

RTMaps Pop'Art image-processing algorithms...

Summary:

You will connect algorithms to a video flow. You should use a webcam to test the Real Time Acquisition. If you don't have one, use any video flow from any image sensor or database from the dedicated RTMaps folder.

RTMaps Software

RTMaps is a Real Time data acquisition and processing Software. Many components and functionalities allow to easily develop any type of Real Time Multisensor Application (Robotics, Automatism, Automotive, Ergonomics, Sports...)

Prerequisite:

Before starting this Tutorial, you should have done the tutorial «RTMaps Magical Tour» to know how to launch RTMaps Studio and connect elementary components.

Objectives:

- » Manipulate RTMaps Studio
- » Use image-processing algorithms

Keywords:

- » RTMaps Studio
- » Algorithms
- » Image Processing
- » Point Tracking

Used components:

Webcam, Viewers, Negative, Gradients and Edges, Threshold, Morphology.



Duration: 10 minutes

Install ^{RT}Maps

The Software

An ^{RT}Maps Demo Version (30 days) is available on the Intempora web site. You can download it or ask us for a CD. Launch the standard setup procedure and follow the steps. By default, ^{RT}Maps is installed in the *Program Files\Intempora\RTMaps 3.2* folder.

NB : The downloadable version is for Windows. Note that ^{RT}Maps is also available under Linux.

Once the installation has successfully completed, you can just launch the ^{RT}Maps Studio, either via the desktop icon, or via the *Start Menu* of Windows (*All programs > Intempora > RTMaps 3.2 > RTMaps Studio*).




Get the image

If you have a webcam

You will use a webcam as an image sensor.

Register the *rtmaps_webcam.pck* package. A new section in the "Component list" window appears with the webcam package. Place a *Webcam* component in your empty diagram. Edit its properties (double click or right click > properties) and choose an RGB Video Format. Most of the components you will try in this tutorial use the RGB format (you'll find more explanations about the video format in [Red Blobs Detection Tutorial](#)).

Registering a package:

Registering a package allows you to use additional components contained in separated files. After registration, such components become available in the Component list and can be used in your diagrams. In the ^{RT}Maps Studio toolbar, click on the "Register package" button (), or via the menu "Actions > Register > Unregister package", then "Add...". Browse for the package file you want located in *.../Intempora/RTMaps 3.2/packages*. The extension associated to a package is *.pck*

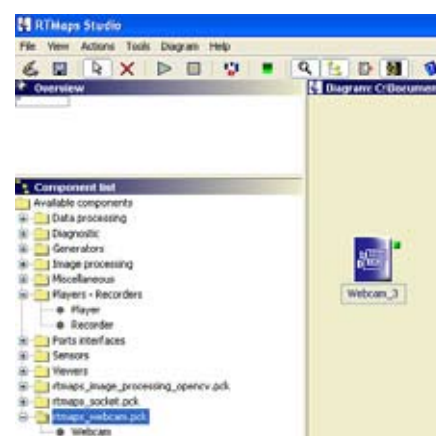
When registering, a new section appears in the component list with the name of the package.

If you don't have a webcam

If you do not have a webcam, download and use the *30' webcam database* available for download on the Intempora tutorials webpage. Place a *Player* on your empty diagram. Edit its properties (double click or right click > properties), and browse for the «.rec» file in the «zip» file you have downloaded.

Only one output (the green square) is associated to this database.

Until the end of this tutorial, we will use a webcam as the video source but you can always practice and follow this tutorial with the Player component and its associated database.



How to connect and use vision Algorithms

Image Viewer

Place an Image Viewer on the diagram and connect the webcam component output to the image viewer input. Run the diagram to check if everything is OK with the video flow.

Shutdown the diagram.

Save your diagram. A .rtd file is created.

Running / shutting down a diagram:

Running a diagram corresponds to starting the execution of all the components you have placed in your diagram. You just have to click on the (▶) button in the toolbar. You can also use the menu Actions > Run.

To stop the execution, use the Shutdown button (■) in the toolbar or use the menu Actions> Shutdown.

