The purpose of this project is to create a mobile computing application that can utilize the contributions of ordinary citizens to gather data on the effect of ecological disasters on animals in a specific region. Specifically, this project focuses on endangered species affected by the Gulf Oil Spill of 2010. More generally, it provides a code generating capability to allow the existing mobile computing application to be used for other disasters.

Specific goals for this project were as follows:

- Create a user-friendly Android application that can be used to help researchers study the effect of the Gulf Oil Spill on endangered species
- Construct a series of yes/no questions that could be used to identify selected endangered species in the Gulf of Mexico
- Create a binary decision tree based animal identification program
- Generalize the animal identification program so that it could be rapidly modified and used in other environmental disasters
- Create a Java code generator for binary decision trees

When the user starts the Disaster Reporting Application for Citizen Scientists (DRACS) they are presented with a screen that allows them to either take a photograph and report an animal affected by the oil spill or invoke the animal identification process. This information will then be shared with researchers, allowing them to study the effects of the spill on the animals of the Gulf.

Extensive internet research was conducted to identify the selected affected endangered species and the best way to identify each. Once this research was complete and the sequence of true/false questions to identify each animal was determined, the Java code was written to input the sequence of questions. At this point it was realized that a code generator could be written to automate this portion of the coding process. The Decision Tree Code Generator (DTCG) was written in Java to generate the Android-style Java code necessary to identify the animals in the mobile application. This generated code was then compiled and linked with the rest of the application. With the animal identification portion of the code generated by the DTCG, this application can be modified quickly and used to gather and report information about any environmental disaster.
Future Work

In the future, the functionality of the project can be enhanced in the following ways:

• The smart phone application can be enhanced to identify more affected animals and plants
• The entire application can be made extensible, rather than just the animal identification process
• The results can be sent to a cloud-based database for collection rather than to a central email account
• Reports can be generated from the database for specific requests from researchers
• The application code, while functional, is not perfect. It could be made more efficient (streamlining code and combining similar functionality)
• The screen graphics were made specifically for the HTC Evo Android phone. They can be generalized for other devices
• Testing alternative implementations of the application with other DTCG generated binary decision trees
• Developing a new more streamlined graphical user interface that can make the application more intuitive
• Bandwidth testing with multiple phones simultaneously

The Android application can be quickly updated and rapidly deployed to report effects of other ecological disasters, such as the recent mudslides in Brazil.