Roadkill Reporter Specifications

6/8/2011

Our goal is to build a **functional**, **easy to use**, **esthetically pleasing** reporting system for animal-vehicle collisions data.

1. Smartphone Application (Roadkill Reporter)

The Roadkill Reporter application will be used by UDWR and UDOT personnel to report animal carcass locations throughout Utah. It will be compatible with the Apple IPhone and the Google Android**.** The specifics of how it should function are described below.

I. ***Instruction Screen:*** When the user clicks on the Roadkill Reporter app icon, an instruction screen will pop up that describes how to use the app. The bottom of the screen will have a button to proceed if the user wants to report an animal carcass.

II. ***Report Form Screen:*** Once the user proceeds past the instruction screen, a report form will pop up. We need the smartphone app to collect several pieces of information, some of which will be entered into the report form on the smartphone screen by the user and some of which will be generated by the app automatically.

App generated information:

A. Location Coordinates: The app will retrieve lat/long coordinates from the smartphone GPS. This can be done in the background and does not have to be displayed on the smartphone screen.

B. Coordinate System: The app will record the coordinate system that the GPS is using (e.g. lat/long degree decimal minutes). This can also be done in the background. We also need to have columns in the database that contain UTM coordinates (NAD 83) for each location. This conversion can take place anytime, and does not have to be done by the app, but the UTMs need to in the final database.

C. Location Error: The app will retrieve the spatial accuracy of each location. For instance, Garmin GPS equipment provides an accuracy estimate (e.g. +/- 12 ft.). If this information is available in the smartphone GPS, we would like to get it. This can be done in the background.

D. Date: The app will record the date the information is entered. This can be done in the background.

E. Time: The app will record the time the information is entered. Military time will work (e.g. 1430). This can be done in the background.

F. User ID: The app will record who is reporting the information. It will do this by retrieving the phone number of the smartphone that is reporting. This can be done in the background.

User entered information:

G. Species: The user will report the species of animal that was killed through a dropdown menu. The dropdown menu will contain a list of the most commonly killed species. The user will also have the option of manually entering species that are not found in the dropdown menu. Once the user has selected an option from the menu, the app will automatically move to the next data entry box. The user will also have the option to go back if they accidently enter incorrect information.

H. Sex: The user will report the sex of the animal killed through a dropdown menu. The dropdown menu will contain "Male, Female, and Unknown" options.

I. Animal Age Class: The user will report the age class of the animal killed through a dropdown menu. The menu will include "Juvenile, Adult, and Unknown" options.

J. Xyphoid Measurement: The user will report a body fat measurement from the animal carcass. The measurement is in "mm" and is typically a number between 0 and 20. Because the user may not be able to record this data because of the condition of the carcass, they also need to have the option of entering "Unavailable".

K. Highway Number: The user will report the highway number through a dropdown menu. The dropdown menu will contain a list of the major highways and interstates in Utah. The user will also have the option of entering a highway number manually if the number they need is not available in the dropdown menu.

L. UDOT Management Regions: UDOT has 5 management regions that they would like to sort the data by. The user could enter this information through dropdown menus, but the person entering the information may not always know what region they are in. It may be better if this information is included later using GIS when the data is in the database.

M. UDWR Management Regions: Same as for "UDOT Management Regions"

N. Comments: The user will have the option to type in additional information.

III. Information Transfer: Once all of the information has been entered by the user, they will push the send button at the bottom of the screen to transfer it to the database. The app will require the user to enter all information before it can be sent. The information will be transferred via a 3G connection. However, users entering data will have access to 3G service less than 60% of the time. If there is no 3G service, the app will store the information in the phone until it has service again, at which time it will automatically transfer the information to the database. Additionally, information

transferred from the smartphone app to the database will only be accepted into the database if all information is transferred completely. If 3G service is lost while data is being transferred, the database will not accept that information and the smartphone app will attempt to resend the information when service is once again available. This process will continue until all information has been transferred completely.

IV. ***Help Info:*** We need to have a help screen as part of the app. The help screen should include some what to do if scenarios, such as "What to do if the smartphone GPS cannot get a location fix". It should also provide contact information for those individuals that are providing support for the smartphone app.

