Guide to Writing a Digest

International Conference on Robotics and Mechatronics
(ICRoM)

November 2024

Contents

1 Introduction

Dear author, first of all, we congratulate you for the approval of the article in the International Conference on Robotics and Mechatronics (ICRoM)!
Every year, ICRoM Conference publishes a bulletin in which all conference information (such as conference chairs, keynote speakers, round tables, etc.) is written. Some printed copies of this bulletin will be prepared for distribution during the conference, and its online version will also be posted on the conference website. At the end of this bulletin, information about all articles approved for oral presentation or poster section will be published. In fact, a space is allocated for each article so that in addition to the authors' names and their affiliations, a brief explanation of the paper's content is also given. You can see an example of this feature in the Fig. 1.1.

Session ThA5 Thursday, December 21, 2023

Continuum & Soft Robotics-II
Chairs: Dr. Hamed Ghafarirad
Dr. Mohammad Zareinejad

9:30-9:50 154 ThA5.1

Intelligent Model-Free Control for Tendon-Driven Continuum Robotic Arms

Nima Maghooli[1], Omid Mahdizadeh[1], S. Ali A. Moosavian[1]
[1] *Advanced Robotics and Automated Systems (ARAS)*
Department of Mechanical Engineering, K. N. Toosi University of Technology, Tehran, Iran

- In this research, the design of a model-free controller with comparable performance to model-based control strategies is presented.
- It aims to improve the performance of the MTJ model-free control strategy in tracking trajectories starting from arbitrary initial conditions in the system work space.
- The research innovation is to use a supervised machine learning method, fuzzy inference system (FIS), to implement the intelligent gain adaptation system to achieve this goal.
- Both simulation and experimental results reveal the merits of the proposed controller.

9:50-10:10 176 ThA5.2

Design, Fabrication, and Modeling of A Soft Bidirectional Planner Actuator

Hooman Rasoulzade[1], Sajad Sadeghi Nalkenani[1], Hamed Ghalarirad[1], Mohammad Zareinejad[1]
[1] *Mechanical engineering department, Amirkabir University of Technology, Tehran, Iran*

- This paper introduces a bidirectional planner soft actuator with dual pneumatic inputs, offering extended elongation and workspace range.
- A significant advancement is the refined dynamic and kinematic model, utilizing a novel parametrization to avoid singularities, especially in straight configurations.
- Incorporating robot inertia, the dynamic model accurately portrays actuator behavior under different pressures.
- Extensive experiments and simulations highlight the actuator's enhanced performance and versatility for soft robotics applications.

10:10-10:30 193 ThA5.3

Kinetostatic Analysis of a Spatial Soft Pneumatic Manipulator Including Gravity EffectBehavior Analysis of Soft Bending Actuators Equipped with Layer Jamming Mechanism

Morteza Mohagheghi, Sepideh Akbari, Sadegh Pourghasemi Hanza, Pouya Firuzy Rad, Hamed Ghalarirad
[1] *Mechanical Engineering Department*
Amirkabir University of Technology (Tehran Polytechnic) Tehran, Iran

- The paper discusses kinetostatic analysis of static spatial soft robot modeling.
- Modeling combines Constant Curvature for free motion and continuous deformation analysis for gravity effects.
- The robot is modeled in Abaqus using the neo-Hookean method for hyperelastic materials.
- Simulation accuracy for a planar-motion robot shows a maximum error of 3.9%.

10:30-10:50 211 ThA5.4

Coupled Transverse-Longitudinal Deformation Analysis of Soft Bending Actuators Using Cosserat Rod Theory

Alireza Saberi, Hamed Ghalarirad, Alshin Taghvaeipour, Sadegh Pourghasemi Hanza
Department of Mechanical Engineering,
Amirkabir University of Technology, Tehran, Iran

- This research leverages the Cosserat Rod theory to develop a model that accounts for the coupled transverse and longitudinal deformation of the actuator.
- In this study, the experimental setup consists of a proportional valve, data acquisition card, pressure sensor, compressor, and a bending actuator made of silicon.
- Consequently, the results of the theoretical model are validated along experimental data, demonstrating improved accuracy compared to conventional constant curvature models.

2023 RSI International Conference on Robotics and Mechatronics (ICRoM) 17

Figure 1.1: Overview of the digest file.

You will complete the digest's data in the sample digest file on the conference website. This information must be provided very carefully because this file cannot be modified after the end of the final sending time. The bulletin is also written incorrectly if the authors send the wrong data.
Please follow the following steps carefully and in order. After finishing, save the file and upload it to the site.
In the last section, some examples of correct digest writings will be shown, which you can follow.

