WebCAT : Web-Based Crime Analysis Toolkit

Semester Report
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Prepared for:

Team GeoMedia Registered Research Laboratory Program

WebCAT Team:
Calvin Francis
Justin Pittman
Frank Prats
Charles Hawkins
Ted Wheeler

Advisors:
Dr. Donald Brown
Mr. Jason Dalton

University of Virginia
School of Engineering & Applied Science
Department of Systems & Information Engineering
Executive Summary

In response to the need for an online crime analysis application, a 2001-2002 Capstone team created Web-Based Crime Analysis Toolkit (WeBCAT). The team designed WebCAT to provide Virginia law enforcement a tool for performing spatial and temporal analysis on criminal incident data. WebCAT includes a Geographical Information System (GIS), an XML driven Database Management System (DBMS), and some analytical tools. Some components are not fully functional and operational.

The current 2002-2003 Capstone team has sought to further WebCAT by improving existing features, implementing new features and taking a systems engineering approach to constructing an optimal system for the client, the Virginia Department of Criminal Justice Services. The team has advanced the design and scope of WebCAT and hopes to complete the new version by the end of the next semester. Much research has gone into researching database and mapping technologies in order to make WebCAT function more effectively.

The team has performed preliminary work on the system and interacted with various software companies in this semester with the goal of making WebCAT a viable option for crime analysts in Virginia. Some accomplishments so far include the creation of a login page (firewall), user accounts, the formulation of a survey to members of the Virginia Crime Analyst Network (VCAN), and the selection of either MapServer or Intergraph’s GeoMedia as the software of choice for the GIS. The team will use this in their implementation of the system next semester.
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Introduction

As technology has evolved law enforcement departments have become able to collect and store vast amounts of criminal incident data. Currently, most agencies use customized software to store, display and in some cases perform analysis on the data. However, many of these applications are difficult to implement and maintain. There are also issues involving compatibility of the data with the software and the sharing of data and tools across jurisdiction borders. As such, the idea of a centralized data storage and analysis system has attracted local and state jurisdictions. Some applications that have been designed to address these issues include ReCAP (Regional Crime Analysis Program), CARV (Crime Analysis and Reporting for Virginia), and Memex.

There is a current need for a widely available crime analysis system that can consolidate the way law enforcement agencies interpret and analyze data. Many keep records on crimes that just sit idle in files, being of little help to investigators and analysts. Instead, by taking this data and creating a dynamic tool that stores this information in a database, law enforcement agencies can gain valuable information in seeing patterns in crime data. This would allow them to respond more quickly to trends that they might not have otherwise seen.

A 2001-2002 Capstone team generated WebCAT, a Web-Based Crime Analysis Tool. The current 2002-2003 Capstone team hopes to improve this application over the course of the year through the addition of online mapping capability and an XML database with querying capability. Such capabilities can be made available to law enforcement agencies at an inexpensive cost. The initial users of the improved WebCAT system will be the Mountain Empire region in Virginia, and San Diego County, California. The current Capstone team is working for the Virginia Department of Criminal Justice Services in creating a web environment featuring tools capable of performing practical criminal data analysis. Such a tool could potentially play a large role in the centralization of crime analysis in the state of Virginia and thereby save individual departments from investing time and effort into developing their own systems.
Problem Statement

WebCAT allows users to upload a dataset and provides a platform for querying, generating reports, mapping the data, and performing statistical analysis to aid law enforcement in performing analyses.

Currently, users cannot take advantage of all of the features of WebCAT. The GIS application, which uses ArcIMS was deemed to be infeasible due to licensing restrictions and cost. Data cannot be manipulated, that is users cannot query, search, and sort through data sets. In addition, the report capabilities, control chart and time chart, are not fully operational. Finally, WebCAT has no security features or user profiles, thus allowing all users to access and save files to the server.