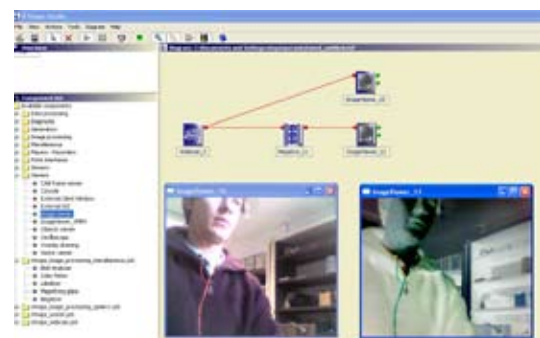


The negative component: a simple algorithm

Register the `rtmaps_image_processing_miscellaneous.pck` package. In the `image_processing_miscellaneous` section from the component list window, you'll find the *Negative component*. Place it on your diagram. Place an Image Viewer. Connect your webcam component to the Negative Component and then, the output of the Negative Component to the ImageViewer.

Run the diagram. The image appears in Negative (an image Viewer can be hidden by another).

Shutdown the diagram.



Finding Gradients and Edges in an image

Register the *opencv* package. Browse for the file called *rtmaps_image_processing_opencv.pck* (located in *.../Intempora/RTMaps 3.2/packages*).

The *Gradients and Edges* searches for important luminosity variations by comparing every pixel to its neighbors. If the luminosity is really different, we can suppose that it belongs to an object edge.

Open the *rtmaps_image_processing_opencv.pck* Section (in the Component list) and place a *Gradients and Edges* component on your diagram. Parametrize it: choose *Canny* in the *Type* property then press the *Apply* button (or *Enter* key).

Connect the *Gradients and Edges* image output to a new *ImageViewer* and run the Diagram to see the results. Reorganize the different viewers as you like and check the results!

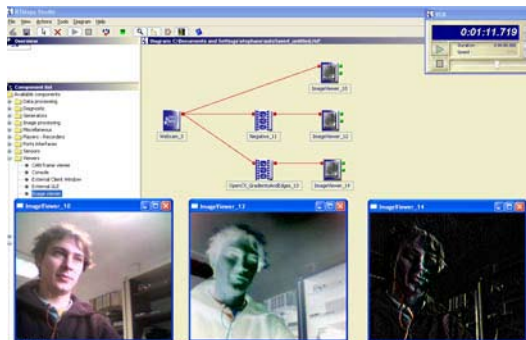
Shutdown the diagram.

OpenCV algorithms:

OpenCV (Open Computer Vision library) is a well-known open-source image-processing library written in C and maintained by Intel®. Detailed information about it can be found on the official website:

<http://www.intel.com/research/mrl/research/opencv/overview.htm>

The *rtmaps_imageprocessing_opencv.pck* package contains RTMaps components that encapsulate some of the main image-processing functions from the OpenCV library.



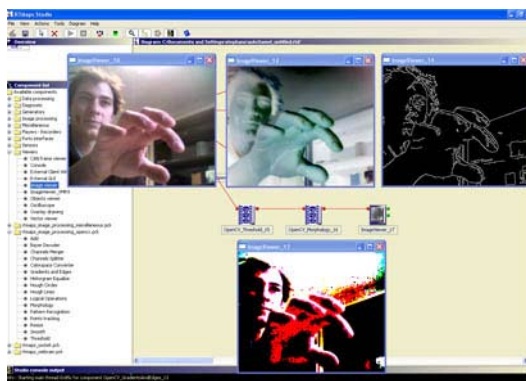
Threshold & Morphology

In the same component list (*image processing OpenCV*), find and place on the diagram a *Threshold* component and a *Morphology* component. Connect the video from your webcam to the *threshold* and then to the *Morphology* component. Use another *Image Viewer* to see the results.

You can test with just one of the two components or using the Morphology before the Threshold. You can try to parametrize those components differently.

Connect a new image viewer and run the diagram. It's pop' art in your webcam!

Shutdown the diagram.



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