Website for the Swedish Rescue Service

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Abstract

The Swedish Climbing Association has a vision of minimizing the time from climbing accident to rescue team at the actual accident site. This document describes a prototype of a web-based system that will help rescue service to find information, especially the location, of a climbing site. The prototype features spatial SQL queries and advanced map functions.

1 Introduction

The Swedish Climbing Association has a vision of minimizing the effects of climbing accidents on their agenda.

One way to reach this goal is a good teamwork between the local rescue service and the climbers.

The main problem for the rescue service is to locate a climbing place when an accident has happend. The climbing sites are usually located in rough terrain not close to paved ways. Also, there is no formal description of the climbing sites in use available for the rescue service.

The purpose of this project "Swedish climbers rescue center" is to supply a Web-based service where Swedish climbers in association with SKF (Svenska klätterförbundet) can insert and update information and maps for the existing climbing sites in Sweden.

This information should then be easily obtained by both the Rescue Service and other climbers so that the site of accident can be located and found with as little loss in time as possible.
2 Approach

The modeling of the database was the first step taken. An Entity-Relationship diagram was carefully constructed and was then translated into a SQL database schema.

The model for the system was to build it as a web-service accessible both from ordinary computers and from smaller, mobile devices with limited capacity and small screens. To make this possible XHTML was used to construct the site. XHTML is HTML in a XML definition and is more strict than HTML. New cellphones often have the capability to access XHTML pages with the restriction that the page not can be to big in bytes (kilobytes). Cascading Style Sheets, CSS, was used to control the look of the site.

To generate the pages dynamically PHP 4 was used. PHP is a server side scripting language available for many platforms. PHP was selected due to its ease of use. The database manager chosen was PostgreSQL, mainly due to its rich feature set.

A very simple system for handling user-logins to the site was constructed. The user management system allows for one admin and ordinary users. The admin can add users to the system and is also the only one allowed to do deletes from the system.

PHP sessions is used to keep track of users logged in to the system and to propagate variables along different page accesses.

An ordinary user can add climbing sites and rescue stations. If you do not log in to the system, you can still use the search functions.

The database holds information about climbing sites and rescue stations. Specifically it keeps geographic data (GPS coordinates) about the locations of each site. The database also holds various other information about (such as name, location in words, road description) the climbing sites and rescue stations. Climbing sites can have different names and nicknames inserted by climbers.

When a search is entered, it searches along all these names.

The map system allows for users uploading maps (from JPG pictures) into the system. These map gets an entry in the database describing their (the maps) area covered and the filename associated to each file. The pictures are not stored in the database as BLOBs (binary large object).

Currently the GPS coordinates is stored as an integer and a float in the database, West-East and North-South is done by using a positive or negative integer on the degree part of the GPS-coordinate.

In the database there are restrictions that will check that inserted data is correct.

Special, small-in-size XHTML pages where developed to suite a low-capacity device (such as a cellphone). At the moment it is possible to do a simple search and get a answer in plain text (no map) on the phone. When you go to the site with any browser (cellphone, computer) the system variabel HTTP_USER_AGENT is checked and then matched against known mobile-devices. If one match the access is directed to the low-sized version of the search page.
3 Results

The SKRS system has not been evaluated by the SKF (Svenska KlätterFörbundet) but has been under extensive testing during the development. Overall the system is working really good but so far it only works in regions where GPS coordinates are in the area North and East, this is due some limitations in our code in the PHP-layer. We have managed to keep the page simple and reasonably fast even where only a slow connection to the internet is available, the only part of the page where the lack of speed of the connection is noticed is when the map and pdf file is about to be downloaded, since the picture are 300KB it will take about one minute with a 56.6 modem. There are no really hard SQL-queries that takes a lot of time, the element that takes the most amount of time is generate pictures and pdf files "on-the-fly". However there is a spatial query that searches for a map where both the nearest rescuecenter and the accident rock is present. An example of generated map is shown below.

![Map](image1)

Figur 1: The map generated when an alarm is submitted.

![Startpage](image2)

Figur 2: The startpage if the admin is logged in.
4 Discussion

Initially, the project outline was very vague. An application with the purpose stated in the introduction had been requested but no details had been discussed. Therefore the initial work was mainly to describe what features the application were to have.

When the project's features were decided most of the work was directed towards designing the database that were going to be used by the application. The final database schema was only slightly modified during the following development of the project.

Since the demands on the database was quite low PostgreSQL suited this project more then well. The programming language, PHP, used for development of the webpage had all the functionality needed for this project. Its graphic library is quite extensive and had lots of functions that was needed for the "on-the-fly" creation of maps and images. PHP also had a PDF creation library we had use for.

One of the main issues we had were making the webapplication entirely xhtml-compatible. Xhtml is an extension of the html standard and takes html a step closer to xml. Using xhtml makes the webpage available for viewing on cellphones which was desirable.

The main amount of time spent on this project was put into developing the functions for connecting the maps and GPS-coordinates and getting these coordinates to be correct for the maps inserted into the system.

So what will happen with this application in the future? First of all the local climbing club (UKHK) will evaluate the system and help us to further develop it so that SKF later on can evaluate a close to finished product.

The final product will have a few features not available in this prototype, for example, a climbing site should be able to consist of different sub-areas and there should be domain-administrators so that all the clubs in Sweden can manage their own geographical area.

Since we are using a database with support for a lot of different datatypes we would like to add in the future is inserting all maps into the database as BLOB's and also adding a datatype GPS with the functionality needed to manage these coordinates. This would make the management of GPS-coordinates a lot easier and thus moving a lot of the work currently done in PHP into the database.

At the moment the evaluation has started and we as a group has good hopes in getting to develop this project into a finished product used all over Sweden in cooperation between climbers and rescue centers.

5 Conclusion

We have been able to develop a web application that works as a prototype ready for evaluation by the local climbing club and later SKF. This was the initial goal set out and my adding even further features that discussed from the beginning we are more then satisfied with the result.

Adding even more features like sub-areas will be easy since the database is ready with tables for this purpose. Domain administrators is an easy change to the database that would add powerful administration possibilities.
The result is very promising and will most likely soon be widely used by Swedish climbers, although hopefully not too often since accidents is something we would like to avoid.