

# LIRe: Lucene Image Retrieval

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LIRe is a Java library for *content based image retrieval*. LIRe extracts image features from raster images and stores them in a Lucene index for later retrieval. LIRe also provides means for searching the index. LIRe is intended for developers, who want to integrate content based image retrieval features in their applications. Due to the simplicity of the approach (no database and only a few lines of code are needed to integrate LIRe) it is an *easy* way to test the capabilities of classical CBIR approaches for single application domains. Also the integration of additional image features is possible easily to further *extend* the functionality of LIRe. Currently the following image features are included in LIRe:

- Basic color histograms in RGB and HSV
- MPEG-7 descriptors scalable color, color layout and edge histogram.
- Tamura Features
- Color and edge directivity descriptor, CEDD, see [1]
- Huang's AutoColorCorrelation feature, see [2]

While LIRe itself is a development library there is also an additional demo package called *LIRe Demo*, which allows for testing selected CBIR features of LIRe with a graphical user interface as shown in Fig. 1. For the sake of speed indexing is done with multiple threads in parallel and for sake of simplicity photos from Flickr can be indexed instead of specifying a local image collection for testing purposes. LIRe Demo also integrates an application built on the capabilities of LIRe for creating image mosaics.

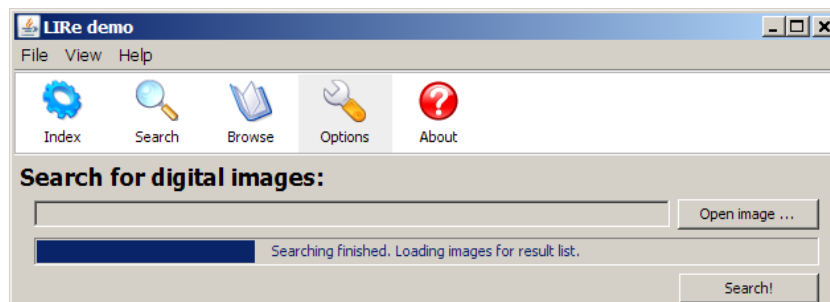


Figure 1 - LIRe demo interface for image search.

LIRe has been first released in Feb. 2006 and is currently available in release v0.6. Both LIRe and LIRe Demo are available licensed under GPL on <http://semanticmetadata.net/lire>. In addition there is a wiki<sup>1</sup> for documentation. Latest development code can be accessed on the Subversion (SVN) server on sourceforge.net<sup>2</sup>. Note that LIRe is hosted as sub project within the project Caliph & Emir, which provides Java based tools MPEG-7 image annotation and retrieval.

## Installation

The package submitted to the ACM Multimedia Open Source Contest 2008 contains a combination of LIRe and LIRe Demo as well as an Ant build file. Requirements for building LIRe and LIReDemo and running LIRe Demo (using the build file) are:

- Java 1.6
- Apache Ant 1.7 (if compiled and run using Ant)

Note that this is a special package as LIRe and LIRe Demo are usually not bundled. The original release can be found on the web page.

<sup>1</sup> URI: <http://www.semanticmetadata.net/wiki/doku.php?id=start>

<sup>2</sup> URI: [http://sourceforge.net/svn/?group\\_id=105915](http://sourceforge.net/svn/?group_id=105915)

### Compilation & start using Ant:

1. Unzip the package
2. Open a command line / shell in the directory containing the build.xml file.
3. Check if Java 1.6 is set up correctly with “java -version”
  - If it says something like “java version “1.6.0\_04”” you are on the safe side
  - If it gives a version number < 1.6 you either need to install Java 1.6 or set your JAVA\_HOME environment variable to point to the base directory of your Java 1.6 installation. Use for instance “set” on Windows or “export” in a bash shell.
4. Run Ant by issuing the command “ant”. This will compile the source and start LIRe Demo.
  - If Ant does not start please check if the Ant executable (ant.bat or ant.sh) is in your path.

### Compilation & start using a Java IDE:

1. Unzip the package.
2. Create a project based on the source files of the unzipped package in an IDE. Use for instance Eclipse, NetBeans or IntelliJ Idea.
3. Specify the jar files in the “lib” directory as project libraries.
4. Specify the class “liredemo.LireDemoFrame” as main class.
5. Use your IDE to compile and run LIRe Demo.

## Running LIRe Demo

LIRe Demo allows to (i) index and photo collections and (ii) search photo collections based on the LIRe library:

1. Create a new index
  - a. Either click the button “Start” on the Index tab and a random set of Flickr images will be retrieved<sup>3</sup> for local storage and indexing.
  - b. Or select a folder containing images and click “Start”.
2. Search within the index
  - a. Either drag and drop an image to the Search tab and click “Start”
  - b. Or select an image with “Open image ...” and click “Start”.
3. Browse the index and search
  - a. Select an image in the Browse tab and click the button “Search”.
4. Search for images similar to a result list item
  - a. Double click on the row in the result table
5. Change the descriptors used for retrieval
  - a. Use “Type of IndexSearcher” in the Options tab.

Note that on the project website<sup>4</sup> there are also demo videos giving a short tutorial on the use of LIRe Demo.

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## References

- [1] Savvas A. Chatzichristofis and Yiannis S. Boutalis, “CEDD: Color and Edge Directivity Descriptor. A Compact Descriptor for Image Indexing and Retrieval”, A. Gasteratos, M. Vincze, and J.K. Tsotsos (Eds.): ICVS 2008, LNCS 5008, pp. 312–322, 2008.
- [2] Huang, J.; Kumar, S. R.; Mitra, M.; Zhu, W. & Zabih, R., “Image Indexing Using Color Correlograms”, Proceedings of the 1997 Conference on Computer Vision and Pattern Recognition (CVPR '97), IEEE Computer Society, 1997, pp. 762-768

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<sup>3</sup> Note that if a proxy is required it can be given in the ant file as indicated by the respective lines in the build file. Edit these lines to connect to Flickr through a proxy server.

<sup>4</sup> URI: <http://www.semanticmetadata.net/lire>