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EyeOnPI

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Raspberry Pi Security Camera Setup

Objective: Setting up a security camera system using Raspberry Pi 4 with Motion software

Tools Used: Raspberry Pi 4, Raspberry Pi imager, USB webcam

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The Methods

- **Motion:** manual configuration
- **MotionEyeOS:** pre-configured
- **MotionEye:** web interface

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Motion

- Open-source software for detecting movement using a camera and streaming video
- Analyzes video from camera to detect motion
- Takes pictures, record videos, when motion detected
- Suitable for system like Raspberry Pi to create surveillance setups
- Consumes fewer system resources, ideal for old versions of Raspberry Pi
- No external services or additional dependencies

Why we didn't choose Motion:

- More complicated set up
- Requires extensive configurations at each run
- Offers less user-friendly interface
- Less information for possible features

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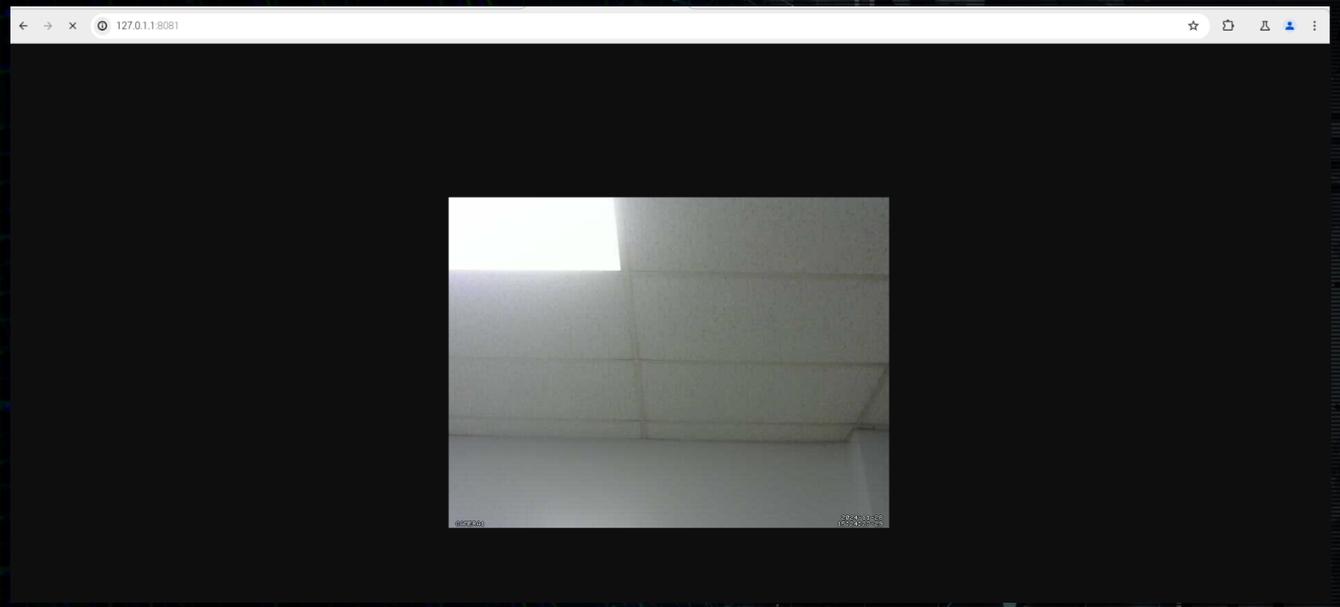

Motion Interface

-Displays year, month, day, minutes, seconds, hours

-Use of IP address with Hostname

-Works with port 8081 by default, can be changed and found in
motion config file

-Use of sudo commands to download the software

-Not many features on interface

-Manual security setup

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MotionEyeOS

- Popular open-source operating system for Raspberry PI
- Provides a web interface to manage and monitor multiple cameras
- Supports motion detection, recording, and video streaming.

