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Epidemic Situation Management GIS System

Scenario


Epidemic Situation Management GIS System

Nowadays, people in Taiwan have much more international communication and travel abroad than before. It also increases the occurrences of overseas infectious diseases and endemic infectious diseases. Therefore, an important task for Centers for Disease Control (CDC), Taiwan is to prevent diseases and safeguard health of citizens.

However, situated in subtropical zone, dengue fever has occurred frequently still in recent years. In order to seize and control the epidemic situation thoroughly and to prevent dengue fever, CDC wants to build an epidemic situation management system integrating with GIS for assisting epidemic control personnel in reporting and comprehending epidemic situation instantly in each area through the Internet.

Goals

To assist epidemic control personnel in comprehending epidemic situation of dengue fever, CDC planned to build an epidemic situation management GIS system which enables epidemic control personnel to report dengue fever infection situation in each area after logging in the system. In addition, integrated with map display and diverse analysis functions, this system also allows users to comprehend mutual relations among dengue fever occurrence, locations and vector mosquito habitats.

Thus, the system must equip with the database which can store information of the locations where dengue fever occurred and the infected patients, and the system also needs to have abilities to integrate with map information and analysis functions. Therefore, the epidemic control personnel is able to realize epidemic situation in every district by map browsing and then tell if cluster infection arises and clearly distinguish whether the dengue fever is primarily caused by to vector mosquito habitats.

Solutions

Epidemic Situation Management GIS website adopts SuperGIS Server 3 as GIS server software which is able to publish and manage map information. In addition to building map websites by utilizing SuperGIS Server 3, developers also can apply customization functions, Jquery and Javascript syntax to have their map websites demonstrate interactive visual effects and designed as required. Besides, Epidemic Situation Management GIS website adopts Microsoft SQL Server 2008 to store and manage relevant indices and statistic information.

Results

Epidemic Situation Management GIS system is composed of the front-end website that provides comprehensive display and manipulation functions and the back-end platform provides database management functions. The functions of front-end website include map toolbar, map switching, layer display, query options and so on. The back-end database management functions contain photo uploading, storage of analysis results, case management, theme layer management and so forth.

I. Primary functions of the front-end website:

1. Map Toolbar

Map toolbar allows users to zoom in/out the map, pan, zoom the map to full screen, go to previous extent or next extent, etc.


Users are allowed to switch the layers to display various types of information.

2. Map Switching

This system provides users with types of electronic maps and satellite images. Users can click buttons to switch the map type and display the map they need on the platform.

Goals

- To assist epidemic control personnel in comprehending epidemic situation of dengue fever, CDC planned to build an epidemic situation management GIS system which enables epidemic control personnel to report dengue fever infection situation in each area after logging in the system.

Case Study


Epidemic Situation Management GIS System provides complete map navigation tools.

3. Map Overlaying

Overlaying various layers to display on the map is one of the important functions. The vector layers include executive authorities and schools in every district, boundary of townships, primary roads, and secondary roads, etc. On the layer management interface, users are able to select the reference layers by checking to overlay these layers for further research and analysis.


The system can help users understand the mutual relationship between patients and vector mosquito habitats.

4. Data Query

Data Query includes Query by Buffer Analysis and District Query. Users can utilize the address to set buffer extent and have the buffer extent displayed on the map. As a result, users can query diverse information in this buffer extent such as landmarks, cases of dengue fever, controlled locations, indices of vector mosquitoes. While adopting District Query function, users can specify districts to query.

II. Primary functions of the back-end platform:


The back-end platform allows administrators to record the location information of vector mosquito habitats.

1. Photo Uploading

Every healthcare staff can upload the photos of monitored cases to the management system.


Administrators can check the status of each monitored location immediately.

2. Notifying Controlled Area of Mosquito Habitats

Health workers in every county and city can notify controlled area of mosquito habitats to CDC and update information of these controlled areas; therefore, dengue fever researchers can decide if the area can be relieved from control or not.

3. Analysis results

The results of buffer analysis which are created in the font-end website can be uploaded, managed and shared on back-end platform.


Administrators can check the status of each monitored location immediately.

4. Theme Layer Management

The primary management functions include “Theme Layer Management”, “Point Feature Editing” and so forth. Users are allowed to modify layer content and information of point position on map to make sure that the map shows correct layer information instantly.

System Effects:

Epidemic Situation Management Geography Information System integrates cases of legal infectious disease with the locations where these diseases happened so that users not only can seize information of patients, controlled area of mosquito habitats, vector mosquito indices and position of public location but also inform the relevant executives to prepare disease prevention plan to avoid spread of the disease.

Results

- To assist epidemic control personnel in reporting epidemic situation of dengue fever in each district effectively, Epidemic Situation Management GIS system is composed of the front-end website that provides comprehensive display and manipulation functions and the back-end platform provides database management functions.

Software Used

- SuperGIS Server 3

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