2 Digest TeX File

Initial Preparation

1. Download the sample digest file from the ICRoM website.

2. Change the file name to your article number. Just write the article number in Latin, and do not write anything else. For example, if the number of your article is 1374, change the name of the digest file to 1374 and do not add or subtract any characters to it.

3. This file is a latex file and has the extension *.tex*. However, you do not need to know how to work with LaTeX compilers to open and edit it. This file can be opened with standard text editors (such as NotePad, WordPad, and Word). To open this file, right-click on it and select one of the text editors from the *Open with* tab.

4. After opening the file, you should see a text similar to the one in the Fig. 2.1. This text has five sections; you have to change the first four sections and it will be explained in the following steps. Please do not change the 5th section.

5. To change everything that will be explained below, delete the existing default text and enter your text instead. This text must be between two brackets, and be careful not to delete the brackets when deleting the default text.

```
%%  Part 1 - Title
\Title{InsertTitle}


%%  Part 2 - Authors
\AddAuthor[1]{FirstName}{LastName}
\AddAuthor[1]{FirstName}{LastName}
\AddAuthor[2]{FirstName}{LastName}


%%  Part 3 - Authors Affiliation
\affiliation[1]{Affiliation}
\affiliation[2]{Affiliation}


%%  Part 4 - Keynotes
\Targets{
\Item{Keynote}
\Item{Keynote}
\Item{Keynote}
}


%%  Part 5 - End Command (Don't change this line.)
\endinput
```

Figure 2.1: Sample digest file.

2.1 Section 1 - Title

In this section, the title of the paper is entered.

1. Download the sample digest file from the ICRoM website.
2. Pay attention to whether the letters are small or capital.
3. Write the title without Dot at the end of it.

2.2 Section 2 - Authors

In this section, all the authors' names in the paper are written, which should be similar to what you wrote in the paper.

1. There should be exactly as many lines as the number of authors. For example, if the paper has five authors, five lines should be written in this section.
2. The sample file contains three lines for this purpose. If the paper has more than three authors, copy one line and add it to the following lines, and if the number of authors is less than three, delete the extra lines.
3. For each author, three sections have been considered: author's affiliation (indicated by a number), first name, and last name. Make sure to write each part precisely in its place.
4. The author's affiliation determines which university or institution the author is affiliated with. The affiliation details are written in the next section.

5. The lowest number of affiliations is equal to one (in the case that all the authors are from the same university), and the highest is equal to the number of authors (in the case that all the authors are from different universities).

6. The number of affiliations always starts from one. In other words, the affiliation number of the first author is always equal to 1. If the next author were from the same university, his/her affiliation number would also be equal to 1; otherwise, his affiliation number would be equal to 2. Determine the affiliation number of all people in the same way.

7. There is no requirement to place people with the same affiliation number next to each other. For example, suppose the affiliation numbers of the first and second authors of the paper are 1 and 2. In that case, the third author can also have affiliation number 1 if he or she is from the same university as the first author.

8. Please pay attention to the spelling of authors' names. Also, if the author's name or surname has several parts, be sure to pay attention to the type of writing of these parts (attached or separated from each other).

9. It is recommended that you check the authors' names with the authors themselves, both in the article and in the digest. This naming style is registered in scientific references, and it is better to have all the articles of the same author with the same name.

2.3 Section 3 - Authors' Affiliation

In this section, the authors' affiliations of the paper are determined. The numbers you entered in the previous section for the authors' affiliation are placed next to the names in superscript. This section determines which university or institution each number belongs to.

1. The number of rows should equal the maximum number you wrote in the previous section and the authors' affiliation section. In the sample file, two lines are reserved for this section, and if the affiliations were more than two institutions, copy one of the lines and write next to the affiliations; if all the authors were affiliated with one institution, delete the second line.

2. Each affiliation has two parts: The affiliation number is specified first, and the name of the university or institution is written in the second part.

3. The affiliation number should be the number of institutions, and in order. If the authors are affiliated with three universities, you will have three lines whose numbers are 1, 2, and 3, respectively. The number of affiliations should not be repeated.

4. The second part of affiliation is related to the title of the desired institution. Usually, universities and institutes have a standard title for reference that is available on their websites.

5. As stated before, if several authors are affiliated with an institution, the institution's name should be written only once and not repeated several times.

2.4 Section 4 - Keynotes

This section summarizes the paper's content to guide those interested in the paper's title and what the paper discusses.

