Robotic Arm

PRIYANSH SURI

VIT UNIVERSITY

VELLORE, TAMIL NADU, INDIA

1priyanshsurii2@gmail.com

m

Abstract— This document gives instructions for students preparing robotic arm using arduino. The students must follow the instructions given in the document for making articulated robotic arm. You can use this document as a reference for making robotic arm. This document all give you a brief idea about Cartesian, cylindrical, spherical and SCARA robotic arms as well.

Keywords— car-Cartesian, cyln-.Cylindrical, sphere-Spherical, RA- robotic arm.

1. INTRODUCTION `

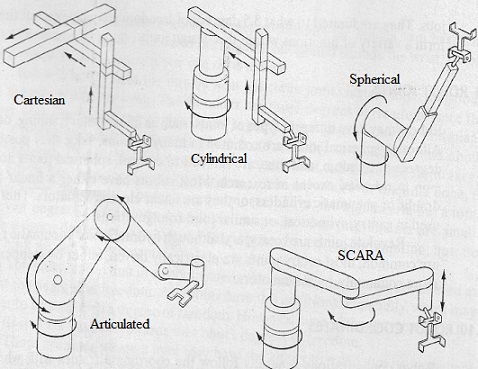
This document contains information about articulated robotic arm and explain the working of Cartesian, cylindrical, spherical and SCARA robotic arms.A Robotic Arm is a type of mechanical arm usually programmable,with similar functions to a human arm.The links of such a manipulator are connected by joints allowing either rotational motion (such as in an articulated robot) or translation (linear) dsiplacement.The links of the manipulator can be considered to a form kinematics chain.The terminus of the kinematics chain of the manipulator is called the end effector and it is analogous to the human hand.

1. APPRATUS REQUIRED

* Arduino uno / Genuino uno
* Jumper Wires
* Breadborad
* Battries
* Servo motors
* Articulated robotic arm

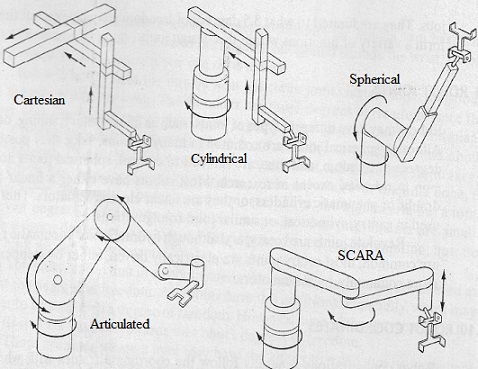
.

1. WORKING PRINCPAL
2. CARTESIAN ROBOTIC ARM



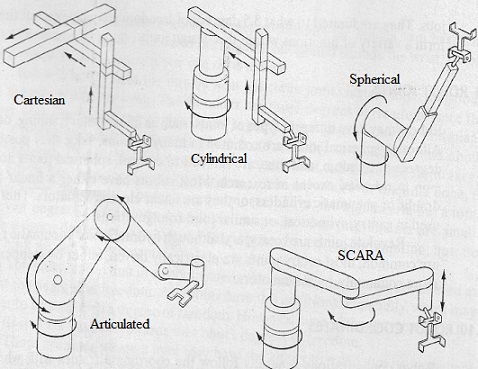
This type of arrangement is known as Cartesian robotic arm.This type of robotic arm employ three translation (liner) motion in X Y Z directions respectively In this type each individual parts translate over one another cartesion axis i.e X Y and Z axis respectively

1. CYLENDERICAL ROBOTIC ARM



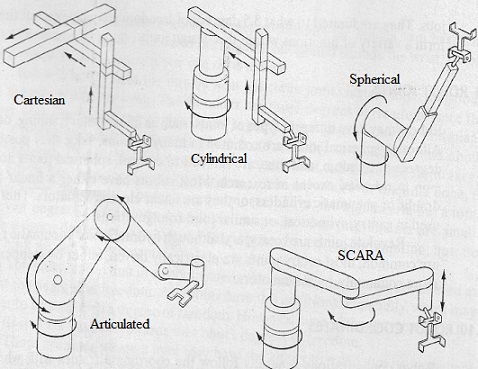
This type of arrangement is known as Caylenderical robotic arm.This type of robotic arm employ two translation (liner) motion in p and Z directions and one to rotational motion for Φ.In this type rotational motion to adjust Φ and translation motion is require to adjust the value of p and Z