Proposed Solution

The completed WebCAT system hopes to solve many of the problems currently faced by crime analysts. WebCAT will still be a free crime analysis application requiring no installation. WebCAT will be a fully functional system that allows users to perform
extensive crime analysis using their own criminal incident data. The control chart and time chart functions will dynamically analyze user files that have either been created or uploaded into the system. Also, a dynamic mapping application will be fully implemented using either MapServer or Intergraph’s GeoMedia. In addition, a querying capability will be implemented to allow users to find specific crime data types within their files. Security issues will be addressed by requiring users to login before using the system. Upon login, individual users will be able to save crime data files onto the server for later use and share data with other jurisdictions, which they have access rights to.

The Needs of Crime Analysts

In order to understand the current needs of Virginia (and national) crime analysts, the team has developed an online survey that contains questions regarding criminal analysis issues within respective jurisdictions (see Appendix B). This survey asks crime analysts questions such as what type of database they use to store criminal incident data, the methods and software used for statistical and spatial analysis of this data, and problem areas of their current system. The team has posted the survey on the Virginia Crime Analysts Network (VCAN) homepage and thus far has received 8 responses. In order to receive more responses from crime analysts the team is considering attending a VCAN meeting and passing out the survey. Also, we have found a web site, www.officer.com, which displays contact information for law enforcement agencies in every state. This resource will allow us to send our survey to agencies around the nation. The team will continue to compile the data received from these surveys as responses are received. With this survey, our team hopes to gain a better understanding of what problems crime analysts currently encounter when performing criminal analysis and then design a more suitable application that addresses these needs and shortcomings of past designs.
Overview of the Current System

WebCAT (v1.0) is an online crime analysis tool developed for Virginia law enforcement. The system allows users to upload data for geographical, spatial, and temporal analysis. It consists of three main parts – a Database Management System (DBMS), Geographical Information System (GIS) and analytical tools. Additionally, WebCAT includes reporting capabilities not yet fully integrated.

The system was implemented using Microsoft Visual Interdev as the development platform. Active server page (asp) and VBScript were used to build the web pages, ESRI ArcIMS to build the GIS tools, and XML to store, transfer and access the crime data sets.

WebCAT possesses many advantages over most current desktop crime applications. It can be accessed from multiple computers (simultaneously) and from anywhere in the world. With the availability of email and the Internet, crime data files and results can be shared, sent and received between jurisdictions faster than by mail. WebCAT is cost efficient because it is installed and housed on one computer – the server. Upgrades can therefore be performed faster because only one computer houses the application. Finally, WebCAT’s performance depends on only two user factors – Internet connectivity speed and browser edition (Netscape 6.0, Netscape 3.0).

There are some disadvantages to the current WebCAT application. The DBMS does not allow users to store and manipulate data sets on the server. As such, users must always upload data sets before using the system. Also, WebCAT uploads large files slowly. This problem is most apparent when the user uses a modem to download a file (a 800 KB file could take upwards of 5 minutes). Since data must be uploaded every time WebCAT is accessed, uploading large files each time makes using WebCAT somewhat ineffective. Another existing problem is that the current GIS component does not interact and perform very effectively, due to complication in communication between ArcIMS, VBScript and ASP.
Goals, Objectives, and Metrics

Goals

The group will use the following goals tree to blueprint and evaluate the progression and success of the WebCAT system. Each main goal will be approached via a bottom-up approach by ensuring each lower level goal is met before the higher levels are considered complete.

**Figure 2**: Goals tree diagram.
Sub goals can be found in Appendix A

Objectives

The objective of the team is to meet the above goals by maximizing the values of the metrics set in each goal. The metrics are listed after each goal in italics. Once again, a main goal will only be completed if each sub goal’s metric is sufficiently satisfied.

Metrics

- **Cost** – Cost represents the monetary value needed for each goal. The main goal of cost is to minimize the amount of money needed to implement the system in order to ensure a free product for the client. Cost will be measured in dollars.

