Requirement Analysis Document

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1   Introduction

1.1   Purpose of The System

The purpose of the system is to facilitate law enforcement processes (Police and Investigation) to let them manage and monitor different police cases. It will have also a database of people, cars, addresses, and properties, and it will support work-flow such as open/foreword cases to be special cases for investigation purposes, which will include work-flow actions such as approve and deny processes. Police cases can be incident/accident reports, or arrest reports.

1.2   Scope of The System

The scope of the system is intensively for investigative operations. It is the area where police and investigators/detectives cooperate to solve crimes or any investigative cases. The system is web based, and may include mobile application. The system will not be able to be connected to a central government database to get people records or so, at least for now, but it will provide functionalities to add/update sufficient data that is used for the investigative cycle, for example, people, cars, addresses etc. The system will have monitoring and reporting functionalities for police cases, and will provide a list of suspect criminals for a new crime based on the data that is available on the system's database. The software also should be able to apply crime prevention for youth at risk by collected and analyzing history data of a young person and the software will be able to classify that person if he/she has high probability of being a criminal in the future. The system will not handle the automatic opening cases from incoming phone calls. It does not have official court or government document printing functions, but it has case monitoring reporting printing functionality. The system will not include operations for renewing car plate license or issuing new IDs or driver licenses.

1.3   Objectives and Success Criteria of The Project

The software should at least have the basic functionalities of law enforcement system, and these basic functions are basic database driven for needed data to perform police and the investigators works. They should be able to open cases and update the investigation process by assigning group of investigators and adding and assigning tasks to the group or by individual. The progress of investigation should

also include adding activities and adding field interviews information. The system must include a proper investigative cycle workflow. Security is important in which users can login and have there privileges, permissions, and accesses. Also, the software must be able to let supervisors to manage groups of officers and investigators and set different permissions for different types of data. There should be an interface for analyzers and investigators for analyzing crimes such as visual relations graph and so on. Last thing, is an implementation of AI in two areas

1- Crime prevention for youth at risk by collected and analyzing the history of a young person and the software will be able to classify that person if he/she has high probability of being a criminal in the future

2- The software will be able to classify the criminal/s attributes based on the case inputs

1.4 Definitions, Acronyms, and Abbreviations

Officer	Controls and use most of the system functionalities.
Investigator	Solve the crimes and uses the part of the investigation in the system. His role starts when an officer assigned his name to start investigate on an investigative case
Entry	Any record in the database is an entry. For example, persons, cars, addresses, organizations are all entries
Event	Any case issues is an event such as incident reports, accident reports, and investigative cases
Relatable	Relatable is an abstract concept means that all entries and events are relatable to each other.
Relation	The relation consists of two relatables who are related to each other and a description of the relation
Investigative Case	Is the case that is been converted for an incident report to investigative case, and is for investigation process
Task	Is a task related to investigation process that is initiated to be accomplished by investigator during investigation
Activity	Activities are the process that investigators make during investigation. Activity can be evidences, developing leads, conducting interviews etc...
Permissions	All data in the system is protected with giving permissions for accessibility

Group of Investigators	A group of investigators who can work on particular case
History	Is a log of any changes happened on entries or events

1.5 References

- http://www.emich.edu/cerns/downloads/papers/PoliceStaff/Unsorted/Criminal%20Investigation%20Case%20Management.pdf
- http://www.aacounty.org/Police/RulesRegs/Sections11-16/1626ManagingCrimInvest.pdf
- https://it.ojp.gov/documents/leitsc_law_enforcement_rms_systems.pdf
- http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCEQFjAA&url=http%3A%2F%2Fkillarneyschool.ca%2Fmrsprott%2FForensic%2520Science%2FFingerprinting%2FNCIC_Fingerprint_Classification.doc&ei=7PaAVIr8Ms2xogTG7oGwAQ&usg=AFQjCNHoP9b7_yC_DV2eoz0wRssr5aECBQ&sig2=0tVNVXQ9QZL3TgfMAGdLUg&bvm=bv.81177339,d.cGU
- http://www.agnovi.com/images/Criminal_Intelligence_Database_Image.png
- http://www.agnovi.com/images/REX_Relationship_Chart.png

2   Current System

There is no stable release running for the system until now.

3   Proposed System

3.1   Overview

This section will cover three parts, functional requirements, nonfunctional requirements, and System models.