2. Database

The database needs to able to accept data from multiple users reporting data with the Roadkill Reporter app, and it needs be able to accept data that is entered manually through the reporting system website. The database also needs to function smoothly with the viewing and filtering options on the website.

3. Reporting System Website

The website is important because it will function as a place where managers, engineers, and the general public view wildlife carcass locations. It will also allow agencies to enter carcass locations manually and to extract carcass location data for further analysis. We would like the website to look similar to Figure 1. This website is a real estate website, but we would like to use the same general layout. We would like the website to consist of 6 pages (About, Viewing, Download, Data Entry, Roadkill Reporter App, and Contacts) which are described in more detail below. The website should contain logos for UDOT, UDWR, AGRC, USU, and USGS-UTCFWRU. We will also provide pictures of wildlife, wildlife crossings, and wildlife fencing to add to the website.

I. ***About***: This will be the homepage. It will contain a description of how the data is collected, what the information is used for, and an explanation of the website. It needs a ticker that displays how many people have viewed the page.

II. ***Viewing****:* This page will be used to view the animal carcass locations. It will automatically map carcass locations from the database using the specifications below.

a. **Google Maps**: The Google Maps API will be incorporated into this page so carcass locations can be easily viewed.

b. **Display**: Locations for species will be displayed in unique colors (e.g. mule deer = brown, elk = orange, etc.) A legend will be needed somewhere on the screen to explain what the colors mean.

c. **Additional Background Layers**: Additional GIS layers for Wildlife Crossing Locations (Under/Overpasses), Wildlife Fencing locations, Annual Average Daily Traffic (AADT), Mile

Markers Locations will be added to the Google Maps display. These layers will be displayed by default, but user will have the option of turning each of them off.

d. **Date Filter**: Additional controls will be added to filter the data that is being displayed. A date dropdown menu will allow the user to select from the Past *7* days, Past 30 days, Year to Date, and All. The user will also be able to filter for a specific date range of their choosing (e.g. 2/1/2011 to 4/15/2011).

e. **Location Filter**: Controls will be added that allow the user to filter by location type. The user will have the option of filtering by Species which will have a dropdown menu of all the species in the database. They will also be able to select multiple species at one time. They will have the option to filter by the Sex of the animal, which will be a dropdown menu with "Male, Female, Unknown, and All". A filter for animal Age Class will also be added that will contain a dropdown menu with "Juvenile, Adult, Unknown, and All". A Highway filter will be added that has a dropdown menu with all of the highway numbers in the database. Finally, a filter for Management Region will have the option to select from 1 of the 5 UDOT management regions or 1 of the 5 UDWR management regions.

f. **Export Map Image Option**: The user will have the option to export an image of the data that is being displayed on the screen. There should also be a tag on the exported image with the filter options that were selected.

g. **Histogram:** In addition to the map, the viewing page will contain an automatically generated histogram that shows the total number of animal carcasses per species according to the filter settings. The user will have the option of exporting the histogram.

III. ***Download****:* On this page the user will have the option to download the database. The same filter options that were available on the viewing screen will be available on this screen. The filter options that were selected by the user on the viewing page will carry over to download page when the user switches pages. The user will have the option to download the database as a ".dbf file" or as an "ESRI Shapefile".

IV. ***Data Entry****:* On this page the user will have the option to manually enter carcass locations that were not collected with the Roadkill Reporter app. It will contain a data entry form that allows the user to enter locations one by one. Data entry will be password protected and not available to the general public. The name of the person entering the data will appear in database next to all location entered by that person.

V. ***Roadkill Reporter App****:* This page will be dedicated to the Roadkill Reporter application. It will explain what is, how it is used, and will contain help information. It will also contain a download option, so the technicians who use the app can download it to their phones. The download option needs to be password protected, because data entry will not be open to the general public.

VI. ***What's Being Done****:* This page will discuss wildlife crossings, wildlife fencing and other mitigation efforts that are being done in Utah to benefit motorists and wildlife.

