



Summary

The objectives of Tripod are to automatically build rich multi-faceted text and semantic descriptions of the landscape and permanent man-made features pictured in a photograph; create image search facilities that serve broader user needs than current keyword or content-based approaches provide; build captions in a range of different languages; automatically update captions, when new information about a location becomes available; package Tripod's tools as a suite of services to prepare Tripod for exploitation in a wide range of markets.

Tripod is achieving these objectives by using GPS and electronic compasses to determine the location of a photographer and the direction in which they were facing when a photograph is taken. Combining this information with digital maps and by taking information from the web, captions can be automatically created.

Summary of Activities

This year the project finished off its work to enhance legacy images with existing captions through a large scale evaluation. At the same time the project worked to complete its more ambitious major goal, captioning location tagged photographs.

- The work of 2007 and 2008 enhancing legacy images with additional keywords was evaluated this year with promising results.
- Tackling the notably harder problem of captioning images tagged with a location and possibly a direction as well was also completed this year with evaluation being conducted towards the end.
- This year, saw a flurry of cameras with in-built GPS and compass. A number of these devices were purchased and tested for both capture of photographs for testing Tripod services as well as for determining usability and accuracy.
- The project will complete at the end of this year. Final integration of the new captioning services into the XLPhoto image system is being completed. Exploitation plans are being prepared and the different possible services from the project are being completed.

Testing the enhancing of legacy images

The Tripod partners' first priority in 2007 and '08 was to enhance the captions of existing legacy images. Services to produce this enhancement were completed in late 2008 and integrated into the XLPhoto image management system (produced by Tripod partner Centrica). Testing took a number of forms. First a quantitative evaluation was conducted, which showed that the enhancement to the captions were accurate, but not at a high enough level for them to be used in a fully automatically system.

Consequently, a second evaluation was conducted to examine the use of the Tripod services in a semi-automatic way. The service was tested with professional captioning staff of (Tripod partner) Alinari and with trainee librarians based at the University of Sheffield. Work from this evaluation is still to be published, but strong indications are that feedback from the testing showed that users preferred captioning images using Tripod services in comparison with other commonly used captioning approaches.

Captioning of location tagged images

In 2009, the main technical task was to provide services that would caption an image tagged with a location described by a coordinate, such as latitude and longitude from

a GPS system. While such a specification of location is precise, being only a pair of numbers, it isn't possible to search the web for caption text using just these numbers. Therefore, keywords and semantic tags from digital maps have to be extracted first. A series of services that provide such keywords/tags were devised. These services were used in conjunction with web search systems to provide a textual caption of an image. Innovative approaches to testing these image captions were devised using a living laboratory service. The testing showed that these captions were accurate.

Testing new devices

In 2007, it was almost impossible to buy any form of camera that could be used to capture GPS location as well as compass direction. Tripod partners either built prototypes or purchased kits for constructing such devices. In 2008, cameras built for surveying tasks started to be sold and a small number of these devices were purchased and photographs for testing the Tripod services started to be collected. In 2009 a number of consumer oriented devices started to be released, most notably the so-called "Google phone", the HTC G1. A number of these devices were purchased and seeded to users to study how users would use such devices when taking location tagged photographs. The photographs taken were then captioned using Tripod services. Testing of captions and photographs is currently under-way.

Integration into XLPhoto

A key aspect of the Tripod system is that its constituent services were to be integrated into a fully functioning image management system: XLPhoto. The start of this integration was conducted in late 2008 with a completed prototype ready in early 2009. The system was demonstrated at the 2nd annual review of Tripod in February. Work to complete the next version of the integrated system is currently being completed by Tripod partners. This new system will include integration of the spatial diversity search engine as well as recommender system and new captioning processes.

User Involvement, Promotion and Awareness

Tripod partners have looked to promote project outputs to a wide range of relevant groups and organizations. Research outputs have been disseminated to a wide range of conferences and workshops. Several issues of the Tripod newsletter have been circulated to a mailing list of interested individuals and organizations. Tripod has participated with the Chorus coordination action by attending and having a stall at its multimedia meeting in Brussels. The project was also invited to present at a professional photography event. The ability of Tripod services has also been demonstrated through a number of videos hosted on YouTube demonstrating different features of the Tripod system.

Future Work or Exploitation Prospects

The project is coming to the end of its three year run. Currently the significant IP contributions are being evaluated by the exploitation partner Alinari and by the project coordinators. The Tripod component service architecture is allowing a series of distinct services to be created and released. Contacts with University commercialization managers have been made and partners for some of the potential services are being pursued.

Further Information

The project's web site holds details of papers, public deliverables, and demonstrations. Please contact Dr. Mark Sanderson at the University of Sheffield (m.sanderson@shef.ac.uk) if you wish to discuss any aspect of Tripod further.