1. There are three default lines in the sample files in this section, which you can change. When printing the digest, the contents of each item are written below. Therefore, it is recommended that these three lines be left off because they may need to fit into the bulletin's box.
2. The content of the same line should not necessarily be one sentence; it can be more.
3. It is recommended that you avoid writing obvious points and dedicate these three lines to the specific content of your paper. We recommend that you divide the entire article into three parts: problem explanation, problem-solving method, and problem results. Then, write a summary of each in three lines.
4. The examples at the end of the manual provide guidance on the digest's content.
5. If the content of keynotes is large during the final printing and does not fit in the corresponding part at the end of the digest, ICRoM editors have the right to change the content of this section.
6. Stay within 50 words or 350 characters (including spaces) in your keynotes in total.

3 Digest's Figure

As you can see in the image of the digest overview (Fig. 1.1), at the bottom of each part, a selected image of the article's content is shown, which must be uploaded separately to the site.

1. There is no requirement regarding the photo's aspect ratio, but it is better if the photo is horizontal to fit the photo. Inspired by the golden ratio (1.618), our recommendation for photo dimensions is to keep the photo's width-to-height ratio between 1.5 and 2. For example, the photo's width could be 900 pixels, and its height could be 600 pixels.
2. The photo on the page is very small. Therefore, your photo should be obvious, and if you write text in the form to explain, it should be large and in a color that stands out from the rest of the image.
3. Some authors send the graphs at the end of their paper as photos, which is not recommended. The diagram needs explanations, which are not at all possible in these dimensions.
4. Considering that these photos are printed on paper, the photo's background should be white.
5. The size of the uploaded photo should be less than 1 MB.

4 Examples

Here are four examples of authors have written in previous years that are suitable for the bulletin. You can use their templates to write a digest for your article.

```
%%  Part 1 - Title
\Title{Mechanism Improvement of RoboWalk Rehabilitation Device to Adjust the
Assistive Force Direction}


%%  Part 2 - Authors
\AddAuthor[1]{Shahin}{Naeemi}
\AddAuthor[1]{Omid}{Mahdizadeh}
\AddAuthor[1]{S. Ali A.}{Moosavian}


%%  Part 3 - Authors Affiliation
\affiliation[1]{Center of Excellence in Robotics and Control, Advanced Robotics and
Automated Systems (ARAS) Lab. \\Faculty of Mechanical Engineering, K. N. Toosi
University of Technology, Tehran, Iran}


%%  Part 4 - Keynotes
\Targets{
\Item{RoboWalk is a lower-body assistive robot designed in the ARAS lab. This
research focuses on addressing the undesired horizontal force generated by RoboWalk
during the walking cycle.}
\Item{The study explores the origin of this force, providing insights into RoboWalk's
characteristics.}
\Item{Proposed solutions involve novel designs that make minimal modifications to the
foundational model. Simulation results using MSC Adams software are also presented.}
}


%%  Part 5 - End Command (Don't change this line.)
\endinput
```

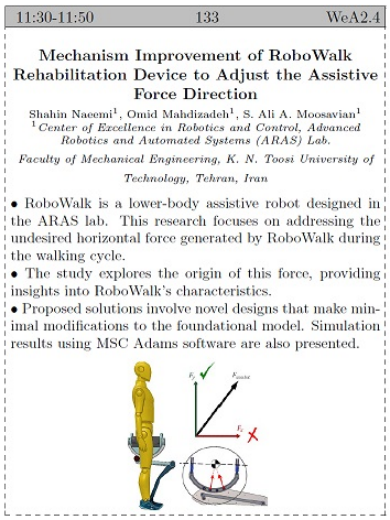

Figure 4.1: Example number 1.

```
%%  Part 1 - Title
\Title{Image Processing and Fuzzy Controller Design for Robotic Walker}


%%  Part 2 - Authors
\AddAuthor[1]{Parsa}{Shafiei}
\AddAuthor[1]{Aghil}{Yousefi-Koma}
\AddAuthor[2]{Moosa}{Ayati}


%%  Part 3 - Authors Affiliation
\affiliation[1]{Center of Advanced Systems and Technologies (CAST)\\
School of Mechanical Engineering, University of Tehran, Tehran, Iran}
\affiliation[2]{Advanced Instrumentation Labratory\\
School of Mechanical Engineering, University of Tehran, Tehran, Iran}


%%  Part 4 - Keynotes
\Targets{
\Item{This research aims to create an active robotic walker to aid voluntary movement
and recover normal standing in balance loss cases.}
\Item{A developed filter segments the user's body, analyzing posture to categorize
stance.}
\Item{The fuzzy logic controller, tailored to user properties, corrects forward or
lateral falls within 10 seconds, proving its effectiveness.}
}


%%  Part 5 - End Command (Don't change this line.)
\endinput
```

