

UNDERGRADUATE PROJECT PROPOSAL

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| **Module Code:** | **CHC 6096** |
| **Module Name:** | **Project** |
| **Date Submitted:** |  |

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# Introduction

## Background

Video surveillance is an important component of security prevention systems, known as Cameras and Surveillance. Traditional surveillance systems include front-end cameras, cables and video surveillance platforms.  
Cameras can be divided into network digital cameras and analog cameras, which can be used to collect video image signals at the front end. Video surveillance is widely used in many places due to its intuitive, accurate, timely and rich information content. In recent years, with the rapid development of computers, networks, image processing and transmission technologies, video surveillance technology has also made great progress.  
The latest surveillance system can use smartphones as the controller, and automatically recognize, store and alarm images. Video data is transmitted back to the control host (which can also be a smartphone) via 4G/5G/WIFI. The host can perform real-time viewing, input, playback, retrieval and storage operations on the images. Thus, mobile interconnected video surveillance can be achieved.

## Aim

The purpose of this project is to develop a video surveillance system and support up to 16 video surveillance channels, which form the regional video surveillance system of the project through the networked video surveillance cameras installed. The digital video surveillance system is composed of networked digital cameras, and the digital video is integrated into a unified platform. It adopts a distributed centralized management control mode for management and control, and through the control of permissions, any computer user on the local area network can log in after installation to display all the surveillance points they have permission to access. Users can view, control, replay history or download them in real time, achieving the networked, digital and intelligent video surveillance system of the entire region.

## Objectives

The objectives are as follows:

Ob1: Investigate project requirements and create projects.

Ob2: Record system: supply flexible recording configuration, according to different monitoring points can choose different time length, different recording methods for recording, and can be dynamically changed.

Ob3: Decoding system: The decoding system has the functions of video decoding, splicing and control.

Ob4: Monitoring management system functions: The system accesses the central server through WEB include Organizational structure management, User management, Device configuration management, Equipment management, System performance management, System fault maintenance.

Ob5: Set up the server using nginx-rtmp.

Ob6: Adapt cameras from different manufacturers as much as possible.

Ob7: Test and publish the system.

## Project Overview

(NB: Most students are working either on a software development-based project or a machine learning/deep learning-based project. Hence, in section 1.4, students must adopt the appropriate theme/content depending on their project topic.)

### Scope

The scope of this project involves developing a comprehensive video surveillance system capable of managing multiple H.265 camera streams. It will focus on capturing, transmitting, processing, and displaying video data through various system layers, including local camera integration, RTSP stream handling, and transforming streams for real-time monitoring on web platforms. The system employs technologies such as FFmpeg, Nginx, and VLC for media processing, and integrates functions like real-time preview, stream recording, and remote monitoring through web services.

### Audience

This software is build for individuals and organizations that need a solution for managing multiple video streams, particularly in sectors like security, smart home and remote monitoring in industrial environments. The audience includes security personnel, IT administrators, and developers interested in building scalable video surveillance solutions using open-source technologies.

# Background Review

The development of the current project is built upon the knowledge and use of open-source tools such as FFmpeg, and integrates various protocols like RTSP and RTMP to enable seamless video streaming and monitoring. Competitive solutions that use proprietary technologies are also reviewed, focusing on their advantages and limitations in scalability, ease of use, and integration capabilities.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Software | Technology Stack | Scalability | Ease of Use | Unique Features |
| Blue Iris | Closed source software | Medium(dev knowledge needed) [1] | Low (User-friendly)[2] | Integrated motion detection |
| ZoneMinder | LAMP stack | Medium[] | High(Community Support) | Supports alarm triggers |
| Milestone XProtect | Nginx | Very high[] | High | Advanced analytics, cloud options |

# Methodology

## Approach

For this project, i employing an agile development model to ensure iterative progress with frequent adjustments based on feedback. The requirement gathering will involve direct engagement with stakeholders to define needs, which will be documented as user stories. Testing will involve a mix of unit testing, integration testing, and user acceptance testing to ensure the software meets the requirements effectively.

## Technology

|  |  |
| --- | --- |
| **Frontend** | HTML, css |
| **Backend** | Nginx-RTMP Module, VLC, FFMPEG |
| **Database** | MySQL |
| **Data Visualization** | QT |

## Version management plan

To manage multiple versions of the project code, we will use a Git repository hosted on GitHub. The repository will include branches for development, testing, and production, ensuring clear separation between the ongoing work and stable versions

# Project Management

## Activities

|  |  |  |
| --- | --- | --- |
| Activity | Description | Objective |
| System Design |  |  |
|  |  |  |
|  |  |  |

## Schedule

In this section, you can use a Gantt chart or other charts to show the activities and their deadlines.

## Data management plan

In this section, students must describe how they would use resources such as Baidu drive, Gitee, etc., to manage project logs, reports, literature, etc.

## Project Deliverables

In this section, briefly list all the documents and project resources that must be submitted for assessment. Example: Project proposal, progress report, final report, project code/ software, etc.

# References

Regarding citations and references, students must adhere to the University guidelines or IEEE referencing style.

**Students doing software development-based projects can cite related websites, web applications, developer documentation, etc. They can cite related articles to their projects, but it is not required. Students doing research-oriented projects should focus on citing research articles. They can also cite appropriate websites whenever necessary.**

**(blue background review（扩展）)**[**https://ipcamtalk.com/threads/blue-iris-with-ai-but-which-one-though.65100/**](https://ipcamtalk.com/threads/blue-iris-with-ai-but-which-one-though.65100/)

**（blue 易用）**[**https://blueirissoftware.com/forum/viewtopic.php?t=3359**](https://blueirissoftware.com/forum/viewtopic.php?t=3359)

**(zoom minder (扩展))**[**https://forums.zoneminder.com/viewtopic.php?t=11191**](https://forums.zoneminder.com/viewtopic.php?t=11191)

**（m）https://www.milestonesys.com/resources/content/articles/IT-considerations-xprotect-vms/**

## Formatting Requirements

Your written assignments must be presented in the following format:

* It must be word-processed in 11-point Arial font
* It must be black text on a white or ivory background
* All pages must be numbered
* Margins must be as follows: Top: 1 inch, Bottom: 1 inch (2.5 cm), Left: 1.25 inches, Right:
* 1.25 inches (3.2 cm)
* Use a line spacing of 1.5
* Numbers and captions to figures and tables should be at the bottom of the figure or table. If the figure or table is mounted sideways into the report, then its bottom is on the right-hand side of the report. **All tables and figures must be labeled**.
* Normally, the report should not contain more than 80 tables/figures.

## Written Presentation

* The project proposal must have a concise written presentation and referencing style.
* It should also have a clear & logical presentation.

**NB:**

1. **All the text in red colour are basic guidelines and must be DELETED after using this guide.**
2. **Finally, update the “Table of Contents” appropriately to display the correct section titles and corresponding page numbers.**