3.2   Functional Requirements

3.2.1   Must have features

- Basic core functionalities:
  - Entries and persons (race, height, age , physical description)
  - Cases
  - Crimes
  - Crime tools
- Workflow and case life cycle
  - The case is viewable for only who are involved on the case or who are given an access to it read, and write accesses should be controllable by police officer (who created the case or the supervisor) initiate the investigative case from incident report/s

- o The case is viewable for only who are involved on the case or who are given an access to it
- o Read, and write accesses should be controllable
- o Police officer (who created the case or the supervisor) initiate the investigative case from incident report/s (case status is open)
- o Police officer (who created the case or the supervisor) assign investigator to investigative case (case status is pending)
- o Investigator responds to investigative case either accept (case status is in progress) or refuse (case status is refused)
- o Investigator conduct investigation
- o Police officer (who created the case or the supervisor) or the investigator can close the case
- o The case must have due date, list of activities, and status
- o The police officer (who created the case or the supervisor) can monitor the case
- o Supervisors must be able to obtain workload information, assess all requests for new investigations, receive deadlines and reminders, and interact with investigators electronically
- o Case Monitoring
- o Supervisors monitor cases to ensure that progress is being made.
- o The information used in case monitoring includes case status and activities, both pending and overdue, and investigator case workload.
- o Supervisors must be able to obtain workload information, assess all requests for new investigations, receive deadlines and reminders, and interact with investigators electronically.
- o Conduct Investigation
- o Conducting an investigation involves following up on leads and documenting additional facts about the case. The activities associated with the investigation typically include collecting evidence, developing leads, conducting interviews and interrogations, requesting warrants, and writing supplemental reports. Each activity during this process may result in an update of the status of the investigation.
- o During the course of the investigation, the primary investigator may assign tasks to others. The system should be capable of monitoring and tracking at both the case and task levels.
- Groups handle cases
- Information locked by its author and some information can be hidden from some groups
- User Profile for users
- For new crime, give suspect criminals
- Prioritize suspected people
- Threat assessment (low, medium, high) for suspected person
- Enables roles within the process to execute their tasks and achieve requirements within the process.

- File attachment: capability to attach any type of files such as image, video, and documents.
- Show persons' history which is related to cases
- Logging: log any update or changes happened on entries and events
- Notifications: issues notifications to new assignments or reassignments
- Interview questions & witnesses
    - Exactly what occurred?
    - When did it happen?
    - Where did it happen?
    - Who was present?
    - Who else may know relevant information?
    - How did it happen?
    - Who did or said what? In what order?
    - Why did it happen? Could it have been avoided?
    - Are there notes, documents, phone messages, or other evidence?
- Analysis tool:
    - Tracks and describes the relationships among matter such as cases, people, vehicles, property, site and organizations.
    - Lie detector from text
    - Adding comments to the case
- Show map of the city and pinpoint the cases location over the map
- Reporting with graphs and filters
- User interface should be friendly and ajaxized
- Give a list of suspected persons by utilizing Artificial Neural Network for data mining in classification in particular
- Give criminal attribute if there is no person in database match
- Crime prevention for youth at risk

3.2.2 Great to have features
- Getting real data: try to get real police customer and get real sample data to work with
- Ability to chat or send messages
- Mobile version
- Client and Personnel Tracking: allows for adding, tracking and searching for an unlimited number of clients, contacts and personnel.
- Auto convert (date, location etc..) object in a written text report
- Graphical or visual analysis
- Auto generate the visual analysis from the text report
- Decision tree plugin to let investigators to build a decision tree during analysis

3.3 Nonfunctional Requirements

3.3.1 Usability
- Officers must be able to open/close investigative cases
- Officers must be able to assign investigators to investigative cases

- Investigators must be able to accept, or deny the requests
- Officers must be notified by investigator responses
- Supervisors must be able to monitor the progress of investigative cases
- Supervisors must be able to create groups of investigators
- Investigators must be able to add tasks and assign tasks to group mates
- Investigators must be able to add activities
- Users must be able to upload files and attach the upload to any entry or event

3.3.2 Reliability
- Release 2 will be tested intensively and viewed to supervisor for feedback
- ANN results will be tested using JUnit

3.3.3 Performance
- The System is web based and it will be hosted on CentOS and the webserver will be Glassfish, so the process will be efficient but since glassfish is Java application the memory consumption might be high so I need to tune the Java Garbage Collector before and after deployment for best performance