- **Ease of implementation** – Represents the feasibility of the group completing a complex problem in the timeframe allocated. This metric will be measured by the amount of time it takes to code and implement the given component of the system.
- **Ease of Use** – The group wants to ensure that all users, no matter what their level of expertise, can manipulate and understand the product. This metric will be measured by performing usability tests with people that have various levels of experience using such products.

- **Speed** – Measures the relative speed of the software versus a standard set via surveying and experimentation. For this metric, we will run tests on transfer times to see how long it takes to load and spatially display criminal incident data. We will compare these results with feedback from the VCAN survey responses we receive.

- **Accuracy** – The group wants to ensure that all returned queries and calculations are free of error and accurate while maintaining efficiency. This metric will be measured by testing the number of valid queries or calculations that fail versus the number of invalid queries or calculations that pass.

- **Maintenance** – The group wants to lower overall cost of system by ensuring easy upgrades and debugging by developers and users.

- **Flexibility** – The group would like to provide components of the system that can be easily integrated with the product as a whole. This will be measured using past research on the various products the team is trying to implement and the time it takes to integrate the various components with one another.
Proposed Design

Login Implementation

One of the disadvantages of WebCAT v1.0 is that there are no security features protecting the server from online users. All users accessing the site have permission to upload files to the server for analysis. Even more dangerous is the fact that uploaded files are not checked for viruses, file type and compatibility. This major security flaw allows users to upload destructive files thus compromising the application files and server.

The solution we proposed to address this problem was to design a login page to authenticate users. The page was designed using XML and VBScript for cost effectiveness, and to maintain WebCAT file similarity and consistency.

All WebCAT files are now hidden behind a VBScript firewall. That is every time a user accesses WebCAT or a WebCAT component, a VBScript code (located at the top of all WebCAT pages) checks to see if the user has logged into the application. If the user is found to have logged on, the code allows the user to view the contents of the page, else the user is automatically redirected to the WebCAT login page (fig. 1). The login page now allows only authorized users to upload files to the server.

![WebCAT login page](image)

**Figure 3:** WebCAT login page

We designed an administrative web page that allows WebCAT developers/administrators to add usernames and passwords to an XML file. This XML file is accessed each time a user submits a username and password. Although this page is to be used and accessed by only WebCAT administrators, it currently resides online (hidden deep in a file directory).
After submitting a username and password (case sensitive), VBScript compares the two data values with all the usernames and passwords in the administrator defined XML file. If validated, the user is redirected to the WebCAT main page, else the user is redirected back to the login page. After validation, all WebCAT pages remain accessible for as long as the user session is valid (i.e. for as long as the browser is open).

GIS-Based Mapping Application

Last year’s WebCAT team implemented a mapping application within WebCAT using ArcIMS. The current mapping function is far from being fully functional. This application does not yet dynamically display criminal incident data sets that the user uploads or creates. However, the user can query the static data set by searching by crime identification number, criminal’s first name, criminal’s last name, and location of the crime. The following screenshot shows the current mapping application being used within WebCAT.
ArcIMS was developed by the GIS Company ESRI, and is powerful, scalable and easy to use. Also, the Systems Engineering Department at the University of Virginia has already purchased a license, which will allow us to continue to work with this software. The main disadvantage of this software arises from its cost. Although we have a license to work with this application, law enforcement agencies that use WebCAT would have to purchase their own license for ArcIMS in order to use the mapping application. Since one of the main goals of this project is to offer agencies with a free crime analysis tool, we will discontinue the use of this application. For this reason, the WebCAT team spent this semester investigating other available mapping applications that are efficient yet inexpensive.

**JMap**

The first mapping application our team began to evaluate was JMap, which is a Java-based mapping application that can be used to display geo-referenced data with a web browser. JMap was developed by Kheops Technologies, Inc. This program features characteristics such as cross-platform executability as well as the use of a vector format for the client-side view of geographical data. The following figure is a screenshot of JMap within a web browser.

