At the same time, team members regularly hold regular meetings to report on the progress of their work and propose relevant internal requirements (such as inter-module interface specifications).

### 4.1.3 System test

After completing the division of labor, the team members will summarize and coordinate each module to build the entire system. The process of building is also the process of testing, so system testing and system building are carried out simultaneously. The product can only be delivered after passing the test.

### 4.1.4 Project summary

After the accomplishment of the project, summarize the problems and lessons encountered during the project development and implementation process, and accumulate relevant project development experience.

## 4.2 Schedule

The specific development progress is as follows:

Table5.2 Project schedule

|  |  |  |
| --- | --- | --- |
| **Milestone** | **Date of completion** | **Responsible** |
| Requirements analysis completed | 2020/3/18 | Chen Yingzhao  Xiao Xiao |
| Project design completed | 2020/3/25 | Bai Chunguang  Ma Haifeng |
| Master the related technology required for development and be able to write demo | 2020/4/05 | Ma Haifeng  Bai Chunguang  Chen Yingzhao  Xiao Xiao |
| Development completed | 2020/5/08 | Bai Chunguang  Ma Haifeng |

# 5 Support conditions

## 5.1 Hardware support

(1) The terminal can run a face login program requires a memory of 512 MB or more, 4 GB or more of storage space, and a front camera, can run normally.

(2) One server, Intel® XEON® Cascade Lake baseband/core frequency: 2.6GHz/3.5GHz, 2 core 4G, bandwidth 6Gbps, 100G hard disk storage.

(3) The terminal can run an information management interface that requires more than 2G of memory, 128G of storage space, 100 broadband, 100M of broadband, and a LAN using TCP/IP protocol.

## 5.2 Software support

The required software support varies according to the different needs of the module.

(1) OpenCV needs to control the version above 3.0.

(2) Support CX11 when configuring.

(3) Node.js software service,

(4) Apache software services,

(5) MySQL database software service,

(6) Operating system of Windows 7 and above.

(7) Development tools: WebStorm 11, HBuilder, Xshell5, FlashFXP, Navicat Premium, Visual Studio 2010 and above version.

## 5.3 Operational support

(1) The terminal operating system needs to select Android system, the version is between Android 5.0~8.1.

(2) The end user is required to grant the necessary permissions when the software prompts the relevant permission, otherwise the software may not work properly.

(3) The administrator interface needs to run on the Windows operating system, and try to turn off the firewall service. It is recommended to run only the necessary security protections such as Windows Defender or Kaspersky.