AKADEMIA GÓRNICZO-HUTNICZA

Documentation for the project

Closed-Circuit TeleVision system

For the subject:

Design Laboratory

Elektronika i telekomunikacja 3 rok

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Tuesday 8:00

Course leader Dr. Inż. Jacek Kołodziej

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Detailed documentation of the CCTV System

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1. Project repository

The project repository will be managed using the Git system, probably GitHub.

Project structure:

- Src/: source code
- Docs/:documentation
- Readme: required and description of the project on the GitHub platform

2. Documentation of design assumptions

- **Cameras:** The system uses OpenCV for camera access and control.
- **Computing power:** Laptop for real-time processing.
- **Motion detection algorithm**
- **Data storage:** Video will be stored in a standard format (e.g., mp4) with adjustable quality.
- **User interface:** The basic version uses the OpenCV console and display window for interaction.
- **Development environment:** Python 3.8+, Visual Studio Code with Python plug-in or PyCharm

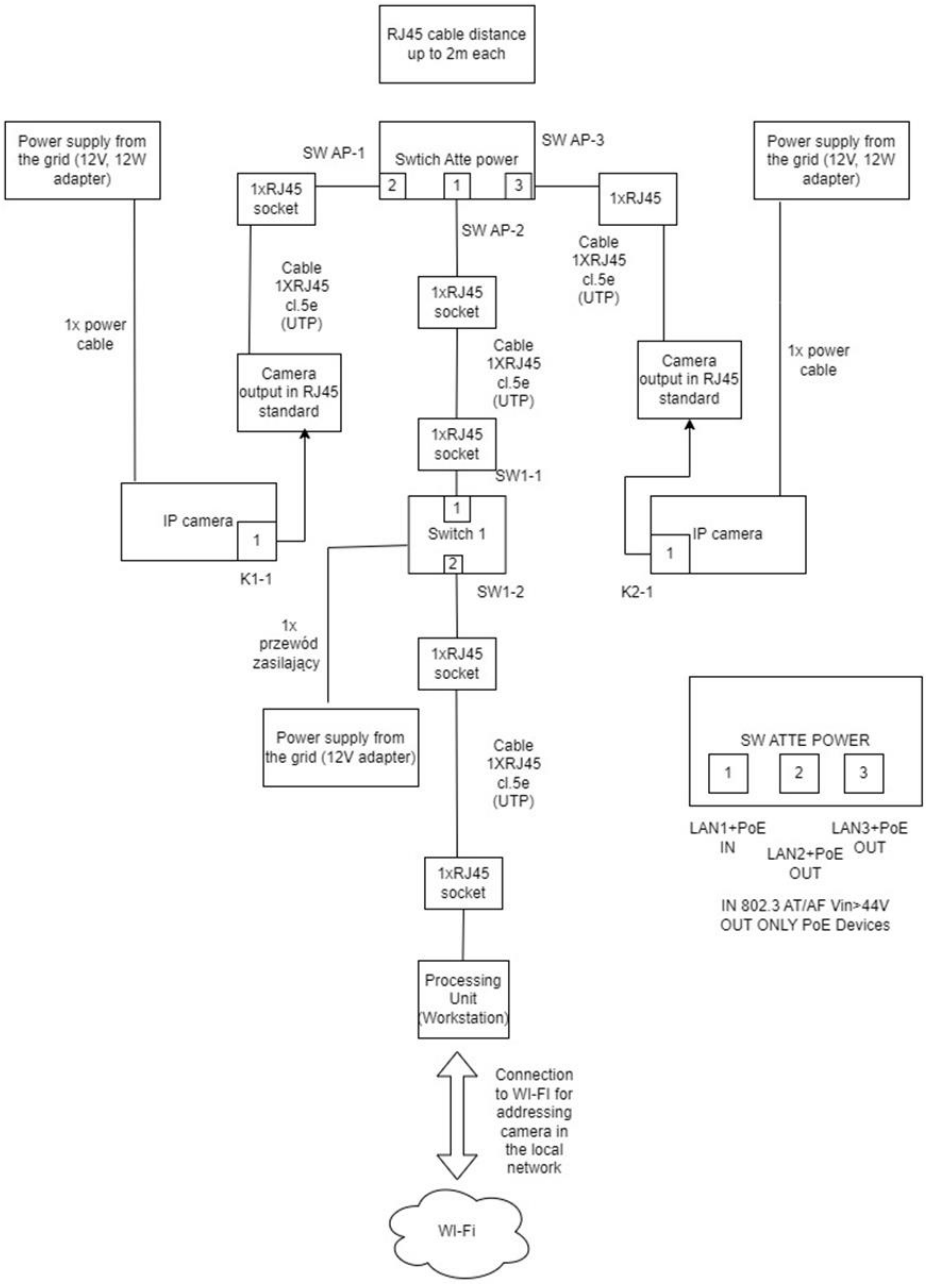
3. Work schedule

- **Week 1: Initial set-up**
    - Installation and configuration of OpenCV - both team members.
    - Creation of a Git repository with basic project structure - both team members.
    - Verification of camera connection and basic video recording functionality - Bartek.
- **Week 2: Recording and displaying camera video**
    - Implementation of a live video stream using OpenCV's ‘cv2.Video Capture’ and ‘cv2.imshow’ functions - Kacper.
- **Week 3: Motion detection**
    - Implementation of a basic motion detection algorithm using haar cascade - both team members.
    - Testing the algorithm under different lighting and motion conditions - Bartek.
- **Week 4: Recording and data storage**
    - Implementation of video recording using ‘VideoWriter’ - Kacper.
    - Optimisation of storage settings (e.g. compression, resolution) - Bartek.
- **Week 5: Final testing and documentation**
    - Running tests with motion detection and recording - Bartek.
    - Finalise documentation, including user guides and technical material - both team members.

4. System block diagram

Components and data flow:

- **Camera unit:** records real-time video
- **Processing unit**: performs motion detection and starts recording
- **Storage unit:** saves video recordings locally
- **GUI window application:** makes live video available to the user



Data flow:

1. The camera captures the image and sends the frames to the processing unit.
2. The procesor analyses the frames for movement and a decision is made to record the video.
3. The GUI application gives a live camera feed for monitoring.

5. Technical specifications of electronic components

Hardware:

- **Camera**: Camera offering at least 480p, 720p upwards recommended
- **Mains power supply from the grid**
- **Processor**: Any processor that supports real-time processing requirements.
- **RAM Memory**: At least 8GB for smooth processing of high-resolution frames.
- **Pamięć masowa**: Hard drive with at least 10 GB of free space for video viles
- **Switch**

Software:

- OpenCV: Camera access and video processing functions.
- Development environment: Visual Studio Code or PyCharm

6. Supplementary support materials

- OpenCV documentation: official API documentation
- Camera specifications: information about the selected camera model