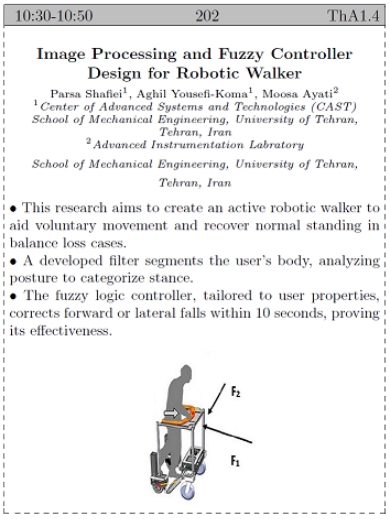

Figure 4.2: Example number 2.

```latex
%%  Part 1 - Title
\Title{Towards Evaluating the Security of Wearable Devices in the Internet of Medical Things}


%%  Part 2 - Authors
\AddAuthor[1]{Yas}{Vaseghi}
\AddAuthor[2]{Behnaz}{Behara}
\AddAuthor[3]{Mehdi}{Delrobaei}


%%  Part 3 - Authors Affiliation
\affiliation[1]{Department of Systems and Control, Faculty of Electrical Engineering, K. N. Toosi University of Technology, Tehran, Iran}
\affiliation[2]{Department of Biomedical Engineering, Faculty of Electrical Engineering, K. N. Toosi University of Technology, Tehran, Iran}
\affiliation[3]{Department of Mechatronics, Faculty of Electrical Engineering, K. N. Toosi University of Technology, Tehran, Iran}


%%  Part 4 - Keynotes
\Targets{
\Item{This paper implements a security approach to a wearable infusion pump.}
\Item{The system integrates a secure, multi-layer architecture emphasizing token-based security and device-specific access.}
\Item{Extensive testing validates the system's robust performance and accuracy.}
}


%%  Part 5 - End Command (Don't change this line.)
\endinput
```

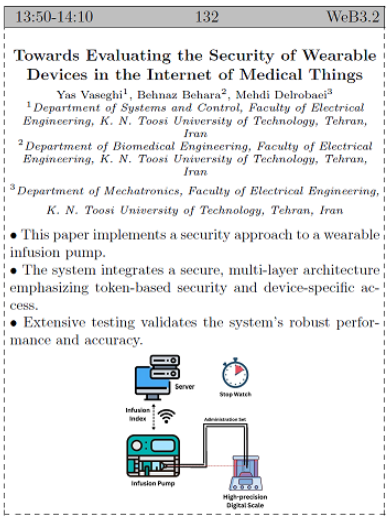

Figure 4.3: Example number 3.

```latex
%%  Part 1 - Title
\Title{Autonomous Robotic Assembly and Sequence Planning Based On YOLOv8}


%%  Part 2 - Authors
\AddAuthor[1]{Zeynab}{Ezzati Babi}
\AddAuthor[2]{Navid}{Asadi Khomami}
\AddAuthor[1]{Mehdi}{Tale Masouleh}
\AddAuthor[1]{Ahmad}{Kalhor}%


%%  Part 3 - Authors Affiliation
\affiliation[1]{Human and Robot Interaction Laboratory.\\
School of Electrical and Computer Engineering, University of Tehran, Tehran, Iran}
\affiliation[2]{Human and Robot Interaction Laboratory, School of Mechanical Engineering, University of Tehran, Tehran, Iran}


%%  Part 4 - Keynotes
\Targets{
\Item{Create a dataset of wooden block objects and train a YOLOv8 model on it.}
\Item{Use segmentation to identify useful objects and determine their sequence by centroids.}
\Item{Apply segmentation to camera-captured frames for object identification and angle determination within the Delta robot's framework.}
\Item{Organize objects as specified, grasping them from their centers.}
}


%%  Part 5 - End Command (Don't change this line.)
\endinput
```

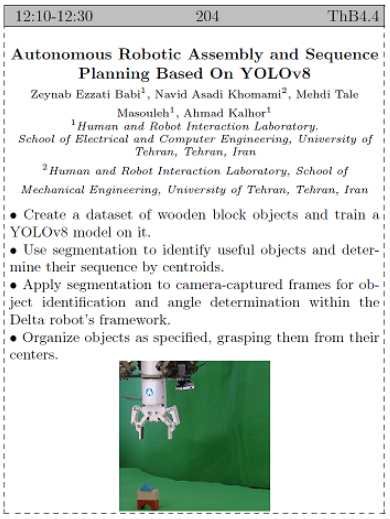

Figure 4.4: Example number 4.