Why we didn't use MotionEyeOS:

- Discontinued, no longer updated or supported
- Latest version is not compatible with the Raspberry Pi 4
- We needed a system compatible with newer hardware for reliable performance

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MotionEye

- Web-based open-source software for detecting motions and surveillance for Linux-based systems
- Manages with network cameras, USB webcams, etc.

Why we use MotionEye:

- Faster setup, versatile, and flexible
- User friendly-interface providing APIs
- We needed a system compatible with newer hardware for reliable performance
- It can be a secondary feature functioning with other applications
- Better storage cleaning options
- Offers multiple features such as notifications
- Monitors from any device

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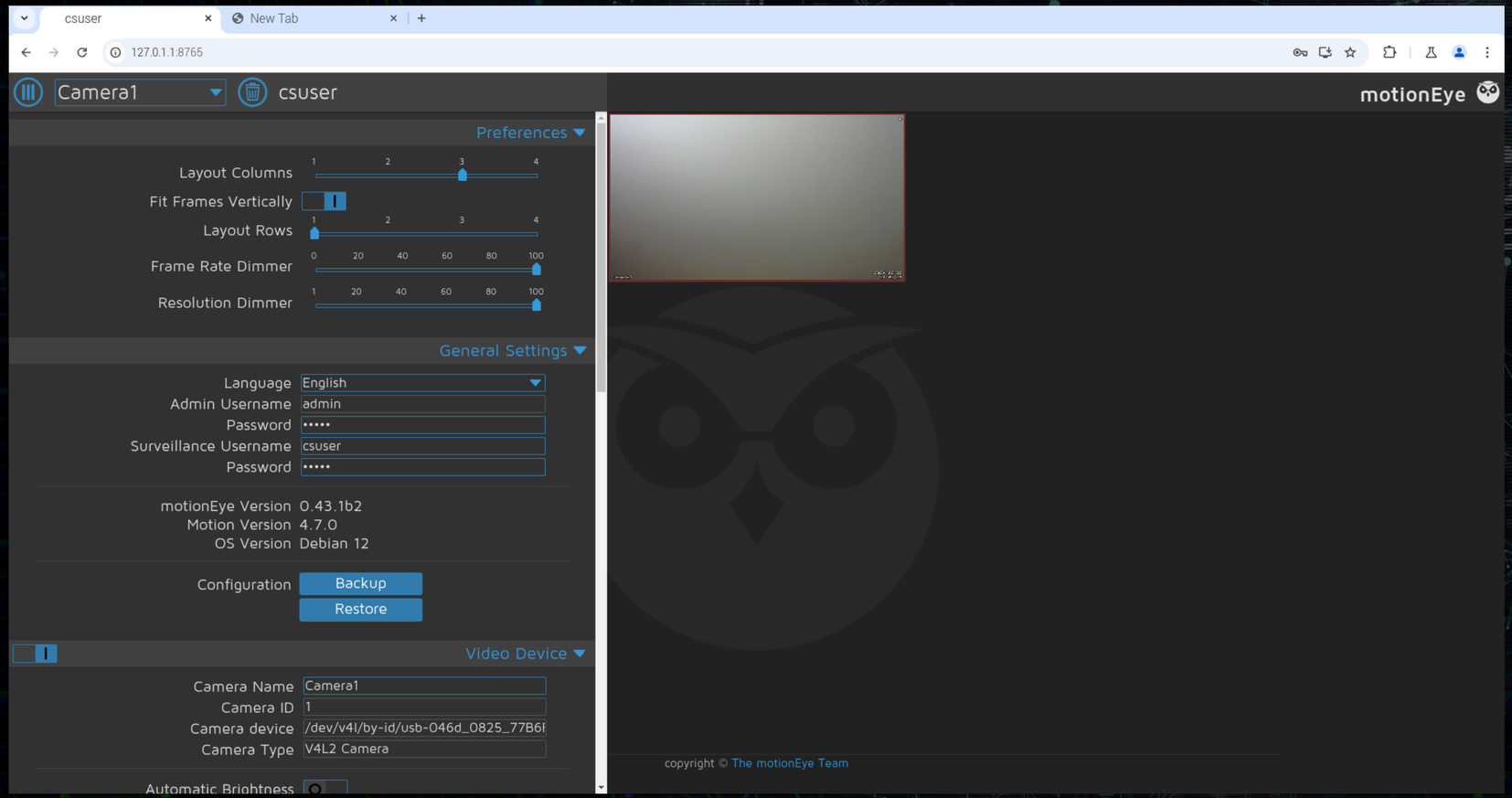

