Optimum Utilization of Memory and Image Enhancement for Mobile Based Location Search Engine

Aradhana Goutam
Lecturer, Fr. Conceicao Rodrigues College of Engineering
Bandstand, Bandra(W) Mumbai-400050

Abstract:
A location-based service (LBS) is an information and entertainment service, accessible with mobile devices through the mobile network and utilizing the ability to make use of the geographical position of the mobile device. The problem with these applications because of the small storage availability with mobile devices or the limited bandwidth of the data transportation. The main objective of the proposed storage system is to provide map images for real-time applications for low memory and less computing resources with better image quality. I am introducing two modules in this paper first module is used for image compression but as after Compression there will be some loss of the information is obtain through histogram so to improve the image quality we does image Improvement and Image Enhancement. Now This Improved and Compressed Image is transferred to Mobile. Which is a software component for imbibing the location based services using servers in real time.

Keywords: Image Compression; GIS; Mobile based location Engine

I. INTRODUCTION:
There are so many applications on LBS and this motivated me to work out on the Map Image Compression and Enhancement for mobile, for fast retrieval and communication between mobile device & server and the less storage in mobile. This can enhance the LBS services. Visualization for the small displays of mobile devices is restricted by several technical limitations, such as the small display size and resolution, the lack of processing power and memory, and most critical the battery lifetime.

Web based mapping applications like Yahoo Maps; Google Maps are sites for location in the real world. By using open APIs and online mapping toolkits for Location search and Map Image Compression. One approach is to mitigate this problem is to reduce the volume of multimedia data compression technique. These approaches concentrate on achieving higher compression ratio without sacrificing the quality of image. Since when Image is compressed there will be some loss of information so to improve the image quality we do image Improvement and Image Enhancement. Firstly Improve does Image Improvement Like Brightness, Contrast and Sharpness.

The Project is in two steps.

1. Image Compression on a Map image.
2. Improve the Sharpness, Brightness & Contrast of this image.

Fig. 1 Geospatial Architectural flow diagram

The paper is organized as follows. Section II presents the theoretical study performed in the area of image compression, Location Intelligence and Spatial Database and image Enhancement. It describes the basics technologies relevant to development of the project. Sections III demonstrate the newly proposed software architecture of the system for mobile based Location search Engine. It is geographic information visualization and Location based services providers on mobile
II. THEORETICAL STUDY

A. Why Image Compression

The Mobile GIS is very forthcoming technique which is very useful for map-reading, path explore and near by restaurant. All which are real time applications and for which we require the Mobile GIS:

- Positioning systems
- Mobile GPS receivers
- Mobile GIS software
- Data synchronization / wireless communication components
- Geospatial data
- GIS content servers

For Mobile GIS we require the Web Map. Web map is the Map which is available on web and the system uses that map. But the size of Map is large which is not compatible to the mobile device because of the small screen size, low memory space and less wireless bandwidth. The size of the map image should be that much compressed without compromising the quality of image so it can be compatible to mobile device to acquire less memory and supports fast communication in real time application i.e.

- Storage – Compressed files take up less space.
- Speed / Efficiency – In many cases smaller files can be executed or read in less time.
- Bandwidth / Transfer time – Smaller files take less time to download/upload.

It takes advantage of three common qualities of graphical data; Redundant, Predictable or Unnecessary. Map Image compression minimizes the size of a graphics file in bytes without crushing the quality of that image to an offensive level. The reduction in file size allows extra files (images) to be stored in a given amount of disk or memory space. It also reduces the time required for images to be sent over the Internet or downloaded from Web pages. Hence, image compression is the technique to reduce the redundancies in data representation in order to reduce the data storage space requirements and hence communication cost. Reducing the storage requirement is equivalent to increasing the density at storage medium and hence communication bandwidth.

B. Image Enhancement and Analysis

(i) Brightness

Brightness is the perception elicited by the luminance of a visual target. This is a subjective attribute/property of an object being observed. A given target luminance can elicit different perceptions of brightness in different contexts. In the RGB color space, brightness can be thought of as the arithmetic mean $\mu$ of the red, green, and blue color coordinates (although some of the three components make the light seem brighter than others, which, again, may be compensated by some display systems automatically)

$$\mu = \frac{R + G + B}{3}$$

Brightness is also a color coordinate in the HSB or HSV color space (hue, saturation, and brightness or value).

