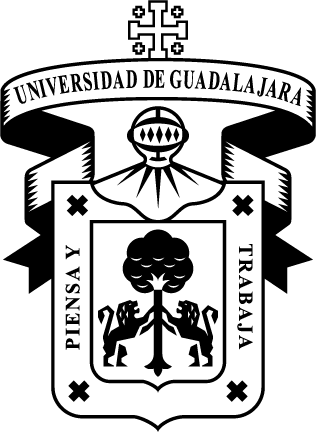
Universidad de Guadalajara

Centro Universitario de los Valles



**Automatic recognition of violent physical actions in video surveillance systems (ARV).**

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# **Abstract**

Video surveillance systems are considered technological tools that help safeguard people's safety. Currently these systems have a great acceptance in daily life, for example, the monitoring of public areas such as airports, department stores, educational institutions, etc. With the application of current advances in digital image processing and wireless communication technology, systems can be created for the visualization and monitoring of areas of interest, capable of capturing and processing images, intelligently sending only the necessary information for the interpretation of different activities.

## Purpose

The interest in developing video surveillance systems to safeguard the security and protection of people grew significantly after the 11th September attack (9/11), so these systems emerge as a natural solution to detect and prevent attacks or situations that put at risk the integrity of people. Video surveillance systems have evolved over time. In 1960, the first generation of video surveillance systems emerged, which, directly focused on visual detections made by human operators, said operators had to analyze, interpret and classify the results of supervision. These types of systems did not guarantee rigorous surveillance because the attention in most individuals declines after 20 minutes of evaluating the screens. Current video surveillance systems called fourth generation (4GSS), seek automation in the detection of relevant events during the monitoring of regions of interest by implementing software systems based on artificial vision algorithms. These systems are developed as support tools, to help the operator to efficiently monitor different areas of interest.

With the next project is to design and implement a tool video surveillance with the ability to detect violent activities such as fights, the system will have the ability to highlight the 2 humans who are participating in the fight with the objective of providing aid for the visual detection of the participants in this violent action

## Scope

### System Overview

The CONACYT (Consejo Nacional de Ciencia y Tecnologia) requires a computer vision system that is capable of automatically detecting violent physical actions such as kicks and punches. The ARV project will help security guards detect these violent actions quickly, the main features of the system are the following:

• The system will allow the detection of people using a camera.

• The system will perform the characterization of violent actions by extracting poses in image sequences.

• The system will allow the training of new models to detect violent actions.

• The system will allow handling different types of scenarios.

Implementing the ARV system will be helping security guards who are on duty, as this program will only send audible alarms when violent actions are detected making monitoring of areas of interest more effective.

ARV will be configured depending on the characteristics of the scenario, this means that depending on the type of lighting is the default configuration.

## Applicable Configuration Items

The ARV project will be managed with the SCRUMBAN software development methodology, for which all portotypes and documents will be provided. ARV will consist of many software and hardware components. This will cover the following areas:

* Data set of tests
* All ARV documentation
* All software versions
* CNN algorithm

## References

1. IEEE Standard for Software Configuration Management Plans (IEEE Std 828-1990), The Institute of Electrical and Electronics Engineers, Inc. New York, NY 1990

# **Configuration Management**

The software is focused on being a support tool for video surveillance systems, so it can be implemented in homes, classrooms, shopping centers, hospitals, etc.

## Organization

The following table identifies all personnel and/or groups who have responsibilities with regard to configuration management for ARV.

|  |  |  |
| --- | --- | --- |
| Role | Name | Organization |
| System Owner or Designated Representative | Salvador Cervantes | UDG |
| Project Manager | Alberto Nolasco | Oversight Activities |
| Senior Analyst & Senior Programmer | Omar Alejandro  Luis Enrique  TDB  TDB | ITInc |
| Configuration  Manager | TBD | TBD |

## Responsibilities

Each of the roles identified in the earlier table have specific configuration management responsibilities. The responsibilities are defined below.

