PATTERN RECOGNITION

TABLE OF CONTENTS

- Description p.1
- Audience p.1
- Impact Factor p.1
- Abstracting and Indexing p.2
- Editorial Board p.2
- Guide for Authors p.6

DESCRIPTION

*Pattern Recognition* is a mature but exciting and fast developing field, which underpins developments in cognate fields such as computer vision, image processing, text and document analysis and neural networks. It is closely akin to machine learning, and also finds applications in fast emerging areas such as biometrics, bioinformatics, multimedia data analysis and most recently data science. The journal *Pattern Recognition* was established some 50 years ago, as the field emerged in the early years of computer science. Over the intervening years it has expanded considerably.

The journal accepts papers making original contributions to the theory, methodology and application of pattern recognition in any area, provided that the context of the work is both clearly explained and grounded in the pattern recognition literature. Papers whose primary concern falls outside the pattern recognition domain and which report routine applications of it using existing or well known methods, should be directed elsewhere. The publication policy is to publish (1) new original articles that have been appropriately reviewed by competent scientific people, (2) reviews of developments in the field, and (3) pedagogical papers covering specific areas of interest in pattern recognition. Various special issues will be organized from time to time on current topics of interest to Pattern Recognition. Submitted papers should be single column, double spaced, no less than 20 and no more than 35 (40 for a review) pages long, with numbered pages.

Benefits to authors

We also provide many author benefits, such as free PDFs, a liberal copyright policy, special discounts on Elsevier publications and much more. Please click here for more information on our author services.

Please see our Guide for Authors for information on article submission. If you require any further information or help, please visit our Support Center

AUDIENCE

Photo-Optical Engineers, Computer Scientists, Space Scientists.

IMPACT FACTOR

2018: 5.898 © Clarivate Analytics Journal Citation Reports 2019
ABSTRACTING AND INDEXING

ACM Guide to Computing Literature
Current Contents - Social & Behavioral Sciences
Current Contents - Engineering, Technology & Applied Sciences
Elsevier BIOBASE
Ocular R
BIOSIS Citation Index
Engineering Index
Information Science Abstracts
Mathematical Reviews
Current Literature on Aging
PAIS Bulletin
Pascal Francis
Web of Science
SSSA/CISA/ECA/ISMEC
Engineering Village - GEObase
Science Citation Index
Zentralblatt MATH
INSPEC
Research Alert
Cambridge Scientific Abstracts
Current Contents
Scopus

EDITORIAL BOARD

Editor-in-Chief
Edwin Hancock, University of York Department of Computer Science, Deramore Lane, Heslington, Y010 5DD, York, United Kingdom

Founding Editor
Robert S. Ledley †

Editor Emeritus
Ching Y. Suen, Concordia University, Montreal, Quebec

Deputy Editor
Zoran Duric , George Mason University, Fairfax, Virginia, USA

Advisory Editors
Roland Chin, Hong Kong University of Science and Technology, Dept. of Computer Science, Hong Kong, China
Josef Kittler, University of Surrey, Guildford, United Kingdom
Seong-Whan Lee, Korea University, Dept. of Computer Science and Engineering, Seoul, Korea, Republic of
Linda Shapiro, UNIVERSITY OF WASHINGTON, Seattle, Washington, United States

Associate Editors-in-Chief
Adam Krzyzak, Concordia University, Centre for PR and Machine Intell., Québec, Quebec, Canada
Longin Jan Latecki, Temple University Computer and Information Sciences Department, Philadelphia, Pennsylvania, United States
Cheng-Lin Liu, Institute of Automation Chinese Academy of Sciences, Beijing, China
Dacheng Tao, University of Technology Sydney, Sydney, Australia
Richard Wilson, University of York Department of Computer Science, York, United Kingdom

