Human-Centered Intelligent Robots

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***Abstract*—This document is a model and instructions for LaTeX. This and the IEEEtran.cls file define the components of your paper [title, text, heads, etc.]. *CRITICAL: Do Not Use Symbols, Special Characters, Footnotes, or Math in Paper Title or Abstract.**

***Index Terms*—component, formatting, style, styling, insert**

I. Introduction

Humanoid robots are very popular in science fiction. There are many movies such as the terminator where the robots are almost identical to humans. In the past decade big progress has been made to make robots increasingly human. In this paper, we will present the various factors affecting robotics and delve into the literature that analyzes the contemporary research among these factors.

II. Pattern Recognition

The human brain has the capability to recognize various patterns to function. As such, we would want an anthropomorphic robot to use mimic this useful ability. In the past decade much progress has been made in this area of robotics given the rapid expanse of artificial intelligence. One main impetus for progress in pattern recognition is the rise of GPU accelerated machine learning techniques. One popular technique on the rise for pattern recognition is reinforcement learning where an agent uses many types of reinforcement learning which tries to maximize some sort of reward function for the agent. This sort of approach utilities mathematical models that uses. One common type of machine learning model used in robotics is the artificial neural network. However, though these have been proved to be very useful and though their distributed nature is similar to natural neural networks, their name itself is misleading because they have flaws like being brittle, inefficient, and myopic[1]. Though there are many projects that have used artificial neural networks to achieve very anthropomorphic results. One such project is famous alpha go project that used artificial neural networks to create an AI that beat Lee Sedol in a 6 game match against alpha go[2]. In that project, the neural network was initially trained using human game datasets and was then later trained using dataset of its own games[2]. Another project that was inspired from this project was a table tennis playing robot by Lin, Yu, and Huang [3]. In that project, Lin, Yu, and Huang [3] used Deep Neural Networks to handle parameters such as air resistance, the magnus effect, etc., and trained the said network using real life game simulations.

A. Computer Vision

One of the key driving factors of modern artificial intelligence is the progress that we have made in computer vision in the past decade. Computer vision is the field of artificial intelligence that deals with computers interpreting the visual world. During the 1990s, there was not much progress made in this field. However, ever since Krizhevsky, Sutskever, and Hinton [4] published their paper on Alexnet and demonstrated their groundbreaking result on image classification using CNNs and GPU accelerated deep learning, there has been a boom in the future papers utilizing such tools. Robots now are capable of performing various forms of vision tasks that they were previously unable to perform. Because this boom in computer vision is so big, Pratt [5] even calls it the possible "robotics cambrian explosion" because this phenomenon of robotic achieving vision is just like the era when there was an exponential increase in evolutionary diversity largely caused by the natural creatures gaining vision.

B. Natural Language Processing

Another area of artificial intelligence that is engendering anthropomorphic robots is the area of natural language processing. We as human beings have the most complex systems of utilizing natural sounds among any living creatures. We can form several different patterns and use sounds in complex ways to convey and understand information. As such, we would expect humanoid robots to be capable of handling such languages. The area of natural language processing is a branch of artificial intelligence that deals with the interaction between machines and humans using the natural language. This field just like computer vision has grown very big. According to Hirschberg and Manning [6] the main reasons for this are (i) increase in computing power (ii) availability of large amounts of linguistic data (iii) success of machine learning (iv) richer understanding of the structure of human language and its deployments in social contexts. The big progress done in this subfield are in machine translation (translating one language to another), spoken dialog systems and conversational agents (agents generating and interpreting human voice; e.g. Google assistant, Apple's Siri) and machine reading (the ability to interpret human written texts)[6].

C. LaTeX-Specific Advice

BibTeX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BibTeX to produce a bibliography you must send the .bib files.

LaTeX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LaTeX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

D. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

E. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

F. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

G. Figures and Tables

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 1", even at the beginning of a sentence.

TABLE I
TABLE TYPE STYLES

Table Head	**Table Column Head**		
	Table column subhead	***Subhead***	***Subhead***
copy	More table copy[a]		

[a]Sample of a Table footnote.

Fig. 1. Example of a figure caption.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words [5] asdaasd rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the

reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

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