![Figure 5: Screenshot of City of Montreal in JMap](image)

Upon contacting Kheops Technologies, we ran into problems when trying to negotiate a contract to use JMap for free. The contract stated that we could not use their product in the interest of a third party. However, law enforcement agencies will be using WebCAT and therefore would be violating the contract. Due to these problems, our team decided not to implement JMap as WebCAT’s dynamic mapping application.
**Intergraph**

Another product being considered by our team is GeoMedia WebMap Professional, which was developed by Intergraph. This product is a Web-based map visualization and analysis application that is very easy to use and set up. GeoMedia WebMap already has built in analysis algorithms. The user can perform proximity analysis, which in our case would show crimes that occur within a specific distance of one another. Also, this application allows the user to query data in its native format without translation and conversion. The following screenshot is demo version of GeoMedia WebMap.

![Screenshot of GeoMedia WebMap Demo](image)

**Figure 6: Screenshot of GeoMedia WebMap Demo**

This product also involves issues with cost. Again, each agency that uses WebCAT would have to purchase the necessary Intergraph products to use our mapping application. However, Intergraph recognizes the importance of close collaboration between academic and commercial communities to further develop and implement GIS applications within society. In order to achieve this collaboration, Intergraph has developed the Team GeoMedia Registered Research Laboratory Program. This program will allow the University of Virginia to receive all of Intergraph’s products for free to be used for continued development and design of GIS applications. Our team will be able to further study the capabilities of GIS applications by using Intergraph’s software products received through this program.

**MapServer**

MapServer was developed by the University of Minnesota and is not a fully functional GIS application. Therefore, this application will require a great deal more of hard coding than other applications. We will need to implement most of the tools and function we want to include within MapServer. However, the big advantage of this mapping application over others that have been researched and evaluated is the fact that it is completely free. As a result, our team will be able to develop a mapping application
within WebCAT tailored specifically to our needs that can be used by any law enforcement agency for no cost.

A member of our team, Frank Prats, spent this past summer developing and implementing MapServer. Currently, the application displays a map on the web and can also read and spatially display criminal incident data onto the specified map. The following screenshots show the current capabilities of MapServer developed by Frank.

![Map of Virginia Using MapServer](image1.png)

**Figure 7:** Map of Virginia Using MapServer

The above figure shows the general interface of MapServer. Currently, the user can choose a map to display and use tools to zoom in, zoom out, and pan. The user can also select the specific layers of the map that he wishes to display such as lakes and roads.

![Static Test for Reading in XML Data](image2.png)

**Figure 8:** Static Test for Reading in XML Data
The above figure shows MapServer reading and spatially displaying criminal incident data in XML format. Currently, this function is static and no map is displayed along with the data.

Next semester, the team plans on completing the implementation of MapServer or Intergraph’s GeoMedia within WebCAT. The team will implement clustering algorithms using hot spot analysis. With this function, users will be able to determine areas of their jurisdiction in which crime is highly concentrated. Also, the team is looking at other types of data that could be read into the dynamic mapping application such as population density and economic status of a given area. These types of data will help law enforcement determine what factors may be causing higher crime rates in a given location. The team will also implement a querying function within the mapping application. This function will allow users to find specific criminal incidents within their jurisdiction based on many factors such as crime identification number, criminal’s name, victim’s name, location, and the date the crime occurred. For example, the user would be able to enter a criminal’s last name, and then all crimes committed by this individual would be displayed on the map.
The Importance of XML

The 2001-2002 WebCAT Capstone group made an excellent choice in implementing eXensible Markup Language (XML) as WebCAT’s underlying data structure. The main benefits of this structure include that:

1. XML is **flexible**. XML allows the author to define his or her own data element tags and document structure. This aspect of XML allows users to implement a data structure that better fits their needs. More importantly, this flexible structure allows easy access to information WebCAT’s functions require.

2. XML is **non-proprietary**. No one owns XML; it is an open source data structure available for anyone’s use. This benefit is in tune with our goal to provide law enforcement agencies a low-cost statistical tool.