Associate Editors
Majid Ahmadi, University of Windsor, Dept. of Electrical Engin., Windsor, Ontario, Canada
Zeynep Akata, Universiteit van Amsterdam, Informatics Institute, Amsterdam, Netherlands
Ognjen Arandjelović, The University of St. Andrews, School of Computer Science, Scotland, United Kingdom
George Azzopardi, University of Groningen, Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence, Groningen, Netherlands
R. Venkatesh Babu, Indian Institute of Science, Bengaluru, India
Song Bai, University of Oxford Department of Engineering Science, Oxford, United Kingdom
Xiang Bai, Huazhong University of Science and Technology, Wuhan, China
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Josep Lladós</td>
<td>Universitat Autònoma de Barcelona (UAB), Computer Vision Center, Barcelona, Spain</td>
</tr>
<tr>
<td>Marco Loog</td>
<td>Delft University of Technology Faculty of Electrical Engineering Mathematics and Computer Science, Delft, Netherlands</td>
</tr>
<tr>
<td>Brian Lovell</td>
<td>University of Queensland, School of Information Technology and Electrical Engineering, Brisbane, Queensland, Australia</td>
</tr>
<tr>
<td>Jiwen Lu</td>
<td>Tsinghua University, Beijing, China</td>
</tr>
<tr>
<td>Shijian Lu</td>
<td>Nanyang Technological University, Coll. of Engineering, Singapore, Singapore</td>
</tr>
<tr>
<td>Yue Lu</td>
<td>East China Normal University, Dept. of Computer Science and Technology, Shanghai, China</td>
</tr>
<tr>
<td>Bin Luo</td>
<td>Anhui University, Sch. of Computer Science and Technology, Hefei, China</td>
</tr>
<tr>
<td>Jiebo Luo</td>
<td>Eastman Kodak Company, Div. of Imaging Science, Rochester, New York, United States</td>
</tr>
<tr>
<td>José Francisco Martínez-Trinidad</td>
<td>National Institute of Astrophysics, Optics and Electronics, Mexico, Dept. of Computer Science, Puebla, Mexico</td>
</tr>
<tr>
<td>Takeshi Masuda</td>
<td>National Institute of Advanced Industrial Science and Technology Tsukuba Center Tsukuba Central, Tsukuba, Japan</td>
</tr>
<tr>
<td>Babu Mehtre</td>
<td>Institute for Development and Research in Banking Technology (IDRBT), Center for Information Assurance and Management (CIAM), Hyderabad, India</td>
</tr>
<tr>
<td>Tao Mei</td>
<td>Microsoft Research Asia, Beijing, China</td>
</tr>
<tr>
<td>Ajmal Mian</td>
<td>University of Western Australia, Perth, Australia</td>
</tr>
<tr>
<td>Majid Mirmehdi</td>
<td>University of Bristol Department of Computer Science, Bristol, United Kingdom</td>
</tr>
<tr>
<td>Yi Lu Murphy</td>
<td>University of Michigan at Dearborn, Dept. of Electrical &amp; Computer Engineering, Dearborn, Michigan, United States</td>
</tr>
<tr>
<td>Karthik Nandakumar</td>
<td>IBM Research, The IBM Place, Singapore</td>
</tr>
<tr>
<td>Feiping Nie</td>
<td>Northwestern Polytechnical University, Sch. of Computer Science and Ctr. for OPTical Imagery Analysis and Learning (OPTIMAL), Xian, China</td>
</tr>
<tr>
<td>Lawrence O’Gorman</td>
<td>Nokia, Bell Labs, Murray Hill, New Jersey, United States</td>
</tr>
<tr>
<td>Umapada Pal</td>
