

Developing An Android-based Emergency Broadcasting System for Natural Hazards

K.-T. Chang¹, B.-C. Lo², M. C. Teng³, Y.-Y. Jiang⁴

¹Civil Eng., Ming-hsin University of Science and Technology, Xing-Feng, HsinChu 304 Taiwan. Corresponding author : E-mail : ktchang1216@gmail.com

²Computer Eng., Ming-hsin University of Science and Technology, Xing-Feng, HsinChu 304 Taiwan.

³Technology & Manmade Disasters Reduction Branch, National Science and Technology Center for Disaster Reduction, Xin-Dien, New Taipei City 231 Taiwan.

⁴Civil Eng., Ming-hsin University of Science and Technology, Xing-Feng, HsinChu 304 Taiwan.

ABSTRACT

According to the report of World Bank, there are 73 percentage area and people in Taiwan threatening by many kinds of natural hazards. Especially, more and more seriously global abnormal change speed-up these threatening. The purpose of this project, through integration and value-added way, collect the earthquake observation, abnormal weather, debris flow, river pan-abuse and other emergency information. Then, these emergency contents will be fast deliver to users via web 2.0 and wireless communication technology, let people obtain real-time messages in the shortest possible time. Finally, profit and efficiency of the corresponding system functions will be verified in the Hsinchu area.

I. INTRODUCTION

The global warming has brought the Earth many unexpected or uncontrollable natural disasters usually resulting in widespread destruction of property or loss of life. Not only the threats exists during the event, but the post-disaster hazards have left the human habitat with tons of flowing debris, wooden tree trunks, garbage, and various kinds of contaminations. The social, environmental, and economical problems caused by natural disaster also cost a nation's tremendous resources and manpower. There are 270 events of natural disasters in Taiwan in 50 years from 1958 to 2007 including categories of typhoons (71.1%), flooding (15%), earthquakes (8.5%), torrential rainfall (2.2%), wind-storms (1.5%), mountain flooding (0.7%), and landslides (0.7%) (Liu et al., 2009). As shown in Figure 1, the frequency of natural disasters is in a trend of increasing.