3.3.4 Supportability
- Firefox will be the only browser compatible with the system
- The users will be able to use the system even though they disable javascript
- Changing the host environment will consist of immigrating 3 things
    - Mysql database
    - Uploaded files
    - And the application WAR file

3.3.5 Implementation
- Technology is Java Enterprise Edition (J2EE)
- Using Java Server Faces (JSF) as frame work
- Using Primefaces as UI component
- Using Eclipse-Link for Java Persistence API (JPA)
- Using Glassfish as webserver

3.4 System Models

3.4.1 Scenarios
Main Scenario: The section of crime solving in police department got a new case that a strange man has been killed in downtown. The officer issued a new investigative case in the system and wrote the incident details. Then the supervisor who is taking care of this case open the case page and sent two requests to two investigators by clicking on request investigator. The system opened a window and list investigators names and he select investigators A and B and clicked on send. Investigator A got a notification that there is a new investigative case request sent to him. He replayed by clicking accept button. However, investigator B was so busy and clicked on reject button. The supervisor got the two replies and he will keep monitoring the investigator A's progress on this case. The investigator's friend is

also interesting to work with this case so the investigator created a group of investigators and sent a request to his friend as will to be enrolled into the group. Both are registered on the system already. Then, they created some tasks and everyone has been assigned to his tasks. They did some interviews and had some pictures. At the end of the day they upload the photos they took to the case and added the activities they did such as the interviews details and evidences. The investigator used the system to generate a visualization of the case and the system generated a relationship graph of the case. The other investigator was working on decision tree using the system and they still could not do anymore progress. Then they decided to check the give suspect persons feature in the system. The system provided some people names that are suspected to be committed in this crime. They did further investigation and finally they have sufficient evidence against person Z. Then the court decided that this person is guilty. Finally, the case has been closed.
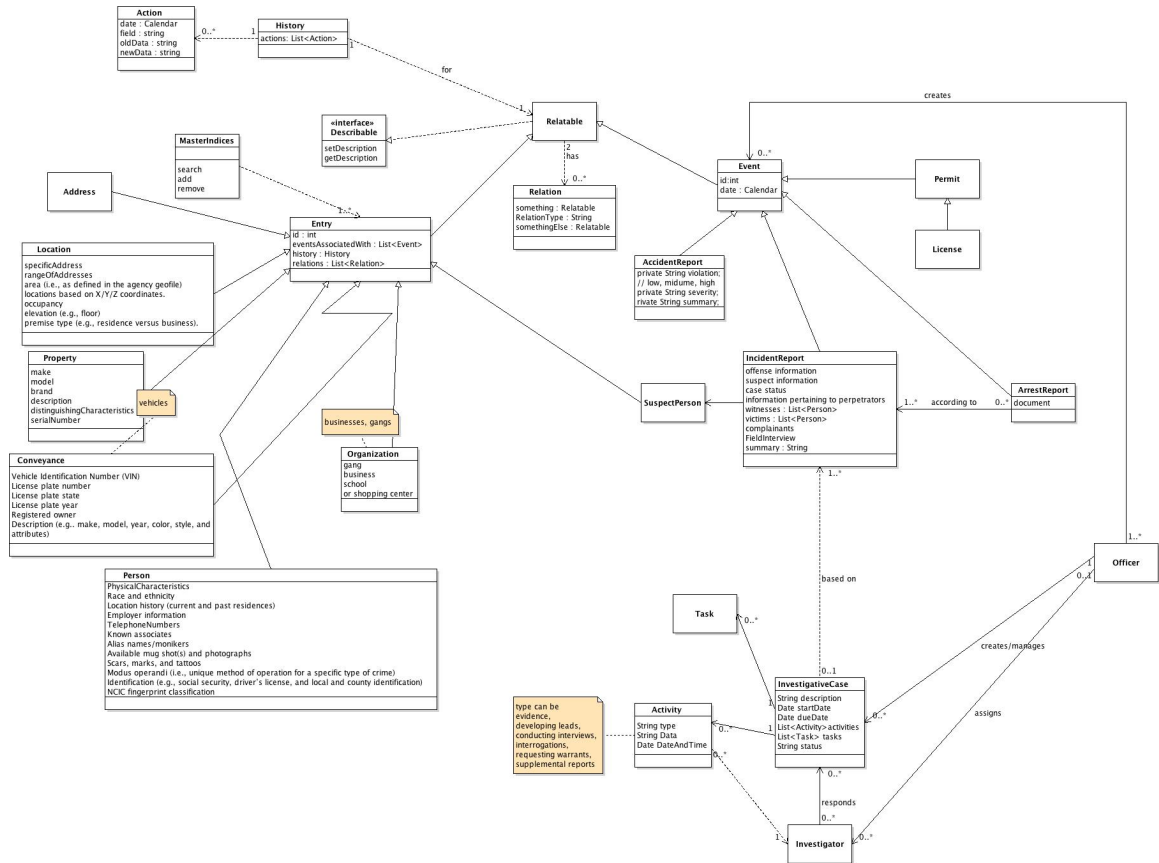
3.4.2   Use Case Model