<td>Indian Statistical Institute, CVPR Unit, Kolkata, India</td>
</tr>
<tr>
<td>Vishal Patel</td>
<td>Johns Hopkins University School of Medicine, Baltimore, Maryland, United States</td>
</tr>
<tr>
<td>Ioannis Patras</td>
<td>Queen Mary, University of London (QMUL), Dept. of Electronic Engineering, London, United Kingdom</td>
</tr>
<tr>
<td>Daniel Carlos Guimarães Pedronette</td>
<td>Universidade Estadual Paulista Júlio de Mesquita Filho, Instituto de Geociências e Ciências Exatas (IGCE), Rio Claro, SP, Brazil</td>
</tr>
<tr>
<td>Marcello Pelillo</td>
<td>Università Ca' Foscari Venezia, Dipart. di Informatica, Venezia, Italy</td>
</tr>
<tr>
<td>Tuan Pham</td>
<td>UNSW Australia, School of Information Technology &amp; Electrical Engineering, Canberra, Australian Capital Territory, Australia</td>
</tr>
<tr>
<td>Guo-Jun Qi</td>
<td>University of Central Florida, Orlando, Florida, United States</td>
</tr>
<tr>
<td>Petia Radeva</td>
<td>Universitat de Barcelona, Departament MAIA, Barcelona, Spain</td>
</tr>
<tr>
<td>Huzeefa Rangwala</td>
<td>George Mason University, Department of Computational and Data Sciences, Fairfax, Virginia, United States</td>
</tr>
<tr>
<td>A. Ravishankar Rao</td>
<td>Fairleigh Dickinson University, School of Computer Sciences and Engineering, New Jersey, United States</td>
</tr>
<tr>
<td>Eraldo Ribeiro</td>
<td>Florida Institute of Technology, Melbourne, Florida, United States</td>
</tr>
<tr>
<td>Kaspar Riesen</td>
<td>FHWN, Sch. of Business, Olten, Switzerland</td>
</tr>
<tr>
<td>Antonio Robles-Kelly</td>
<td>Commonwealth Scientific and Industrial Research Organisation, Canberra, Australian Capital Territory, Australia</td>
</tr>
<tr>
<td>Arun Ross</td>
<td>Michigan State University, Dept. of Computer Science and Engineering, East Lansing, Michigan, United States</td>
</tr>
<tr>
<td>Luca Rossi</td>
<td>Southern University of Science and Technology, Guangdong Sheng, China</td>
</tr>
<tr>
<td>Samuel Rota Bulo</td>
<td>Fondazione Bruno Kessler, 3D Optical Metrology unit, Trento, Italy</td>
</tr>
<tr>
<td>Walter J. Scheirer</td>
<td>University of Notre Dame Department of Computer Science and Engineering, Notre Dame, Indiana, United States</td>
</tr>
<tr>
<td>Raimondo Schettini</td>
<td>Università degli Studi di Milano, Dipart. di Informatica, Milano, Italy</td>
</tr>
<tr>
<td>Shishir K. Shah</td>
<td>University of Houston, Houston, Texas, United States</td>
</tr>
<tr>
<td>Chunhua Shen</td>
<td>University of Adelaide, School of Computer Science, Adelaide, South Australia, Australia</td>
</tr>
<tr>
<td>Dinggang Shen</td>
<td>University of North Carolina at Chapel Hill, School of Medicine, Chapel Hill, North Carolina, United States</td>
</tr>
<tr>
<td>Ali Shokoufandeh</td>
<td>Drexel University, Dept. of Computer Science, Philadelphia, Pennsylvania, United States</td>
</tr>
<tr>
<td>Richa Singh</td>
<td>Indraprastha Institute of Information Technology Delhi, New Delhi, India</td>
</tr>
<tr>
<td>William A. P. Smith</td>
<td>University of York Department of Computer Science, York, United Kingdom</td>
