Arif Arham, GEOG695

Computational Frontiers

1. The implications of location-aware computing for GIScience

Information technology has been growing expansively in the last ten year both hardware and software. From the hardware site, mobile computing is very popular for communication and work. Laptop, Global Positioning System (GPS), and cellular phone are three top mobile gadgets that are used by people around the world for daily-based activities. Basically, laptop can be used for work, entertainment, and communication using internet technology; GPS can be used in car for identify location on Earth using satellite; and cellular phone can be used for communication. Nowadays, the capabilities of those gadgets are improved so they can be used for more other needs since the computer software has been also developed rapidly for many purposes. For full computing experience, laptop can be installed many useful software in which location of the laptop can be detected by others using GPS or the brand new internet-based application called "Google Latitude". GPS is also become a multifunction gadget since it is implanted with multimedia player so user can navigate, drive and listen to music simultaneously. In addition, Cell phone is more powerful since it is also has capability for navigating, playing multimedia, typing, browsing, and gaming. In short, computer hardware and software development change the way we work and travel into a worldwide networking activities.

The location-aware computing is the cause for a new age for geographical information and has significant impacts for computational in GIScience. Mobile computing change the way we handle data from collecting, saving, analyzing and in the decision making process (NRC 2003). People now can report a phenomenon in a particular location using laptop and send the data to others using internet. Data also can be stored at the small size yet huge capacity hard disk, both internal and external. Moreover, analyzing phase to produce new information can be done by collaboration among expertise from distance using online conference. This mechanism can improve the decision making process, both in term of time and quality.

2. The implications of cloud computing for future of GISystems.

Internet is one of the important aspects in information technology development. This networking technique changes the way we work and gain geographical information. Following the success of internet, browser software also improved and utilized for internet applications. For example, people now can use "Yahoo Calender" for manage their schedules. This calendar application is not installed in the local hard disk, but in the Yahoo's server that the users have no idea where it is. All they have to do is open a Yahoo account, log in to the account, and use a lot of internet applications for free. This phenomenon then is called cloud-computing to illustrate the unknown computer hardware location which users around the world access as if they use the local computer hardware.

Cloud-computing has significant implication for computational in GIScience, especially in the way we use hardware. Software installation needs space in hard disk as well as data

storage, but in cloud-computing the space is not in local hard disk rather in a huge hard disk somewhere on Earth. Implication for this state is file transfer capacity and speed play significant role for data storage. Although users do not need more space in their local hard disk, they still need a broadband internet connection for accessing data and application from the 'cloud'.

Another implication is related to the GIS software. An important question can be ask: will GIS disappear into the cloud? The short answer is yes, it will. However, some issues are needed to consider to the implementation of this cloud-computing. Firstly, broadband connection is a must since geographical information is not only in attribute table but also in image. Image file usually has a big size depending on resolution; thus, low connection can ruin the data processing and analyzing both attribute tables and images. Secondly, due to its feature/addon/plugin, the size of application such as ArcGIS is relatively big. Hopefully, if this application in the future can be accessed from the internet then full feature is also needed to be installed to make this cloud-computing reliable for GIScience. Thirdly, the price to purchase the software could be decreased since the user will not really have the software and only can be accessed where the computer connected to the internet. Moreover, it also could be free since some GIS open source software such as GRASS and Quantum GIS are significantly enhanced recently.

3. The implication of location-aware and cloud computing for VGI and Emergency Management

Data collection is the key words for volunteered geographical information (VGI). In this matter, citizen as sensor play the important role to gain geographical data and share with others (Goodchild 2007). Using location-aware computing, this work can be done more rapid and easier in term of data sharing and then analyzing by the expertise. Therefore, real time data for emergency management, especially in response phase can be acquired by the emergency manager to conduct an appropriate action to safe live.

The cloud computing helps both data collectors and emergency manager in data sharing and storage. Data can be saved in thousand miles away from the hazard area and can be accessed by other emergency agencies from federal, state, and local authorities. This privilege can help a local emergency management center (EMC) to seek aid from several resources out of the impact area. Consequently, more live and properties could be saved from a disaster.

References

Goodchild, M. F. 2007. Citizens as sensors: the world of volunteered geography. *GeoJournal* 69 (4):211-221.

NRC. 2003. IT Roadmap to a Geospatial Future. http://nap.edu/ openbook.php? record_id=10661&page=1 (last accessed 2 March 2009).