

Project Documentation

Project Files:

SNO	File Name	Description
1	main.py	Main project file
2	imageTransfer.py	Handles emailing the attachment
3	send_sms.py	Handles sending SMS notification
4	project_config.py	All email, SMS and change detection related parameters can be adjusted here

Working:

1. Get raw frames from the camera
2. Convert the frames to grayscale
3. Define a ROI for the frame
4. On application startup, ignore the first 5 frames and take the 6th as the starting reference
5. For every frame received after the initial reference is stored, calculate the Mean Squared Error (MSE) between the fresh frame and the reference in the ROI and increment a counter if it is greater than a set threshold value.
6. If the next **EXTDEF_EVENT_CHECK_FRAMES** frames also have MSE greater than the threshold values, it can be noted as a change in the reference image.
7. To check if this is a sustained change and not a temporary change in the frames, it is checked if the above mentioned check happens for **EXTDEF_SUSTAINED_EVENT_VERIFICATION_RUNS** times thereby confirming that there is a persistent change in the scene.
8. The local log file is updated with the timestamp when the change was detected.
9. An email and SMS (optional) is sent notifying of the event.
10. A notification timer is set defining the minimum duration for the next email/sms notification.
11. **EXTDEF_UPDATE_IMAGE_FLAG** can be set in the project_config.py file. Enabling this flag updates the reference image every time an event is detected.

Run Project:

To execute the application,

1. Go to the folder containing the main.py (and other .py) files
2. Open terminal
3. Execute “python3 main.py”

Changes/Improvements for the next version:

1. Better camera with night vision. The existing camera is very sensitive to minor changes in light conditions (which affects the event detection)
2. A better solution would be to store the images online (like S3 storage)
3. Add GSM/GPRS support
4. Improvements to the event detection algorithm based on the final use case
5. Application autostart on reboot
6. Remote configuration of the application and its parameters if necessary
7. Use bulk sms services if necessary