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# The Importance of Open Access in Scientific Publications

Release 0.00

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## Abstract

This document describes a new algorithm implemented using the Insight Toolkit ITK [www.itk.org](http://www.itk.org). The code of the algorithm is written following the ITK CodingStyle as described in the directory

ITK/Documentation/Style.pdf

This paper is accompanied with the source code, input data, parameters and output data that the authors used for validating the algorithm described in this paper. This adheres to the fundamental principle that scientific publications must facilitate reproducibility of the reported results.

Latest version available at the [Insight Journal](http://hdl.handle.net/10380/1338) [ <http://hdl.handle.net/10380/1338>]

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Using filters from the Insight Toolkit, we develop an algorithm for detecting and tracking the movement of solar spots. As it is widely known, celestial objects such as the sun are ethereal and perfect, and therefore can not harbor artifacts such as spots. However, observations performed with our open source telescope have revealed the presence of such spots. The spots seem to continuously change positions on the solar surface.

Automatic detection and tracking of the solar spot movements are of fundamental importance for allowing the authors to dedicate more time to perfecting optical instruments and less time to the supervised acquisition of reliable data.

The reader should be warned that direct observation of the sun without proper equipment may result in personal injury, loss of vision and burned brains.

## 1 Principles of Solar Spot Detection

Solar spots can be classified as the darkest objects present on an image of the solar surface. Algorithms such as watersheds, statistical classification and mathematical morphology are suitable for automatically detecting these features in images of the solar surface.

## 2 Why Image Processing Papers must include Source Code, Images and Parameters

Modern Image Processing is most of the time performed with computers. An attempt to replicate the results of an algorithm described in a paper entails to reimplement the algorithm into source code. This task is far from trivial and consumes months of work. The final result can not be guaranteed to be equivalent to the actual code that was used for testing the algorithm when the paper was written, and therefore it cannot be considered a baseline for comparing the algorithm with other algorithms available to the reader.

Papers to the Insight Journal are written in the spirit of facilitating and encouraging readers to perform replication of work. In this sense, the Insight Journal is compliant with essential concepts of the scientific method.

Since the code is included with the paper, less time has to be spent in describing the code, and more time can be used for describing how to use the algorithm in particular types of images.

For questions on the basis of the scientific method the reader is referred to [2, 1].

## 3 Pointing to other material

The format of this LaTeX file, allows authors to include code snippets, like the following

```
typedef itk::Image< unsigned char, 3 > ImageType;
ImageType::Pointer image = ImageType::New();
```

and to cite the online documentation of the Insight Toolkit, for example, the link to the doxygen documentation of the ImageToImageFilter

[itk::ImageToImageFilter](#)

LaTeX macros are also available for typesetting code in familiar courier fonts. Like the following method of an ITK class.

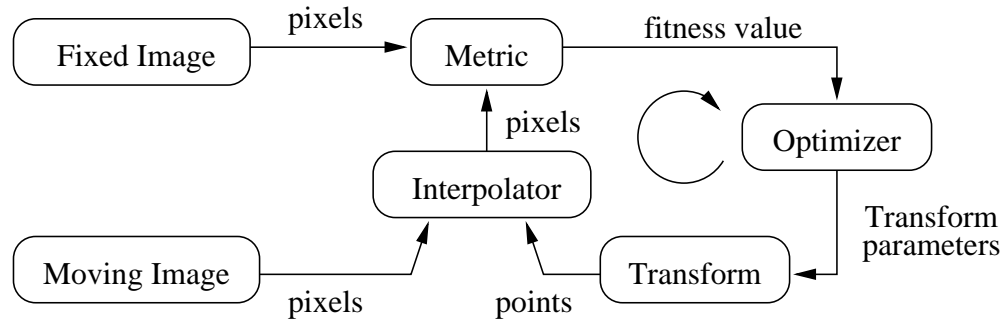


Figure 1: The basic components of the registration framework are two input images, a transform, a metric, an interpolator and an optimizer.

SetNumberOfIterations()

## A This is an Appendix

To create an appendix in a Insight HOWTO document, use markup like this:

```
\appendix
```

```
\section{This is an Appendix}
```

To create an appendix in a Insight HOWTO document, ....

```
\section{This is another}
```

Just add another `\section{}`, but don't say `\appendix` again.

To support shape-guidance, the generic level set equation (Eqn( 1)) is extended to incorporate a shape guidance term:

$$\xi(\psi^*(\mathbf{x}) - \psi(\mathbf{x})) \quad (1)$$

## References

- [1] K. Popper. Open Society and Its Enemies. Princenton University Press, 1971. 2
- [2] K. Popper. The Logic of Scientific Discovery. Routledge, 2002. 2