



MAYACHITRA, Inc.

Newsletter

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Message from the Founders

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We are very excited to get the first issue of the Mayachitra newsletter out to our valued customers at the beginning of the New Year. The year 2010 has been a very exciting time at Mayachitra. We have made great strides in developing some exciting new technology that we think will be of great benefit to many of you.

We hope you enjoy learning about them from this newsletter, and if you have any additional questions or comments, or any sort of feedback whatsoever, please do not hesitate to contact us.

Wishing you all a happy and prosperous new year!

B.S. Manjunath, C.E.O. & S. Chandrasekaran, C.T.O.

Image Registration for GIS

Imagine that you want to quickly create an accurate georeferenced map using the latest images taken from your airborne platform. Imagine that you can budget at most the time to mark down a few ground control points on a few images.

This is one of the situations where **geoAIPR** can help you. Based on the registration engine developed at Mayachitra, **geoAIPR** incorporates new and powerful georegistration capabilities to create seamless georeferenced panoramas.

If you have high quality georeferenced base imagery, **geoAIPR** will use it to register the frames from your airborne platform (no need for ground control points!). If you don't, **geoAIPR** is able to utilize a set of ground control points provided by the image analyst to bootstrap the georeferencing process.

In both cases the final results is the same: *a seamless, accurate, and georeferenced panorama* that can be imported by all the most popular GIS software suites.

*"Imagine that you want to quickly and accurately create and/or update a georeferenced map using the latest images taken from your airborne platform. Then **geoAIPR** is the solution for you."*

Please see *Image registration for GIS* on page 3

Mayachitra Tracks!

“Mayachitra’s team is creating tools that can be used by the image analyst to restore the video quality, to reliably track objects for extended periods of time without reinitialization, and to map the trajectories in a georeferenced coordinate system”

Visual tracking in real life scenarios is hard. The perturbations that make tracking a very challenging problem are either unavoidable or require very expensive hardware solutions.

The visual appearance of the object as well as the illumination conditions may change drastically, the camera may shake and the quality of the video may be degraded by a variety of factors such as interlacing, blocking artifacts, frame drops, motion blurs, etc.

Despite many valuable research efforts, there still exist many domains where current commercial trackers do not perform well enough.

Mayachitra’s R&D team is addressing all these problems, joining the efforts of the research community to develop proprietary technologies that provide excellent performances in real life scenarios.

Our tools allow to restore the frames quality (see Figure 1), and to reliably



Figure 1. The results of the innovative deinterlacing technology by Mayachitra. The content of the original image is entirely preserved. The AP Hill data was provided by the DARPA VIRAT program.



Figure 2. The georeferenced trajectory of the tracked vehicle computed from an airborne video clip.

track objects for extended periods of time without reinitialization. Coupling the tracking technology with the georeferencing tools we can map the trajectories in a georeferenced coordinate system. All this reducing the manual intervention required to the image analyst

In the example in Figure 1, a small vehicle was tracked with no reinitialization for over 600 frames and its trajectory was georeferenced and exported as a standard shape file.

To learn more about Mayachitra’s tracking tools calls us or send an email to info@mayachitra.com.

Content Based Video & Image Search

Consumers and enterprises are both capturing and storing vast amounts of image and video data. For the most part, users have to rely on any metadata generated by the capture device or on manually assigned labels in order to search over the media stores. Mayachitra's **imago-vis** radically changes the existing paradigm by allowing users to search by the *content* of images.

For example, to allow users to search for a car in a datastore of images, instead of annotating each occurrence of a car, **imago-vis** automatically

"Mayachitra's imago-vis radically changes the existing paradigm by allowing users to search by the content of images."