3. XML is **universal**. Because of its other readily identifiable benefits, many software vendors have incorporated XML into their designs. As a result, XML is cross-platform and can be manipulated by nearly any programming language on the market—particularly web programming languages like VBScript and JavaScript.

**XML Database Functions**

All of WebCAT's major functions read data contained in XML documents. As a logical extension of the benefits of XML and the information management needs of law enforcement agencies, integrating an XML database into the application is a top priority. Such a database serves two important functions:

1. **Security and Administration** – Like businesses, law enforcement agencies need to protect the data they collect and process. Access to data and functionality is largely a function of administrative status (i.e., the higher one’s status, the more access one has to data and functionality). WebCAT’s database should support these aspects of information management using some hierarchy of user profiles and privileges.

2. **Usability** – WebCAT should support analysis and information management on a continuous basis with respect to each eligible user. That is, a user’s identity, privileges, and work should survive every user session. WebCAT’s database should:
   
   a. Recognize, through some controlled login procedure, a user to whom access to WebCAT has been granted
   b. Recognize, through some administrator-controlled profile, a user’s privileges
   c. Save user files and user information in a protected directory dedicated to the user
d. Save shared user files and information in a protected directory dedicated to a group of users

e. Support the deletion of files, through some administrator-controlled procedure, whereby a user can dispose of irrelevant, outdated, or unusable work

f. Support the invocation of WebCAT functions on files saved in user or group directories (i.e., querying, spatial analysis, reports, etc.)

Stated another way, from a user perspective, WebCAT’s database should incorporate the following questions and answers into its design:

- Does the system remember who I am (name, position, status, privileges, date of last login)?
- Does the system allow me to save/delete my files at my discretion?
- Do my work and relevant files survive a session (when I log off, then log on again)?
- Are my user account and user profile protected from other users by some password that I can change at my discretion?
- As an administrator, do I have more access privileges than a lower level analyst?

An XML database would greatly improve WebCAT, as its inclusion in the application provides a firm basis for information analysis and sharing across jurisdictions using one of the most robust data structures on the market.
Database Design Alternatives

Tamino XML Server

Software AG’s Tamino XML Server is the leading candidate for the XML database component, not only because it provides support for the aforementioned functions, it also translates information from a relational structure into a hierarchal (XML) structure. This translation functionality may have far-reaching benefits for law enforcement agencies nationwide. Currently, different law enforcement agencies employ different database management systems (DBMS) that support the collection and organization of criminal incident data. Providing translation into an XML structure from a variety of Database Management Systems (DBMS) is essential for:

1. Making WebCAT available for use by all law enforcement agencies, regardless of size and jurisdiction
2. Lowering crime by providing a common component capable of facilitating information sharing and analysis across jurisdictions

The inherent problem in relying on Tamino XML Server (or any other proprietary software, for that matter) is its potential cost over both the short and long term. From our experience in evaluating software components, software vendors exhibit little resistance in allowing us to procure and evaluate their products, but indicate that should we choose to implement their technology for a third party (law enforcement jurisdictions, in this case), each jurisdiction would have to purchase a license agreement. This problem is a fundamental obstacle to our goal of providing WebCAT to jurisdictions at a low cost.

Developing such software also detracts from the amount of time necessary to pursue alternative, less costly solutions. However, developing Tamino XML Server may still be worthwhile, as some law enforcement agencies may be able to afford the software. Also, we could possibly coordinate jurisdictions to enter license agreements together to defray costs.

Presently, we have applied for a research license agreement to procure and evaluate Tamino XML Server and expect to follow through with an evaluation at the outset of next semester.

Active Server Pages: The ‘Do-It-Yourself’ Alternative

In the event we are unable to procure a software solution to WebCAT’s need for an XML database, we can still simulate the presence of an XML database and its desired functionality. We will draw from the general construct that the database simply allows pertinent user information to survive a web session. Using extensive applications of a Visual Basic File System Object (FSO), we could use Active Server Pages (ASP) to provide runtime support for our necessary functions. For example, we could create the necessary files and folders to support user accounts, as previously discussed. We have
already had success with ASP and FSOs in reading data from an XML document to
dynamically write and display files essential to spatial analysis. Expanding this
application of ASP and FSOs to include essential functions provided by an XML
database is possible.

