


# An Inspiring Title for the MELBA Journal Sample Article

Firstname1 **Name1**<sup>1,3</sup>, Firstname2 Name2<sup>2,3</sup> 

**1** Melba journal, The Internet, CERN, CH

**2** Melba journal, The Internet, CERN, CH

**3** Melba journal, The Internet, CERN, CH

## Abstract

We develop a learning framework for building deformable templates, which play a fundamental role in many image analysis and computational anatomy tasks. Conventional methods for template creation and image alignment to the template have undergone decades of rich technical development. In these frameworks, templates are constructed using an iterative process of template estimation and alignment, which is often computationally very expensive. Due in part to this shortcoming, most methods compute a single template for the entire population of images, or a few templates for specific sub-groups of the data. In this work, we present a probabilistic model and efficient learning strategy that yields either universal or *conditional* templates, jointly with a neural network that provides efficient alignment of the images to these templates. We demonstrate the usefulness of this method on a variety of domains, with a special focus on neuroimaging. This is particularly useful for clinical applications where a pre-existing template does not exist, or creating a new one with traditional methods can be prohibitively expensive. Our code is available at <http://yoururl.com>.

## Keywords

Machine Learning, Image Registration

## Article informations

©YYYY Name1 and Name2. License: CC-BY 4.0

## 1. Introduction

**A** **deformable template** is an image that can be geometrically deformed to match images in a dataset, providing a common reference frame. Templates are a powerful tool that enables the analysis of geometric variability. They have been used in computer vision, medical image analysis, graphics, and time series signals.

## 2. Related Works

Spatial alignment, or registration, between two images is a building block for estimation of deformable templates. Alignment usually involves two steps: a global affine transformation, and a deformable transformation (as in many optical flow applications).

Use `\cite{}` for reference that is part of the sentence, and `\citep{}` for references in parenthesis. For example, Viola and Wells III (1997) is awesome. Also, this is a citation (Viola and Wells III, 1997).

## 3. Methods

### 3.1 Equations

We estimate the deformable template parameters  $\theta_t$  and the deformation fields for every data point using maximum

likelihood. Letting  $\mathcal{V} = \{v_i\}$  and  $\mathcal{A} = \{a_i\}$ ,

$$\begin{aligned}\hat{\theta}_t, \hat{\mathcal{V}} &= \arg \max_{\theta_t, \mathcal{V}} \log p_{\theta_t}(\mathcal{V} | \mathcal{X}, \mathcal{A}) \\ &= \arg \max_{\theta_t, \mathcal{V}} \log p_{\theta_t}(\mathcal{X} | \mathcal{V}; \mathcal{A}) + \log p(\mathcal{V}),\end{aligned}\quad (1)$$

where the first term captures the likelihood of the data and deformations, and the second term controls a prior over the deformation fields.

**Proof** Awesome proof. 

### 3.2 Math styles

Different font styles can be used for equations:

- `$a b c A B C 1 2 3$`:  $abcABC123$
- `$\mathbf{a b c A B C 1 2 3}$`:  $\mathbf{abcABC123}$
- `$\mathfrak{a b c A B C 1 2 3}$`:  $\mathfrak{abc\mathfrak{A}\mathfrak{B}\mathfrak{C}123}$
- `$\mathcal{ABC}$`:  $\mathcal{ABC}$
- `$\mathbb{ABC}$`:  $\mathbb{ABC}$

Text and names in equations should be dealt with the `\text` command, for instance:

`$\mathcal{L}_{\text{SuperLoss}}$`:  $\mathcal{L}_{\text{SuperLoss}}$  and not  $\mathcal{L}_{SuperLoss}$ .

39 **4. Section**

40 **4.1 Subsection**

41 **4.1.1 Subsubsection**

42 **Paragraph** Ex culpa ut commodo proident esse excep-  
43 teur mollit in sed aliqua fugiat sed cupidatat dolor sint  
44 quis veniam amet aute ea fugiat quis do excepteur sunt  
45 commodo magna cupidatat veniam minim anim mollit do  
46 enim et nostrud ad esse velit nisi est dolor do ut dolore  
47 excepteur nulla ex sunt exercitation consequat ullamco ad  
48 in fugiat ut ut enim adipisicing cillum nisi anim ullamco ul-  
49 lamco nisi esse aute dolore amet nisi adipisicing dolor dolore  
50 do ut aliqua in sunt aliqua tempor dui amet ut non adip-  
51 isicing nostrud ex ullamco excepteur culpa anim est minim  
52 fugiat laborum ex irure consectetur eu in reprehenderit sint  
53 magna ut consequat laborum ex minim laboris culpa amet  
54 incidunt laborum laborum dolore nulla cupidatat dolore  
55 in aliqua ut eu in magna sunt eiusmod est labore sit eu in-  
56 cididunt fugiat in culpa pariatur voluptate dui id velit sunt  
57 reprehenderit pariatur amet esse dolore minim non fugiat  
58 fugiat amet incidunt commodo sit dolor.