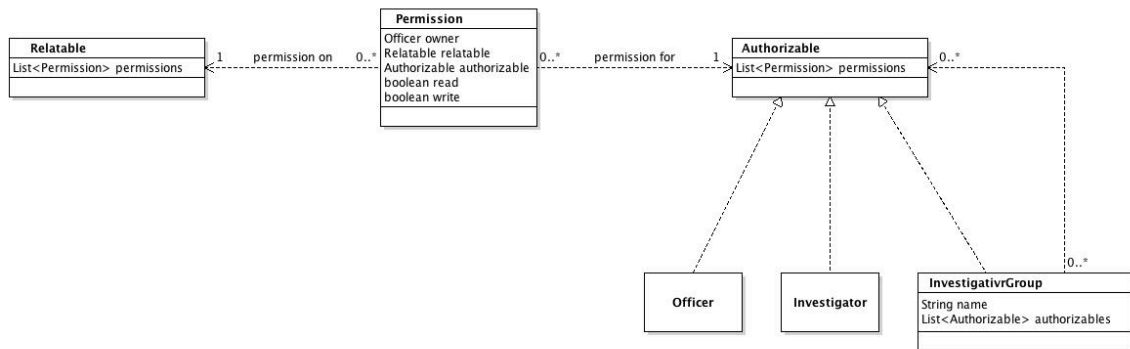| Name:	Uploading files to the investigative case
Actor:	Investigator
Entry Conditions:	The investigative case already initiated and in open state and the investigator is already assigned to this case
Flow of Events:	1. He opens the system and then opens his profile 2. He clicks on the case he wants to update among list of cases 3. He clicks on attach files or photos button 4. System opens the upload page and he uploads the files 5. System redirects him to the case and shows the new files are uploaded
Exit Conditions:	The investigative case is in open state

Name:	Updating the investigative case
Actor:	Investigator
Entry Conditions:	The investigative case already initiated and in open state and the investigator is already assigned to this case
Flow of Events:	1. He opens the system and then opens his profile 2. He clicks on the case he wants to update among list of cases 3. He clicks on the task he wants to update among list of tasks 4. He clicks on add activity 5. System opens the activity page and he fills up the activity fields and enters the details 6. System redirects him to the case and shows the new activity is added
Exit Conditions:	The investigative case is in open state

3.4.3 Object Model

3.4.3.1 Core Functionalities

3.4.3.2 Permissions

4 Glossary

Officer
Controls and use most of the system functionalities.

Investigator
Solve the crimes and uses the part of the investigation in the system. His role starts when an officer assigned his name to start investigate on an investigative case

Supervisor
Is an officer who has privileges

Event
Any case issues is an event such as incident reports, accident reports, and investigative cases

Investigative Case
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Is a task related to investigation process that is initiated to be accomplished by investigator during investigation

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Decision Tree
It is a graphical model looks like a tree to analyze a certain issue. For Example, it start with question such as was the crime happened on the morning or at nighttime? If on the morning there would be different questions, and if it

	happened at the nighttime then the analysis will differ. The next question will depend on the current state of the analyses.
Release	It is a usable software that is not have all functionalities yet except the last release
User Story	Is a generic phrase that describe a feature to be done on the software
Class diagram	A graphical model that shows a set of system or problem domain classes and their relationships.
Class	An object model represents a real word object. Officer, Person, Car, Address, and Investigative Case all can be represented as classes
Actor	A person, or a system that in process to achieve a goal