</tr>
<tr>
<td>Enrique Sucar</td>
<td>Instituto Nacional de Astrofísica, Óptica y Electrónica, Dept. of Computer Science, Puebla, Mexico</td>
</tr>
<tr>
<td>Ponnnuthurai Nagaratnam Suganthan</td>
<td>Nanyang Technological University, Singapore, Singapore</td>
</tr>
<tr>
<td>Shiliang Sun</td>
<td>East China Normal University, Dept. of Computer Science and Technology, Shanghai, China</td>
</tr>
<tr>
<td>David Suter</td>
<td>The University of Adelaide School of Agriculture Food and Wine, Adelaide, Australia</td>
</tr>
<tr>
<td>Kenji Suzuki</td>
<td>Illinois Institute of Technology, Chicago, Illinois, United States</td>
</tr>
<tr>
<td>Andrea Torsello</td>
<td>Università Ca’ Foscari Venezia, DAIS, Venezia, Italy</td>
</tr>
<tr>
<td>Pavan Turaga</td>
<td>Arizona State University, School of Arts, Media and Engineering, Tempe, Arizona, United States</td>
</tr>
<tr>
<td>Carole Twining</td>
<td>The University of Manchester, Manchester, United Kingdom</td>
</tr>
<tr>
<td>Seiichi Uchida</td>
<td>Kyushu University, Fukuoka, Japan</td>
</tr>
</tbody>
</table>
Mayank Vatsa, Indraprastha Institute of Information Technology, Infosys Center for Artificial Intelligence, New Delhi, India
Mario Vento, Università degli Studi di Salerno, Dipart. di Ing. dell’ Informazione e di Ing. Elettrica, Salerno, Italy
Nicole Vincent, Université Paris Descartes, Centre de Recherche en Informatique, Paris, France
Fei Wang, University of Connecticut, Dept. of Computer Science & Engineering, Storrs, Connecticut, United States
Liang Wang, Chinese Academy of Sciences (CAS), National Laboratory of Pattern Recognition (NLPR), Beijing, China
Yunhong Wang, Beihang University, China
Jianxin Wu, Nanjing University, Dept. of Computer Science & Technology, Nanjing, China
Yihong Wu, Institute of Automation Chinese Academy of Sciences, Beijing, China
Gui-Song Xia, Wuhan University, Wuhan, China
Bai Xiao, Beihang University, Beijing, China
Herb Yang, University of Alberta Department of Computing Science, Edmonton, Alberta, Canada
Jian Yang, Nanjing University of Science and Technology, School of Computer Science, Nanjing, China
Jane Jia You, The Hong Kong Polytechnic University, Dept. of Computing, Hong Kong, Hong Kong
Jun Yu, Hangzhou Dianzi University, School of Computer Science and Technology, Hangzhou, China
Pong Chi Yuen, Hong Kong Baptist University, Department of Education Studies, Kowloon, Hong Kong
Kun Zhang, Carnegie Mellon University, Dept. of Philosophy, Pittsburgh, Pennsylvania, United States
Yanning Zhang, Northwestern Polytechnical University, China
Guoying Zhao, University of Oulu, Center for Machine Vision Research (CMV), Oulu, Finland
Wei-Shi Zheng, Guangzhou University, Guangzhou, China
Jun Zhou, Griffith University, School of Information and Communication Technology, Brisbane, Australia
Barbara Zitova, Czech Academy of Sciences, Prague, Czechia, Czech Republic
Reyer Zwiggelaar, Aberystwyth University, Dept. of Computer Science, Aberystwyth, United Kingdom
GUIDE FOR AUTHORS

