

## An Integration Framework for Police Blotter using Semantic Web

### Current State of Art:

Police Blotter is the daily written record of events (as arrests) in a police station which is released by every police station. These records are available publicly on the web which provides us wealth of information for analyzing the crime patterns across multiple jurisdictions. The Police Blotters are available to public or between police departments are generated from legacy systems and may also be published as web documents. There are major challenges that a police officer would face when he wants to analyze different police blotters to study a pattern (e.g., a spatial-temporal activity pattern) or trail of events. There is no way a police officer can pose a query where query will be handled by considering more than one distributed police blotters on the fly. With the advance of web 2.0 , there are some mashups of Google Maps with police blotters of some counties. There is not a cohesive tool for the police officer to view the blotters from different counties , interact and visualize the trail of crimes and generate analysis reports. The Blotters can currently searched only by keyword through current tools and does not allow conceptual search, and fails to identify spatial – temporal patterns and connect various dots/pieces. Therefore, we need a tool that will integrate distributed multiple police blotters, extract semantic information from a police blotter and provide seamless framework for queries with multiple granularities.

### Motivating Scenario:

Police Blotters are available from legacy based systems which causes the data integration problems . The Blotters may come in different data formats like HTML, PDF. Semantic Web Service Interface provides us with the capability to integrate these varied data formats and semi automate the process of integrating different data sources for an unified view. Also the information regarding the crime reported through police blotters are in format not cohesive for machine to interpret for drawing inferences and assertions which are necessary for a scenario mentioned below.

Here we consider the real event that occurred very recently “The Shootings at Virginia Tech” which has raised again the consideration of robust emergency response tools in the hands of the Police to take actions and handle the emergencies. Police blotters of a university crime are available with different University Police departments, and also the blotters from counties of major City like Dallas [1] needs to have an efficient way to integrate the information to analyze the patterns and produce a trail of similar events that help to catch the suspect faster/quickly.

We need to develop a tool that will facilitate the following tasks.

### Task 1: Semantic Search Browser for Police Blotters:

To Provide a Semantic Level Browser that integrates the blotters from various counties or by geographic regions which provides an interface to the police office to query to get information with different input criteria like (a) by Crime Types (e.g., rape case) (b) By

Time Period (e.g., in the first week of April 2007) (c) By Suspect Personal information (e.g., crime activity of Mr. X) (d) by geographical region using Zip Codes, City (e.g., list all sex offenders in City of Dallas). We have already developed a semantic framework DAGIS which can handle queries of this nature. The Blotters will be exposed through Web Services for general input criteria and Semantic Web Services of these exposed web services will provide the capability to do more conceptual searches and dynamically compose services on the fly to handle various complex queries. Therefore, integration problem of multiple police blotters will be addressed. In addition, this solves semantic heterogeneities across blotters and provides an automated discovery of knowledge.

#### Task 2: Tools for Generating Crime Analysis Concepts from Blotters

Information available in the blotters would be mined by developing using Data Mining tools which would be used to generate the concepts that would be mapped to build an Ontology for Crime Analysis across multi-jurisdictions. These tools will also be exposed as Semantic Web services and can be integrated with the Semantic Search browser developed in Task 1. In DAGIS we have developed OWL-S based semantic web service for the ClearForest Text Mining Semantic Web Services[3]. In future, we would like to develop techniques that will generate semantic representation of concepts and their relationship given a police blotter report.

#### Task 3: Map based Visualizing Tools and Semantic Dashboard

Current blotters are usually text based with some overlay (e.g., Map mash up) but there is no visualizing tool that provides a trail of crimes occurred according to the search criteria (i.e, fail to connect dots). However, if we can connect these dots using some visualization tool, the Officer will be able to make decisions quickly and efficiently during emergencies. We would like to develop a Map based Visualizing display for overlaying the results of the blotter search and the analysis. This output of display will be a semantic dashboard like wiki based pages.

#### Datasets Available:

1. Police Blotters for Dallas County available online <http://www.dallasnews.com/sharedcontent/dws/news/city/collin/blotter/vitindex.html>
2. Semantic Access Ontology, GRDF Ontology, Geospatial Services Ontology.
3. ClearForest Semantic Web Services for Text Mining and Analysis: <http://sws.clearforest.com/ws/sws.asmx?wsdl>