1. SPHERICAL ROBOTIC ARM



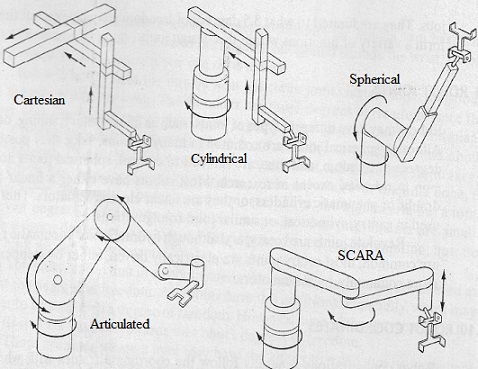
This type of arrangement is known as Spherical robotic arm. This type of robotic arm employ two rotational for Φ and ϴ and one translation (liner) motion in p direction. In this type rotational motion to adjust Φ and ϴ and translation motion is require to adjust the value of p

1. SCARA ROBOTIC ARM



This type of arrangement is known as SCARA robotic arm.This type of robotic arm employ two rotational and one translation (liner) as shown in the fig.

1. ARTICULATED ROBOTIC ARM



This type of arrangement is known as Articulated robotic arm.This type of robotic arm employ three rotational motion as shown in the fig.

All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

1. Text Font of Entire Document

The entire document should be in Times New Roman or Times font. Type 3 fonts must not be used. Other font types may be used if needed for special purposes.

Recommended font sizes are shown in Table 1.

1. Title and Author Details

Title must be in 24 pt Regular font. Author name must be in 11 pt Regular font. Author affiliation must be in 10 pt Italic.

Email address must be in 9 pt Courier Regular font.

TABLE I

FONT SIZES FOR PAPERS

|  |  |  |  |
| --- | --- | --- | --- |
| Font Size | Appearance (in Time New Roman or Times) | | |
| Regular | Bold | Italic |
| 8 | table caption (in Small Caps), figure caption, reference item |  | reference item (partial) |
| 9 | author email address  (in Courier), cell in a table | abstract body | abstract heading (also in Bold) |
| 10 | level-1 heading (in Small Caps), paragraph |  | level-2 heading, level-3 heading, author affiliation |
| 11 | author name |  |  |
| 24 | title |  |  |

All title and author details must be in single-column format and must be centered.

Every word in a title must be capitalized except for short minor words such as “a”, “an”, “and”, “as”, “at”, “by”, “for”, “from”, “if”, “in”, “into”, “on”, “or”, “of”, “the”, “to”, “with”.

Author details must not show any professional title (e.g. Managing Director), any academic title (e.g. Dr.) or any membership of any professional organization (e.g. Senior Member IEEE).

To avoid confusion, the family name must be written as the last part of each author name (e.g. John A.K. Smith).

Each affiliation must include, at the very least, the name of the company and the name of the country where the author is based (e.g. Causal Productions Pty Ltd, Australia).

Email address is compulsory for the corresponding author.

1. Section Headings

No more than 3 levels of headings should be used. All headings must be in 10pt font. Every word in a heading must be capitalized except for short minor words as listed in Section III-B.

* 1. Level-1 Heading: A level-1 heading must be in Small Caps, centered and numbered using uppercase Roman numerals. For example, see heading “III. Page Style” of this document. The two level-1 headings which must not be numbered are “Acknowledgment” and “References”.
  2. Level-2 Heading: A level-2 heading must be in Italic, left-justified and numbered using an uppercase alphabetic letter followed by a period. For example, see heading “C. Section Headings” above.
  3. Level-3 Heading: A level-3 heading must be indented, in Italic and numbered with an Arabic numeral followed by a right parenthesis. The level-3 heading must end with a colon. The body of the level-3 section immediately follows the level3 heading in the same paragraph. For example, this paragraph begins with a level-3 heading.

1. Figures and Tables

Figures and tables must be centered in the column. Large figures and tables may span across both columns. Any table or figure that takes up more than 1 column width must be positioned either at the top or at the bottom of the page.