MotionEye GUI

-Displays year, month, day, minutes, seconds, hours, camera names, and frame that detects motion

-Use of IP address with Hostname

-Works with port 8765 by default, can be changed

-Use of sudo commands to download the software

-Many features on interface, including security setups

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Key Differences & Similarities

1. **Motion**

Motion is an Open-source software for detecting movement using camera, capturing images and streaming videos.

2. **MotionEyeOs**

MotionEyeOs is an operating system for Raspberry Pi that provides a web interface to manage and monitor multiple cameras.

3. **MotionEye**

MotionEye is a web-based frontend for motion, simplifying camera management and motion detection, similar to MotionEyeOS.

Updating Raspberry Pi

Updating Raspberry Pi package list and upgrade installed packages:

```
sudo apt update
sudo apt upgrade
```

to Ensure the system is up-to-date with the latest security patches and software versions.

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Installing Required Packages

Install necessary packages for MotionEye

```
sudo apt --no-install-recommends install ca-certificates curl python3
```

```
python3-dev libcurl4-openssl-dev gcc libssl-dev
```

what we installed:

- ca-certificates: secures communication over HTTPS.
- curl: A tool for downloading foles (needed for fetching MotionEye).
- pyhton3 and python3-dev: Python version and development libraries for running MotionEye.
- libcurl4-openssl-dev: Library for secure data transfers
- libssl-dev: Required for SSL encryption.
- gcc: Compiler for building software for source.

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Installing Pyhton Pip

Ensure pip is installed to handle Python packages

```
pip --version

sudo apt install python3-pip -y
```

- pip is used to install python packages and dependencies, including motionEye.
- this step ensures that the package manager for python is available to install the required software.

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Fixing External Environment Errors

Avoid errors related to Python package installation

```
sudo python3 -m pip config set global.break-system-packages true
```

This command avoids eros by conflicts between system-managed and user-installed packages. It ensures that Python packages can be installed without affecting the system's package manager

Installing MotionEye

Install MotionEye using Pyhton Pip.

```
sudo python3 -m pip install --pre MotionEye
```

This installs the motionEye package, which will allow us to configure and manage the camera system from a web interface.

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Initializing MotionEye

Initialize MotionEye and set up the system to manage cameras.

```
sudo motioneye_init
```

This command initializes MotionEye and prepares it for use by creating necessary directories and configuration files.

Accessing the Web Interface

Initialize MotionEye and set up the system to manage cameras.

It displays the Raspberry Pi's IP address

```
hostname -I
```

to access:

```
http://<Your Raspberry Pi IP>:8765
```

The default login is admin with no password.

Camera Configuration

- Function with a USB camera:

MotionEye needs recognition and configuration of video feed

UVC(standard protocol for USB cameras) allows MotionEye to use the camera

- **In MotionEye Web Interface:** Choose USB camera as the camera type.
- Set the camera Type to UVC (USB Video Class)