The disadvantage here is that a large amount of time is necessary to implement,
integrate and test such functionality, as opposed to simply procuring a software
component like XML Server that already supports such functionality. Another
disadvantage here is that we would have to customize translation from DBMS relational
data structures on a case-by-case basis. The advantage is low cost. Like XML, ASP is
available to anyone who wants to use it.

**Querying**

The group also investigated the feasibility of incorporating QuiP, another product
from Software AG. QuiP is a prototype of XQuery, the standardized W3C XML Query
language. XQuery is designed to allow for querying of a wide range of data, whether it is
physically represented in XML form or not. QuiP is a platform designed to help the user
easily work with XQuery. After preliminary investigation of QuiP and testing, it appears
that its feasibility in WebCAT may be limited. Integrating QuiP into WebCAT will
present a number of problems; therefore another means of XML-based querying will
most likely be implemented.
Improvement of the GUI

A number of changes have been proposed to the graphical user interface (GUI). First, the team would like to add content to the various links on the left hand side of the webpage. The link for “Importing Files” brings the user to a helpful page. However, the links for “Using WebCAT”, “Description of Functions”, “WebCAT Demonstration”, and “ReCAP” are not functional and send the user to the University of Virginia’s Department of Systems Engineering Home Page. The team has begun to design and supplement these links as appropriate. In addition, the team would like to create a frequently asked questions page in order to provide information to those not familiar with the project, or potential users researching WebCAT features for the first time. The FAQ page would likely be placed in a prominent position and should be a helpful link.

Another redesign would be a better, more descriptive home page. The team is researching a new banner and design of the website in order to make it more appealing and user friendly. Also, a redesign of the layout of the website and the paths taken by the user is underway. The hope here is to streamline the system with regards to the user. The team hopes to fully evaluate the website in the coming semester, by conducting usability tests.
Overview of Next Semester

By the start of next semester, the team plans to have chosen the main software to be used in the development of WebCAT (GeoMedia/Mapserver). Once this goal is met, the group will begin the actual implementation and testing of the system. Following systems methodology, the group will iteratively identify and remedy problems while ensuring maximum usability via user testing. The group will apply these methods in the completion of the XML database and dynamic GIS. In doing so, the group will have a fully functional and dynamic XML database, capable of querying data and displaying it graphically for the purpose of clustering and hotspot analysis. Additionally, the group plans to have a fully functional security system in place in order to ensure integrity. Furthermore, the group will use responses from the VCAN network to aid in the assessment of metrics in order to ensure universal functionality of the WebCAT system.

During the design process, the group will also employ graphic design principles in order to ensure maximum usability. The additional use of Eyegaze Response Interface Computer Aid System (ERICA) will help the team assess the success of user interaction by judging which features stand out the most to the average client. Further usability tests will be conducted in order to maximize the main metrics outlined in the paper.

Following the aforementioned plan for next semester, the group plans to meet its goal of providing an affordable, efficient and ergonomic web environment featuring tools capable of performing criminal data analysis.
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Appendix A – Goals Tree

Main Goal: Aid DCJS and law enforcement agencies in their efforts to create safer communities by supplementing the existing WebCAT system.