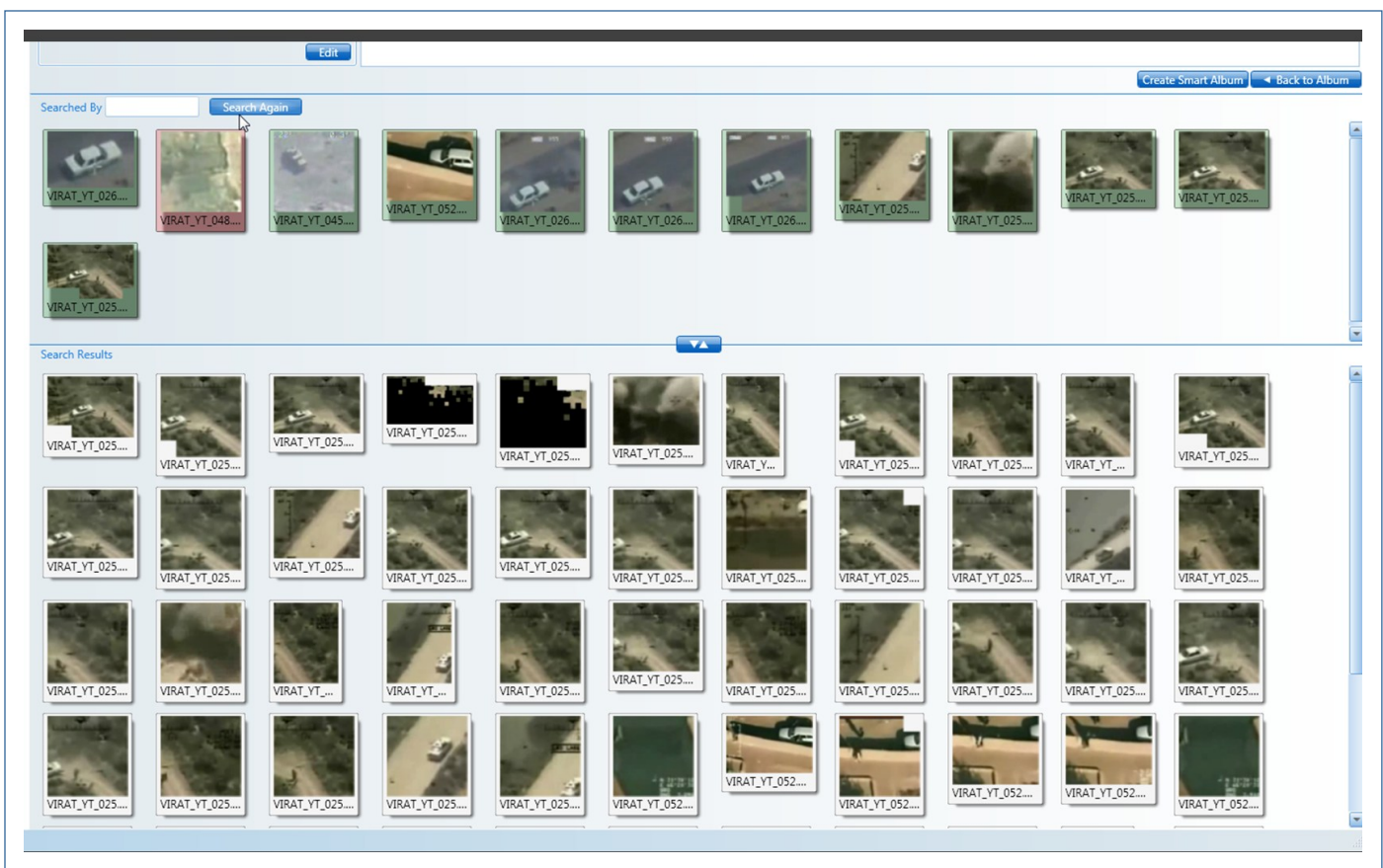


Figure 3. Retrievals corresponding to a query containing a car after two rounds of feedback

identifies and extracts features inside images. Once these features are extracted, given a few query images of a car, **imago-vis** can perform a content based search and bring up other occurrences of car in the database (see Figure 3).

