

Dot Blot Analyzer: software development using the macro language of ImageJ

Abstract:

Dot blot is used to check semi-quantitatively the presence of a specific molecule in several samples. This method allows for example, large screening of anti-PrP (prion) molecules collections (Ouidja et al [1]). Dot blot image consists in grey level dots, spread along lines and rows. A simple method of analysis, performed by integrating the grey levels of pixels (volume) surrounded by a circular selection has been described onto the ImageJ website (Rasband [2]). The “Dot Blot Analyzer”, which was programmed in ImageJ’s macro language, is a graphically interfaced tool of the method, greatly simplifying analysis. Once opened, a dot blot image is integrated into its own graphical interface by a previously used method (Carpentier [3], Gray [4]). This interface contains two main interactive areas:

- The dot blot preview sub-window allowing dynamic dot volume measurements by a customisable composite cursor.
- The “user’s facilities area” that renders analysis easier by several functions: invert image, Look Up - Tables, automatic cursor circle size settings, dynamic display of the integrated value of the over-flying area (...).

Two measurement modes are available at any time: a single measurement, and a grid mode performing a global analysis of the image, by selecting three forming-angle dots. Results (single measurements and grid measurements) are stored into separated tables recordable as Excel like file format (Carpentier [5]). Representation of the grid results is available as a modeled blot image showing a virtual dot blot built from the volume measurements resulting from grid analysis. The tool contains the generally required online functionalities of software: documentation, demo images for training and update facilities.

More than these analysis performances, this work demonstrates that the ImageJ's macro language is suitable to perform some friendly “WYSIWYG” multi-platform and upgradable software for research applications.

[1] Ouidja MO, Petit E, Kerros ME, Ikeda Y, Morin C, Carpentier G, Barritault D, Brugère-Picoux J, Deslys JP, Adjou K, Papy-Garcia D: Structure-activity studies of heparan mimetic polyanions for anti-prion therapies. *Biochem Biophys Res Commun.* 2007 363: 95–100.

[2] Rasband W. Dot Blot Analysis, ImageJ documentation, Tutorial and Examples, available at the [HYPERLINK http://rsb.info.nih.gov/ij/docs/examples/dot-blot/index.html](http://rsb.info.nih.gov/ij/docs/examples/dot-blot/index.html)

[3] Carpentier G: Contribution: the Image, Stack and Timelapse Arrow Labelling toolset (online documentation), which allows the user to draw arrows on images and stacks. *ImageJ News*, May 2007.

[4] Gray C, Packham IM, Wurmser F, Eastley NC, Hellewell PG, Ingham PW, Crossman DC, Chico TJ. Ischemia is not required for arteriogenesis in zebrafish embryos. *Arterioscler Thromb Vasc Biol.* 2007 Oct; 27(10): 2135-4.

[5] Carpentier G. Contribution: CustomTabStatFromResults, a macro set that demonstrates how to create, modify, open and save custom results tables. *ImageJ News*, November 2007.

Keywords:

dot blot, macro language, ImageJ, software, prion, graphical interface

Author

Gilles CARPENTIER

Organisation

Faculté des Sciences et Technologies, Université Paris 12 Val de Marne, Créteil, France

Homepage

Short Biography

Research Assistant starting 1987, now Engineer at the Faculté des Sciences et Technologie de l'Université Paris 12, UMR CNRS 7149. Biochemist, I first worked on proteomic and endocrinology of crustaceans at the Laboratoire de Biochimie et Physiologie du développement, Ecole Normale Supérieure de Paris (France). After an experience in cryobiology of sea organisms at the "Centre Océanologique du Pacifique de l' IFREMER (French Polynesia), I joined the Université Paris 12 in year 1991. Here, I first worked on biochemistry of muscle differentiation, and I was led to be responsible of a pole of image facilities in the laboratory. I am developing image processing and analysis tools with the ImageJ macro language since 2004.

From: <http://www.imagejconf.org/> - ImageJ User and Developer Conference

Permanent link: http://www.imagejconf.org/archive/imagej-user-and-developer-conference-2008/copy_of_programme/posters/dot-blot-analyzer-software-development-using-the-macro-language-of-imagej 

Last update: 2009/11/24 13:08