**System Owner or Designated Representative**

* Asesorar al equipo del proyecto ARV
* Firmar los entregables
* Concurs/Non-concurs at stage exits with the successful completion of each phase.
* Concurs/Non-concurs upon any substantive project issues that impact resources, schedules, and other operational considerations.
* Initiates Change Requests during project reviews by identifying new or previously unidentified requirements.
* Provides budgetary resources for the project.

**Project Manager**

* Makes Project Team assignments for preliminary investigation of change requests (analysis, feasibility and impact study, resource estimates), and the assignments to make, test, and implement the change.
* Reviews analysis and resource estimates.
* Monitors schedules and status items to ensure timely delivery.
* Reviews ARV release plans with the Configuration Manager.
* Coordinates ARV releases with the Configuratio

**Systems Analysts and Programmers**

* Identifies new or previously unidentified Configuration Items during design, customization, testing, and processing changes.
* Initiates Change Requests when encountering system problems or when recognizing performance improvements during design, customization, testing, and processing changes.
* Performs preliminary investigation of change requests (analysis, feasibility and impact study, resource estimates).
* Makes, tests, and implements the approved changes.

**Configuration Manager**

* Coordinates with the Project Team in identifying Configuration Items.
* Determines the areas affected by each Configuration Item.
* Maintains an inventory of all Configuration Items.
* Responsible for providing status reports on the configuration effort.
* Ensures that the configuration management process is executed according to the plan.
* Interfaces with the Project Manager and the Project Team.
* Plans ARV releases with the Project Manager.
* Coordinates documentation changes.

# **Configuration Management Activities**

CM guidelines provide a structure to ensure that all ARV components are documented and managed throughout the system’s life cycle. As a result, the system’s configuration must be controlled effectively to ensure that the integrity, continuity, and availability of the mission critical ARV application is maintained.

Activities necessary to achieve the CM objective include:

* Configuration Identification
* Configuration Control
* Configuration Status Accounting
* Configuration Audits and Reviews

## Configuration Identification

There are three major ARV configuration areas:

* Project Documentation
  + Project Plan
  + Quality Assurance Plan
  + User Documentation
  + Test Plans
* Software
  + Python
  + Tensorflow
* Hardware
  + Testing & Configuration Servers & Workstations

Specific items in each of these areas may be added or deleted during the ARV life cycle. This document will be modified to reflect any changes.

## Configuration Control

in the project ARV, software and hardware components can be updated and released to the general public very frequently. It is anticipated that these upgrades will be handled through the configuration control process, or configuration control board (CCB), and will be initiated by members of the project team. The introduction of new modules and functionality through ARV customization will be controlled through the change control process or CCB as well. These changes can be initiated by project team members or ARV customers.

The CCB will meet as necessary to review hardware, or ARV customer change requests.

The CCB will:

* Approve specific procedures for encouraging ARV customers to identify improvements and submit change requests
* Agree on criteria for prioritizing, evaluating, and approving or disapproving change requests
* Approve a prioritized list of changes to be made on the ARV current production version
* Set schedules for issuing each new version and ensure that each new version is adequately tested and documented before issuance.

### Criteria of approve or disapprove

Below are the criteria that CCB must take to approve or disapprove the changes:

Approve

* Have skilled human resources, and his/her/their work can be relocated on other developers.
* Have adequate infrastructure: computers, devices, servers etc.
* When the change request implies to modify the project no more than 30%
* The change request does not affect the project delivery times by 20%.
* Do not exceed the available financial resource or the change request can be absorbed by the organization.
* Do not affect multiple modules released if the change is critical.

Disapprove

* Developers with a lot of workload.
* You don't have the technology to apply the change.
* Delivery times are compromised.
* The financial resource is committed.
* The change affects critically various released modules.
* If the change request is not realistic with regards the scope, required effort.
* The performance the whole project is compromise due the change request.
* The change request implies illegitimated purposes

### Requesting Changes

Any ARV project team member or any ARV customer may request a change or correction to the system. A ARV Change Request form must be submitted the ARV Project Manager to initiate the process or a request may be submitted to the ARV support team through ARV logged as an incident. This form, or the incident in ARV, will be used to report problems, identify new or changed requirements, and log suggestions for improvement. A ARV project team member is expected to complete the ARV Change Request form and present it to the Project Manager. A ARV customer may contact a member of the project team and take one of two steps to initiate the process.