VII. ***Contacts***: This page will contain the contact information for those who developed and maintain the website.

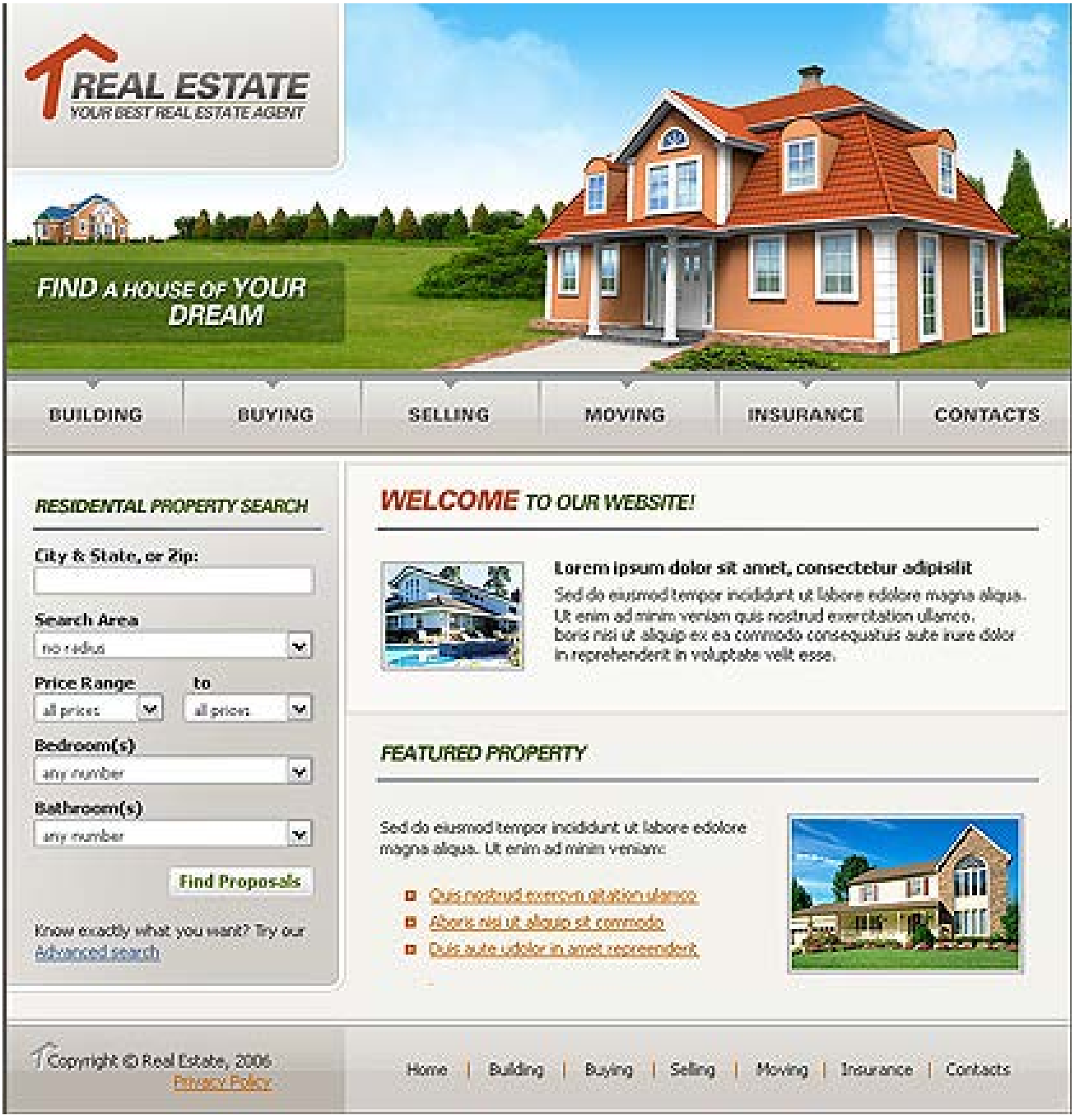

Figure 1. Website layout

4. Documentation

The code for the app will be freely available to the general public. Its needs to well documented, so others can use it with only minor programming changes.