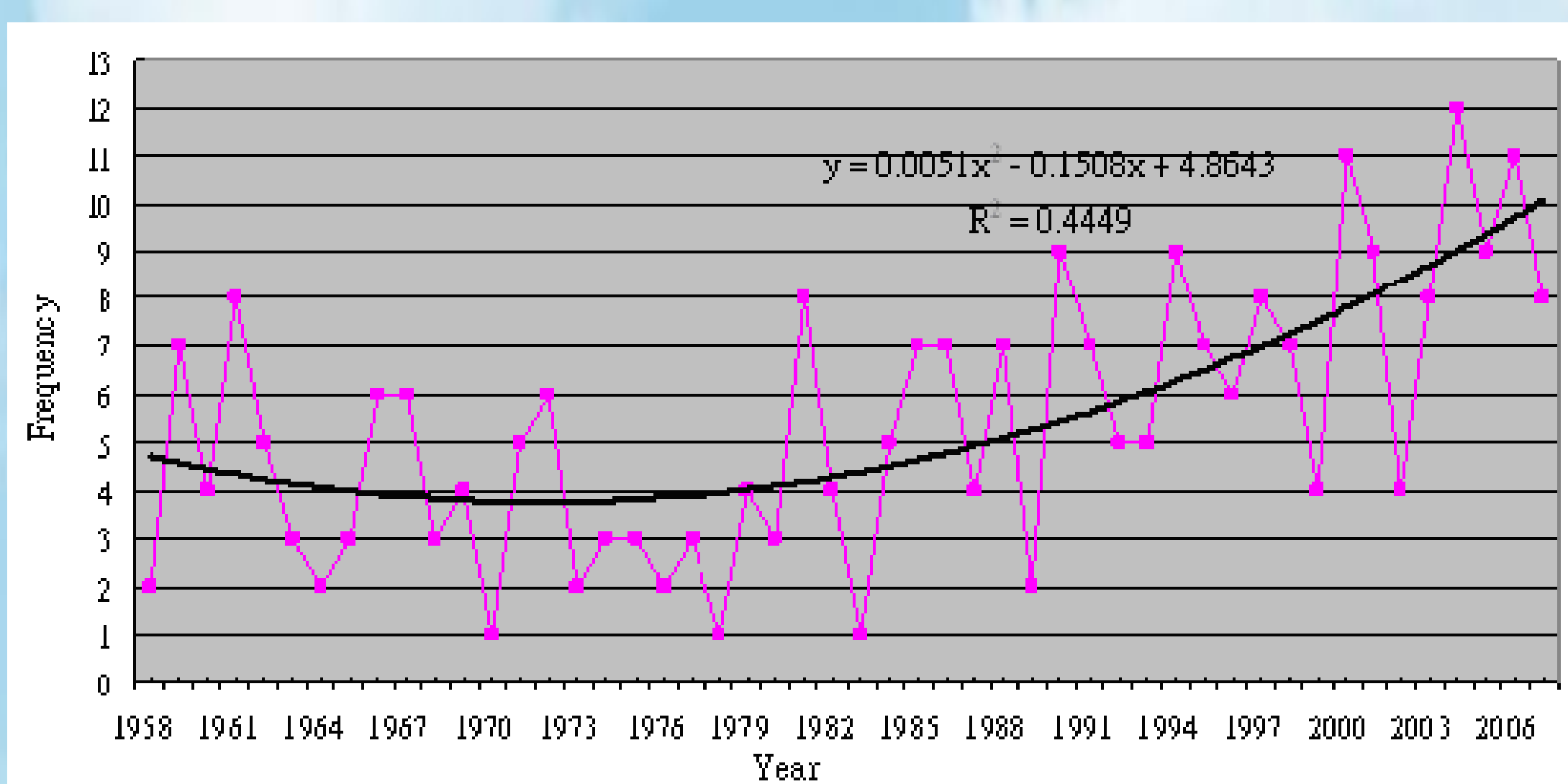


Figure 1. Statistics of natural disasters in Taiwan from 1958 to 2007

II. A WEB EMERGENCY DATABASE

The natural disasters present common threats. It is prudent to manage the disaster relief of natural disasters through warning system classification, identifying baseline of warning indices, and quantifying the emergency response operation procedures.

The common types of natural disasters in Taiwan include: Typhoons, earthquakes, flooding, and mud flows. According to the above mentioned purpose and schema design of emergency contents, the retrieval codes were performed in Visual Basic language

III. DESIGN OF THE EMERGENCY BROADCASTING SYSTEM

According to the functional requirements for the system, three sub-modules can be designed for the system as following :

- (1) Web Application Subsystem (WAS)
- (2) Emergency Database Subsystem (EDS)
- (3) Embedded Mobile Application Subsystem (EMAS)

Above mentioned illustration for the three sub-modules indicates that the Service Architecture Diagram (SAD) can be shown as Figure 2

The scope of the research objective includes the development of Web Robots or Web Spiders to perform auto selection on internet. The most critical information will be collected while browsing through the information posted on the internet.

The task process is performed as described in Figure 3. So far the majority of the natural disaster prevention and broadcast system network do not set limits on automation in data retrieval.