A key benefit of our software is that the categories that the user wants to search over do not need to be fixed beforehand. **imago-vis** is able to

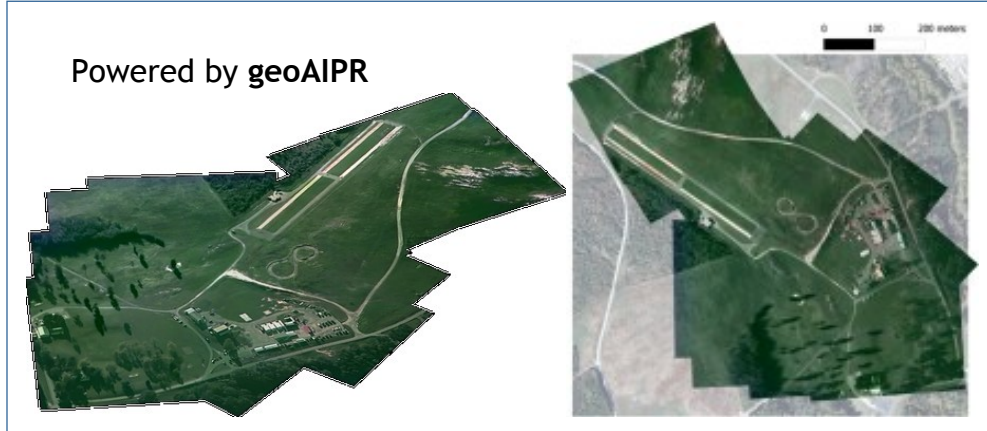
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Figure 4. A panorama of Fort A.P. Hill (left) and its georeferenced version (right) assembled automatically by geoAIPR.

geoAIPR was tested on one of the most challenging airborne datasets available: the videos taken over Fort A.P. Hill, VA. Figure 4 displays a seamless (non georeferenced) panorama which can be used for situational awareness and a georeferenced panorama which utilizes the ground control points provided by the analyst for just 3 images.

In both cases **geoAIPR** constructed automatically a panorama assembling 17 images. The georeferenced panorama was subsequently utilized as the reference image to automatically georeference 614 frames from a video clip. Yes, that's right! With **geoAIPR** you can create *georeferenced video clips!*

Try it yourself! Call us or contact us at support.aipr@mayachitra.com to obtain a free evaluation version of **geoAIPR**.

"The georeferenced panorama was utilized as the reference image to automatically georeference 614 frames from a video clip."

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learn the concept through user feedback. **imago-vis** can also search by content through frames of videos and we are currently working on incorporating activity-based video search.

imago-vis technology is embedded in **imago**, the bioimage management and analysis software that allows a user to store, organize search and analyze scientific images. Thanks to **imago**, content based image retrieval can be performed in an intuitive fashion just in a few clicks. The user is able to easily browse the results and to provide relevance feedback to refine the search.

To Learn More about Mayachitra

Visit our website at www.mayachitra.com to learn more about the technology, the products and the services available at Mayachitra. More specifically:

- **[AIPR Registration Capabilities.](#)**
Follow [this link](#) (<http://www.mayachitra.com/presentations/image-video-registration/presentation-image-video-registration.html>) to see how our registration engine can register very difficult image sets characterized by scene changes, illumination changes, different sensor modalities, atmospheric disturbances, scale changes, non-nadir views, etc.
- **[The Tale of Georegistration.](#)**
Follow [this link](#) (<http://www.mayachitra.com/presentations/georegistration/presentation-georegistration.html>) to see an online presentation that shows how Mayachitra's georegistration and tracking technology can be used to quickly solve a challenging task such as georeferencing the trajectory of a vehicle tracked from a UAV.
- **[Video Tracker.](#)**
Follow [this link](#) (<http://www.mayachitra.com/presentations/tracking/presentation-tracking.html>) to see some of the results obtained using Mayachitra tracking technology. Note that our tracker does not require the video to be stabilized and it is effective in dealing with very challenging situations, where the object is affected by relevant geometric and photometric distortions and the quality of the video is degraded by compression artifacts.
- **Software Customization Services.** At Mayachitra we do not just deliver software. *We deliver solutions.* That's why we interact closely with our customers to meet their specific needs. Most of our products can be tailored to be part of the work flow you are familiar with, so that you can maximize the benefits of utilizing new technologies minimizing the effort of learning how to use new tools. Contact us if you want to discuss a specific problem and if you believe that our core competencies in image informatics can help you.

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