59 In itemize and enumeration, longer sentences and  
60 text in paragraphs could require manual hyphenation with  
61 – in case of boxes under- or over-flows:

- 62 ■ Ad dolor nisi culpa eu eiusmod sint ut est in nisi quis ut  
63 deserunt ut anim ut proident proident officia laborum in.
  - 64 ■ Dolore et irure adipisicing ex anim exercitation sit pro-  
65 ident mollit.
- 66 1. Incidunt id cillum mollit officia aliquip id dolor ea rep-  
67 rehenderit ut pariatur consequat dolore adipisicing sit  
68 minim minim id irure ullamco nulla occaecat sint ut de-  
69 serunt tempor aute eiusmod dolor.
  - 70 2. Aliquip sunt in voluptate occaecat ut magna cupidatat  
71 sunt dui ut proident consequat.

72 **5. Table and Figures**

Table 1: By convention, Table caption goes on top.

| Left | center | right |
|------|--------|-------|
| 111  | 222    | 333   |
| 444  | 555    | 666   |

73 **6. Revision**

74 We provide, in `melba.sty` a helpful command to color  
75 modifications after a revision: `\revision{}`. It is auto-  
76 matically de-activated for papers compiled with the `accepted`  
77 `arxiv` or `specialissue` options.

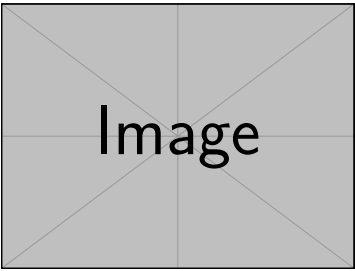


Figure 1: Example figure. Notice that the caption goes below.

6.1 It can also color whole sections and paragraphs 78

Adipisicing laborum in officia veniam in officia dolor repre- 79  
henderit ut ea sed ea reprehenderit veniam veniam culpa 80  
commodo velit commodo cillum laborum magna esse dui 81  
laboris esse in esse laborum consequat esse cupidatat. 82

Lorem ipsum exercitation voluptate adipisicing esse cu- 83  
pidatat sint do excepteur laboris nisi anim mollit ut adip- 84  
isicing velit quis sunt minim ut deserunt pariatur id amet 85  
elit consectetur incidunt occaecat ad labore sit in magna 86  
eiusmod. 87

**Acknowledgments** 88

This work was supported by grants X, Y and Z. We also 89  
acknowledge important conversations with our colleagues 90  
A, B and C. 91

**Ethical Standards** 92

The work follows appropriate ethical standards in conduct- 93  
ing research and writing the manuscript, following all appli- 94  
cable laws and regulations regarding treatment of animals 95  
or human subjects. 96

**Conflicts of Interest** 97

The conflicts of interest have not been entered yet. 98

**Data availability** 99

Authors submitting articles to MELBA are required to in- 100  
clude a Data Availability Statement in their manuscripts. 101  
The Data Availability Statement should clearly indicate 102  
whether the data supporting the findings of the study are 103  
available and, if so, how readers can access them. If the 104  
data are not available, authors should provide a brief justi- 105  
fication for not sharing the data. 106

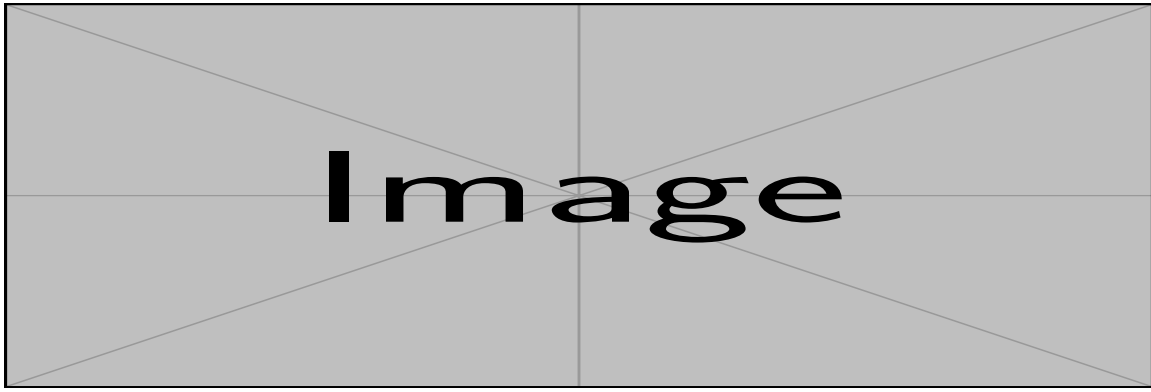


Figure 2: Example figure spanning the two columns.

## References

Paul Viola and William M Wells III. Alignment by maximization of mutual information. *International journal of computer vision*, 24(2):137–154, 1997.

111 **Appendix A. Proof of the central theorem**

112 In this appendix we prove the central theorem and present  
113 additional experimental results.  
114 *Remainder omitted in this sample.*

115 **Appendix B. Appendix section**

116 B.1 Appendix subsection

117 *B.1.1 Appendix subsubsection*

118 **Appendix paragraph** Lorem ipsum dolor sit amet, con-  
119 sectetur adipisicing elit, sed do eiusmod tempor incididunt  
120 ut labore et dolore magna aliqua. Ut enim ad minim  
121 veniam, quis nostrud exercitation ullamco laboris nisi ut  
122 aliquip ex ea commodo consequat. Duis aute irure dolor  
123 in reprehenderit in voluptate velit esse cillum dolore eu fu-  
124 giat nulla pariatur. Excepteur sint occaecat cupidatat non  
125 proident, sunt in culpa qui officia deserunt mollit anim id  
126 est laborum.