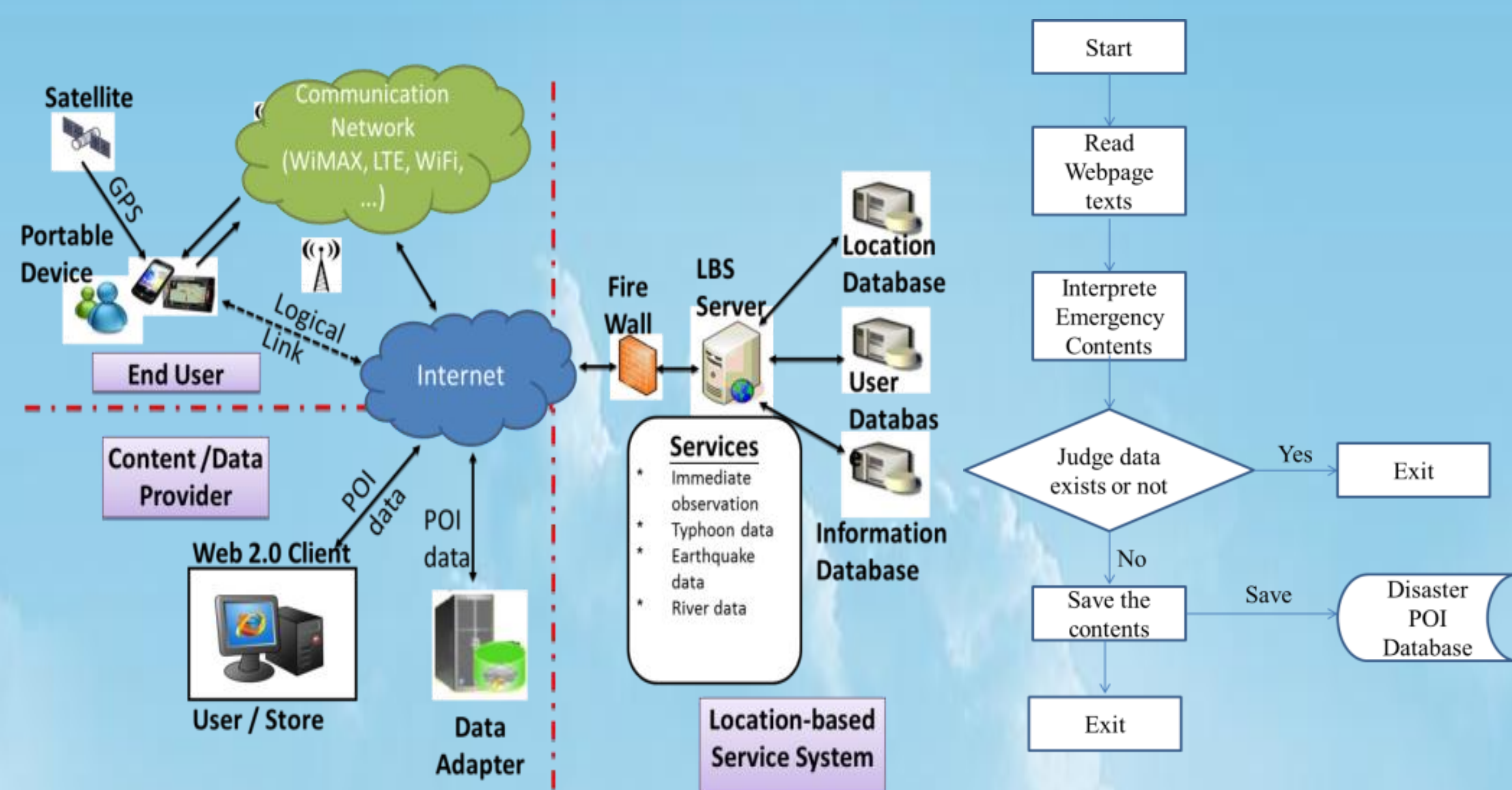


Figure 2. Service Architecture Diagram for the emergency broadcasting system.

Figure 3. Workflow for the Emergency Contents Retrieval.

IV. CONCLUSIONS AND SUGGESTIONS

In this study, the current popularity of convenient network is used to pass emergency information of natural disasters happened in Taiwan. The system requirement specification and design for three functional subsystems had been performed in the paper. The testing results indicate that all five published alert data types can be real-time and accurately accessed from this system. It is believed a valuable channel to inquire emergency information via mobile devices.