INTRODUCTION

Submission checklist
You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
- E-mail address
- Full postal address

All necessary files have been uploaded:
Manuscript:
- Include keywords
- All figures (include relevant captions)
- All tables (including titles, description, footnotes)
- Ensure all figure and table citations in the text match the files provided
- Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)

Supplemental files (where applicable)

Further considerations
- Manuscript has been 'spell checked' and 'grammar checked'
- All references mentioned in the Reference List are cited in the text, and vice versa - authors are requested to note the extensive guidance on organising references in the relevant sections below.
- Permission has been obtained for use of copyrighted material from other sources (including the Internet)
- A competing interests statement is provided, even if the authors have no competing interests to declare
- Journal policies detailed in this guide have been reviewed
- Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

BEFORE YOU BEGIN

Ethics in publishing
Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Declaration of interest
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

Submission declaration and verification
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in
English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

Preprints
Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy. Sharing your preprints e.g. on a preprint server will not count as prior publication (see 'Multiple, redundant or concurrent publication' for more information).

Use of inclusive language
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

Changes to authorship
Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed. Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Article transfer service
This journal is part of our Article Transfer Service. This means that if the Editor feels your article is more suitable in one of our other participating journals, then you may be asked to consider transferring the article to one of those. If you agree, your article will be transferred automatically on your behalf with no need to reformat. Please note that your article will be reviewed again by the new journal. More information.

Copyright
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

Author rights
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.
Role of the funding source
You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

Funding body agreements and policies
Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the gold open access publication fee. Details of existing agreements are available online.

Open access
This journal offers authors a choice in publishing their research:

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
• No open access publication fee payable by authors.
• The Author is entitled to post the accepted manuscript in their institution's repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

Gold open access
• Articles are freely available to both subscribers and the wider public with permitted reuse.
• A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

Creative Commons Attribution (CC BY)
Lets others distribute and copy the article, create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), include in a collective work (such as an anthology), text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honor or reputation.

Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)
For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The gold open access publication fee for this journal is USD 3250, excluding taxes. Learn more about Elsevier's pricing policy: https://www.elsevier.com/openaccesspricing.

Green open access
Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. Find out more.

This journal has an embargo period of 24 months.
**Elsevier Researcher Academy**

**Researcher Academy** is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

**Language (usage and editing services)**

Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

**Submission**

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

**Resubmission Policy**

This journal has a mandatory period of 4 months for the re-submission of a previously rejected paper.

**Referees**

Please submit the names and institutional e-mail addresses of several potential referees. For more details, visit our Support site. Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

**PREPARATION**

**Peer review**

This journal operates a single blind review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. More information on types of peer review.

**Use of word processing software**

It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

**Page limit**

Please limit your manuscript to between 20 and 35 pages (figures and tables included, ideally embedded in the text), double-spaced and in single column with numbered pages. For survey papers, since there will be a lot of references, your paper can be up to 40 pages. If your paper is less than 10 pages long, we suggest you submit it to our sister journal Pattern Recognition Letters, which specialises in publishing shorter letters format papers.

**LaTeX**

You are recommended to use the Elsevier article class elsarticle.cls to prepare your manuscript and BibTeX to generate your bibliography.

Our LaTeX site has detailed submission instructions, templates and other information.

**Article structure**
Subdivision - numbered sections
Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

Author Biographies
Include in the manuscript a short (maximum 50 words) biography of each author.

Essential title page information
- Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible. The title should be in the format 'Topic - application (for example: Distance metric optimization driven convolutional neural network for age invariant face recognition).
- Author names and affiliations. Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
- Corresponding author. Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.
- Present/permanent address. If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Highlights
Highlights are mandatory for this journal. They consist of a short collection of bullet points that convey the core findings of the article and should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point). You can view example Highlights on our information site.

Abstract
A concise and factual abstract is required (maximum length 150 words). The abstract should be structured and state briefly the (i) purpose of the research, (ii) the methods used, (iii) the principal results and (iv) major conclusions (which should relate to the study aims). An abstract is often presented separate from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

Graphical abstract
Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site. Authors can make use of Elsevier's Illustration Services to ensure the best presentation of their images and in accordance with all technical requirements.

Keywords
Immediately after the abstract, provide a maximum of five to ten keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These Keywords will be used for indexing purposes.
**Abbreviations**
Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

**Acknowledgements**
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

**Formatting of funding sources**
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Units**
Follow internationally accepted rules and conventions: use the international system of units (SI). If other units are mentioned, please give their equivalent in SI.

**Math formulae**
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

**Footnotes**
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

**Artwork**

**Electronic artwork**

**General points**
- Make sure you use uniform lettering and sizing of your original artwork.
- Embed the used fonts if the application provides that option.
- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Provide captions to illustrations separately.
- Size the illustrations close to the desired dimensions of the published version.
- Submit each illustration as a separate file.