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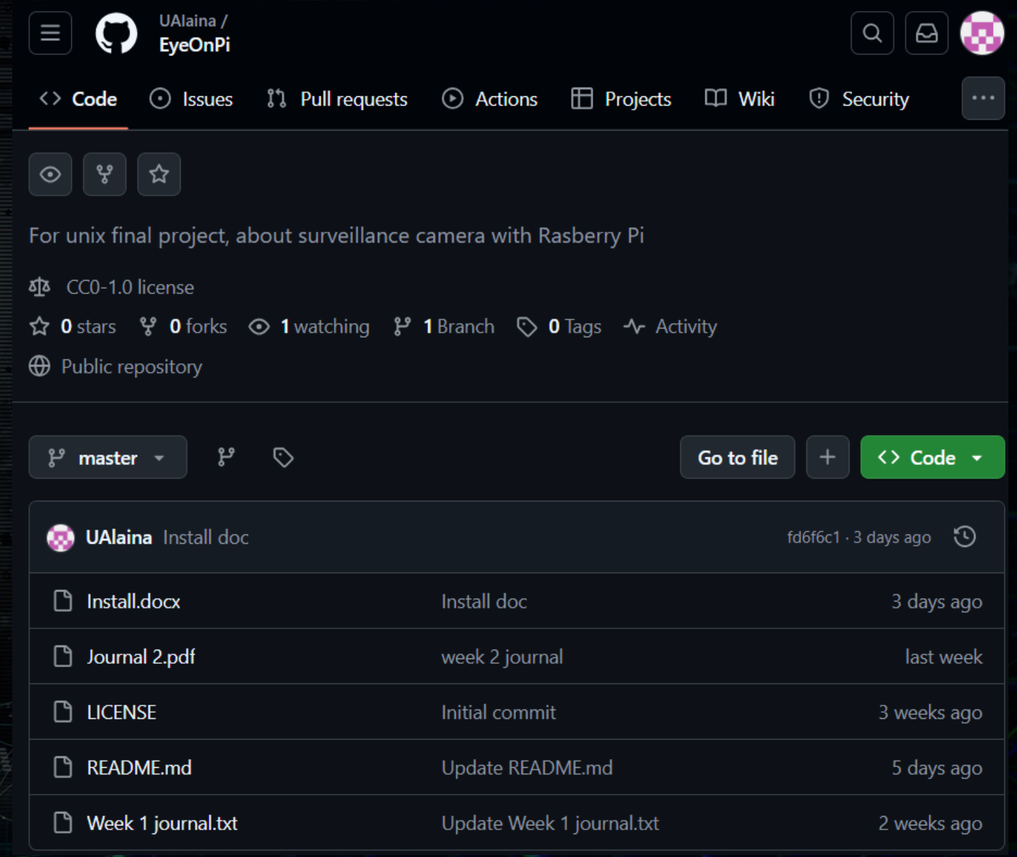
Git repo Tour

https://github.com/UAlaina/EyeOnPi.git



Major Challenges

- Finding a solution compatible with the Raspberry Pi 4 was challenging, especially with discontinued software like MotionEyeOS.
- Setting up Motion software without extended details such as FTP

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Major Accomplishments

- Successfully set up a security camera network using MotionEye
- Overcame compatibility issues and managed to configure the system to work with the Raspberry Pi
- Gained valuable experience with Raspberry Pi and security camera integration

Future Plans

- Add and learn extra features for the proposed software to Github
- Enhance accuracy of the motion detection from various distances
- Adding night vision and sounds
- Implement with IoT platforms like home assistant for home surveillance
- Enhance security
- Starting a consulting service or custom setups for businesses:
  Educate clients
  Implement encryption

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Any Contribution to a Floss Project?

- MotionEye is a free and open-source project under the GNU General Public License (GPL), making it a FLOSS project
- Any project done contributes to the support of open-source ecosystem

Why should You Buy This Product?

- Offers an easy-to-set-up, cost effective surveillance solution using Raspberry Pi
- Customizable, flexible and leverages open-source software, providing scalability for future expansions
- Provides a reliable and smooth performance for basic security camera needs
- Useful for Warehouses, home-owners, businesses that require surveillance
- Affordable hardware
- Access live video remotely via a secure web interface

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