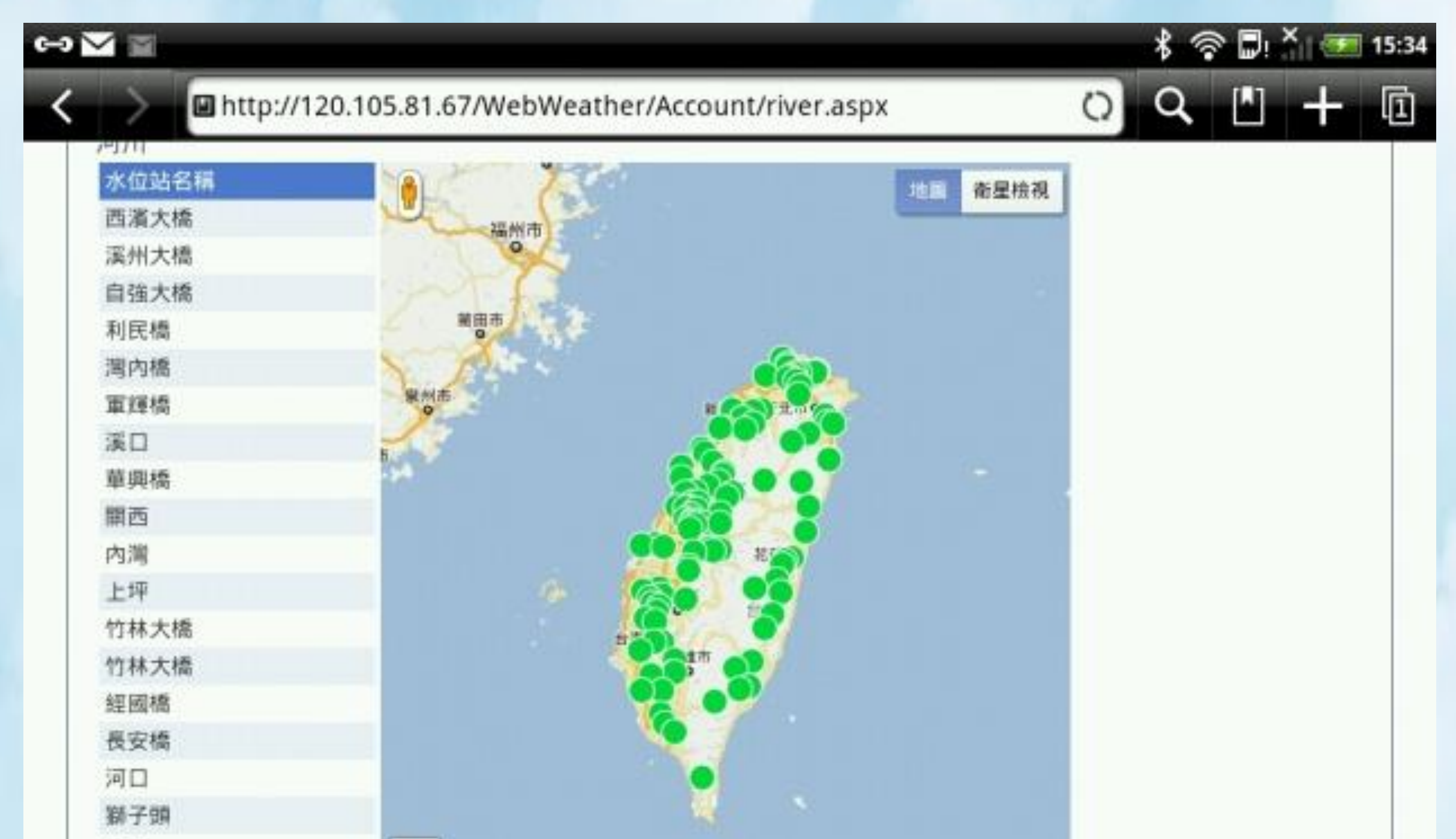


Figure 4. Monitoring stations of river water level



Figure 5. Pan-abuse river information