1. Supplement a web environment featuring tools capable of performing criminal data analysis
   1.1. Develop XML-driven criminal data analysis
      1.1.1. Verify choice of XML technology [Cost - Free/Low, Ease of Implementation - time it takes to implement, Ease of Use - ability of users possessing different levels of experience to use technology]
      1.1.2. Allow users to convert relational data into XML [Speed - determine the time in seconds it takes for a user to convert sample files of relational data into XML]
      1.1.3. Allow users to query datasets [Accuracy - determine if the query returns the correct information for a given query]
      1.1.4. Make time chart and control chart perform dynamic crime analysis
         1.1.4.1. Supplement and improve existing code
            1.1.4.1.1. Review current WebCAT code
            1.1.4.1.2. Fix existing bugs
            1.1.4.1.3. Streamline code
   1.2. Allow users to be uniquely identified through separate, secure accounts
      1.2.1. Log-in & password [Test number of valid logins that fail vs. number of invalid logins that pass]
      1.2.2. Space on the server
         1.2.2.1. Storage of applicable files [Amount of server space - determine how much space should be allocated to each user, Determine if non-applicable file types are being saved, Speed - determine whether server speed dramatically decreases with the number of files being stored]
   1.3. Allow users to view a map display from a dataset with spatial or geographical attributes
      1.3.1. Integrate the web mapping application to provide basic GIS functionality
         1.3.1.1. Properly read and dynamically display spatial datasets [Speed - how many seconds it takes to display map w/ data, Accuracy - whether or not data points are displayed in correct location]
         1.3.1.2. Develop mapping tools for Pointer, Zoom In, Zoom Out, Pan, Full View, Radius and Rectangle Select, View Legend, Print, Select Layers [Accuracy - determine if tools do what they are supposed to by running tests with sample maps]
         1.3.1.3. Implement appropriate web mapping platform
            1.3.1.3.1. Evaluate free web mapping applications [Cost - low/free, Ease of Implementation - amount of coding/communication w/database, Number of analysis tools already built in]
1.3.1.4. Develop spatial analysis tools that use clustering, hot spot, and point pattern analysis [Speed - determine how long in seconds it takes for system to display criminal incident data using these types of spatial analysis, Accuracy - determine if data is displayed correctly]

2. Provide a web environment that is user-friendly

2.1. Analyze the skills/needs of the user population

2.1.1. Identify the user population

2.1.2. Use VCAN to get ideas/suggestions from crime analysts [Develop questionnaires to determine how to design WebCAT to fit the needs of crime analysts, Compare shortcoming of past crime analysis applications with recommendations received from VCAN]

2.2. Tailor the website to this user population

2.2.1. Usability testing and analysis [Use ERICA to determine eye movements and number of mouse clicks it takes users to complete a given task]

2.3. Provide help tools

2.3.1. Explanation of functions [Ease of Understanding - let first time users read explanations and determine if they accurately understand what various functions do]

2.3.2. Links to UVA homepage, Contact, etc. [Accuracy - determine if user is taken to correct web page when clicking certain link]

3. Provide a web environment with general applicability to law enforcement agencies nationally

3.1. Research applicability of WebCAT to enforcement agencies nationally

3.1.1. San Diego, other jurisdictions

3.1.1.1. Determine popular DBMS types in use [Type of Use - determine which methods are most common among different agencies]

3.1.1.2. Determine popular file types in use [Type of Use - determine which methods are most common among different agencies]

3.1.1.3. Determine criminal incident reporting methods [Type of Use - determine which methods are most common among different agencies]

3.1.2. Continue research into web mapping applications [Cost - Free/Low, Ease of Implementation - amount of coding/communication w/ database]

3.2. Promote WebCAT to enforcement agencies nationally

Develop a promotion package [Free/Low Cost, Ease of Use, Flexibility, Low Maintenance]
Appendix B – VCAN Survey

Agency: 
Location: 

How does your agency/department collect criminal incident data?

- Written Forms
- Wireless Transfer
- Mobile Data Forms

What records management system does your agency/department use to organize and store criminal incident data?

If stored in a database, what is the name and type of the database that your agency/department uses?

What database program does your system use to store your data (i.e. mainframe, SQL server)?

If statistical analysis is performed, what methods and software does your agency/department use for this analysis?
If geographical analysis is performed, what methods and software does your agency/department use for this analysis?

What are approximate transfer times for loading and spatially displaying data?

List problem areas of the current system in use.