A detailed guide on electronic artwork is available. **You are urged to visit this site; some excerpts from the detailed information are given here.**

**Formats**
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.
Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):

**EPS (or PDF):** Vector drawings, embed all used fonts.
**TIFF (or JPEG):** Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
**TIFF (or JPEG):** Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
**TIFF (or JPEG):** Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please **do not:**
- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
- Supply files that are too low in resolution;
- Submit graphics that are disproportionately large for the content.

**Color artwork**

Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. **For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article.** Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.

**Figure captions**

Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (**not** on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

**Text graphics**

Text graphics may be embedded in the text at the appropriate position. If you are working with LaTeX and have such features embedded in the text, these can be left. See further under Electronic artwork.

**Tables**

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

**References**

Authors are requested to use between 35-45 references to illustrate their work and the context in which it sits in the field of pattern recognition. References should be (i) relevant to the research undertaken to set it in the context of past research, and to illustrate the article's novelty and contribution to the field of pattern recognition, (ii) relevant to the Pattern Recognition journal's own readership and (iii) from multiple sources within the pattern recognition field to illustrate a breadth of knowledge on the topic. References to publications outside the field of pattern recognition and its cognate fields should be used only where research is on the interface of pattern recognition and another field, and then should only be used sparingly.

**Citation in text**

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

**Web references**

As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.
Data references
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

References in a special issue
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

Reference management software
Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:
http://open.mendeley.com/use-citation-style/pattern-recognition
When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

Reference style
Text: Indicate references by number(s) in square brackets in line with the text. The actual authors can be referred to, but the reference number(s) must always be given.
Example: '..... as demonstrated [3,6]. Barnaby and Jones [8] obtained a different result ....'
List: Number the references (numbers in square brackets) in the list in the order in which they appear in the text.
Examples:
Reference to a journal publication:
Reference to a journal publication with an article number:
Reference to a book:
Reference to a chapter in an edited book:
Reference to a website:
Reference to a dataset:

Journal abbreviations source
Journal names should be abbreviated according to the List of Title Word Abbreviations.

Video
Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly
relate to the video file’s content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply ‘stills’ with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

Data visualization
Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

Supplementary material
Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

Research data
This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

Data linking
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

Mendeley Data
This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the Mendeley Data for journals page.
Data in Brief
You have the option of converting any or all parts of your supplementary or additional raw data into one or multiple data articles, a new kind of article that houses and describes your data. Data articles ensure that your data is actively reviewed, curated, formatted, indexed, given a DOI and publicly available to all upon publication. You are encouraged to submit your article for Data in Brief as an additional item directly alongside the revised version of your manuscript. If your research article is accepted, your data article will automatically be transferred over to Data in Brief where it will be editorially reviewed and published in the open access data journal, Data in Brief. Please note an open access fee of 600 USD is payable for publication in Data in Brief. Full details can be found on the Data in Brief website. Please use this template to write your Data in Brief.

MethodsX
You have the option of converting relevant protocols and methods into one or multiple MethodsX articles, a new kind of article that describes the details of customized research methods. Many researchers spend a significant amount of time on developing methods to fit their specific needs or setting, but often without getting credit for this part of their work. MethodsX, an open access journal, now publishes this information in order to make it searchable, peer reviewed, citable and reproducible. Authors are encouraged to submit their MethodsX article as an additional item directly alongside the revised version of their manuscript. If your research article is accepted, your methods article will automatically be transferred over to MethodsX where it will be editorially reviewed. Please note an open access fee is payable for publication in MethodsX. Full details can be found on the MethodsX website. Please use this template to prepare your MethodsX article.

Data statement
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

AFTER ACCEPTANCE

Online proof correction
Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors. If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF. We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

Offprints
The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier’s Author Services. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

AUTHOR INQUIRIES
Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch. You can also check the status of your submitted article or find out when your accepted article will be published.