### Evaluating & Approving/Disapproving Changes

Upon receipt of a ARV Change Request form, the Project Manager will review the form for completeness, clarity, and applicability. If the form is incomplete in any way, the Project Manager will contact the submitter for clarifications. Assuming that the form is complete, the Project Manager will make an impact assessment of the change. The following is a list of impact definitions.

* **Emergency**
  + If the change is not made as soon as possible, ARV operation may be severely hampered or terminated. An emergency change request should be resolved within 24 hours.
* **Critical**
  + The impact of not making the change would significantly impact ARV , but would not suspend it’s operation. A critical change request should be resolved in 5 working days or less.
* **Routine**
  + A normal change request that can be planned, included in a current schedule or plan, and ranked among other normal actions.

For Emergency or Critical impact change requests, the Project Manager will assign the appropriate staff to the task and will inform the remainder of the project team of the situation immediately. For Routine or Deferred impact change requests, the Project Manager will present them at the next CCB meeting for discussion. The CCB may decide to approve or disapprove of the change request during the meeting, or, a project team member or members may be assigned the responsibility of researching the proposed change and reporting on system impacts. Impacts should be addressed in terms of those on the project schedule, project costs, and impact on the customers.

### Implementing Changes

After a ARV Change Request form is approved, the Project Manager will assign the appropriate technical personnel to the task. All changes to ARV will be made in the test bed environment QA. When a change has been fully tested, a schedule will be developed to implement the change in the production environment. In most cases, the change to the production environment will be completed outside of normal working hours in order to minimize the impact to the customers. The ARV Change Request form will be updated to reflect the completed status of the request.

## Configuration Status Accounting

Each configuration item, ARV will be tracked in detail. ARV customization will be tracked, at a minimum, by version number, release date, and capability. The tracking will be done by the Project and Configuration Managers.

## Configuration Audit and Reviews

Auditing verifies that configuration items reflect operational objectives and satisfy customer requirements. The ARV project team will follow a technical review process. This will include Structured Walkthroughs, In-Stage Assessments, Stage Exits, and System Acceptance.

Each of these processes are described below.

* **Structured Walkthroughs**
  + are informal meetings among the ARV project team to review and evaluate technical aspects of the application.
* **In-Stage Assessments**
  + will be conducted with a Quality Assurance (QA) consultant near the end of each project stage. This is a technical review to assure that the established project management processes are being followed effectively.
* **Stage Exits**
  + are formal meetings with a group of selected individuals to review and evaluate the current status of the project. When a stage has been successfully "exited", it indicates that all deliverables due to date have been completed, all outstanding issues have an acceptable action plan, and there is a sound plan for the remainder of the project. All approvers must provide a written position of concur/non-concur at the Stage Exit.
* **System Acceptance**
  + provides a formal basis for determining whether the system is fully operational and has satisfied customer requirements.

# **CONFIGURATION MANAGEMENT PLAN MAINTENANCE**

The Project and Configuration Managers are responsible for maintaining this plan. The plan is subject to the procedures specified in the ARV Software Quality Assurance Plan (SQAP). Under the terms of the SQAP, the CM plan is subject to review throughout the ARV life cycle, particularly during the In-Stage Assessment and Stage Exit processes. Significant changes will be made through a new version release of the plan. Minimal changes may be made through the use of page updates.

# References

[1] E. H. Bersoff, “Elements of Software Configuration Management,” IEEE Trans. Softw. Eng., vol. SE-10, no. 1, pp. 79–87, 1984.

[2] “Project 3,” pp. 1–7.

[3] S. Engineering, S. Committee, and I. Computer, IEEE Standard for Configuration Management in Systems and Software Engineering IEEE Computer Society, vol. 2012, no. March. 2012.