(ii) Contrast

Contrast is the difference in visual properties that makes an object distinguishable from other objects and the background. In visual perception of the real world, contrast is determined by the difference in the color and brightness of the object and other objects within the same field of view. The human contrast sensitivity function shows a typical band-pass shape peaking at around 4 cycles per degree with sensitivity dropping off either side of the peak. This tells us that the human visual system is able to detect gratings of 4 cycles per degree at a lower contrast than at any other spatial frequency. The high-frequency cut-off is related to the packing density of the retinal photoreceptor cells: a finer matrix can resolve finer gratings. The low frequency drop-off is due to lateral inhibition within the retinal ganglion cells.

(iii) Sharpness

In photography, acutance is the edge contrast of an image. Acutance is related to the amplitude of the derivative of brightness with respect to space. Due to the nature of the human visual system, an image with higher acutance appears sharper even though an increase in acutance does not increase real resolution.

(iv) Gray Scale

Grayscale digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest. Grayscale images are distinct from one-bit black-and-white images, which in the context of computer imaging are images with only the two colors, black, and white (also called bi-level or binary images). Grayscale images have many shades of gray in between. Grayscale images are also called monochromatic, denoting the absence of any chromatic variation.
III  SOFTWARE DESIGN METHODOLOGY

(A)  Operating Environment

Windows 98/Windows XP and JAVA and google Map for Map Image Processing

(B)  User Environment

User will work on the Applet, which is well known. Simple GUI interface with less typing and traversing. Compressed and Enhanced image will be transferred to mobile.

(C)  Constraints in Design and Implementation

Compared to desktop computers, mobile devices have many restrictions:

a. Displays are very limited.
b. Lower resolution
c. Fewer colors.
d. Onboard hardware.
e. The CPU.
f. Memory.
g. Buses
h. Graphic hardware
i. Input peripherals
j. tiny keypads
k. micro joysticks
l. Rollers
m. Input techniques
n. Connectivity is slower
o. Data is stored on remote databases;
p. Currently available tools, such as graphics libraries, tend to be low-level or limited.

(D)  Software Requirement

a. Java Run Time Environment
b. JDK 1.5 or above
c. J2ME Wireless Toolkit
d. Google Map API

(E)  Nonfunctional Requirements

(i)  Performance Requirements

The application should be flexible for future enhancements.

(ii)  Safety Requirements

Runtime exceptions need to be handled on all fronts like database and application.

(iv)  Security Requirements

Image has to be handled properly and save after operations.

(G)  Object Model

The Object Model shows the static data structure of a system. The model describes object classes and their relationships to each other. From the general description of the project problem statement above, a list of objects and classes can be derived.

Fig 2: Use Case Diagram

IV  RESULT:

A.  Image Compression:
**B. Image Enhancement**

Fig 3: This is the 100% uncompressed image. i.e. 0% uncompressed image. Originally the size of image was 258,441 bytes

Fig 4: This is the 65% uncompressed image. Now the size of image is 82,418 bytes

Fig 5: This is the 20% uncompressed image. Now the size of image is 30306 bytes

Fig 6: This is the 10% uncompressed image. Now the size of image is 18,500 bytes

Fig 7: This is the 5% uncompressed image. Now the size of image is 10648 bytes

Fig 8: ImageFilterDemo in AppletViewer

Fig 9: Showing Saved Image after Compression
V Conclusion

1. This project will be helpful in future for better communication between server and mobile because the size of image is reduced and quality of compressed image will be improved by image Enhancement and Filter.

2. To maximize memory utilization while satisfying certain system performance or quality of service requirements.

3. These approaches concentrate on achieving higher compression ratio without sacrificing the quality of image.

4. Filters will remove the noise added in the image after compression and improve the image quality for the better quality of image.

5. Filters are spatial domain methods, which operate directly on pixels.

6. Filters will reduce the effect of Noise in image.
7. Image Enhancement functions like Brightness, Contrast, and Sharpness and will improve the visual quality of the image.

REFERENCES:

[16] Hel Reid, "A Few Cool Technologies from the Location Intelligence Conference" Directions Magazine.
[18] Java2, The Complete Reference, By Herbert Schildt

AUTHORS PROFILE

Aradhana Goutam, Pursuing Ph.D. Devi Ahilya Vishwavidyalaya, Indore (M.P.). Assistant Professor, Department of Information Technology, Father Conceicao Rodrigues College of Engineering, Bandra (West), Mumbai.