Graphics may be full color. All colors will be retained on the CDROM. Graphics must not use stipple fill patterns because they may not be reproduced properly. Please use only SOLID FILL colors which contrast well both on screen and on a black-and-white hardcopy, as shown in Fig. 1.

1

1

Label your axes, include units

2

2

3

3

4

4

5

5

6

6

7

7

8

10

9

Si

Al

Au

Label your axes, include units

Fig. 1 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

Fig. 2 shows an example of a low-resolution image which would not be acceptable, whereas Fig. 3 shows an example of an image with adequate resolution. Check that the resolution is adequate to reveal the important detail in the figure.

Please check all figures in your paper both on screen and on a black-and-white hardcopy. When you check your paper on a black-and-white hardcopy, please ensure that:

* the colors used in each figure contrast well,
* the image used in each figure is clear, • all text labels in each figure are legible.

1. Figure Captions

Figures must be numbered using Arabic numerals. Figure captions must be in 8 pt Regular font. Captions of a single line (e.g. Fig. 2) must be centered whereas multi-line captions must be justified (e.g. Fig. 1). Captions with figure numbers must be placed after their associated figures, as shown in Fig. 1.



Fig. 2 Example of an unacceptable low-resolution image



Fig. 3 Example of an image with acceptable resolution

1. Table Captions

Tables must be numbered using uppercase Roman numerals. Table captions must be centred and in 8 pt Regular font with Small Caps. Every word in a table caption must be capitalized except for short minor words as listed in Section III-B. Captions with table numbers must be placed before their associated tables, as shown in Table 1.

1. Page Numbers, Headers and Footers Page numbers, headers and footers must not be used.
2. Links and Bookmarks

All hypertext links and section bookmarks will be removed from papers during the processing of papers for publication. If you need to refer to an Internet email address or URL in your paper, you must type out the address or URL fully in Regular font.

1. References

The heading of the References section must not be numbered. All reference items must be in 8 pt font. Please use Regular and Italic styles to distinguish different fields as shown in the References section. Number the reference items consecutively in square brackets (e.g. [1]).

When referring to a reference item, please simply use the reference number, as in [2]. Do not use “Ref. [3]” or “Reference [3]” except at the beginning of a sentence, e.g. “Reference [3] shows …”. Multiple references are each numbered with separate brackets (e.g. [2], [3], [4]–[6]).

Examples of reference items of different categories shown in the References section include:

* + example of a book in [1]
  + example of a book in a series in [2]
  + example of a journal article in [3]
  + example of a conference paper in [4]
  + example of a patent in [5]
  + example of a website in [6]
  + example of a web page in [7]
  + example of a databook as a manual in [8]
  + example of a datasheet in [9]
  + example of a master’s thesis in [10]
  + example of a technical report in [11]
  + example of a standard in [12]

IV. CONCLUSIONS

The version of this template is V2. Most of the formatting instructions in this document have been compiled by Causal Productions from the IEEE LaTeX style files. Causal Productions offers both A4 templates and US Letter templates for LaTeX and Microsoft Word. The LaTeX templates depend on the official IEEEtran.cls and IEEEtran.bst files, whereas the Microsoft Word templates are self-contained. Causal Productions has used its best efforts to ensure that the templates have the same appearance.

Causal Productions permits the distribution and revision of these templates on the condition that Causal Productions is credited in the revised template as follows: “original version of this template was provided by courtesy of Causal Productions (www.causalproductions.com)”.

ACKNOWLEDGMENT

The heading of the Acknowledgment section and the References section must not be numbered.

Causal Productions wishes to acknowledge Michael Shell and other contributors for developing and maintaining the IEEE LaTeX style files which have been used in the preparation of this template. To see the list of contributors, please refer to the top of file IEEETran.cls in the IEEE LaTeX distribution.

REFERENCES

1. S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.
2. J. Breckling, Ed., The Analysis of Directional Time Series: Applications to Wind Speed and Direction, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.
3. S. Zhang, C. Zhu, J. K. O. Sin, and P. K. T. Mok, “A novel ultrathin elevated channel low-temperature poly-Si TFT,” IEEE Electron Device Lett., vol. 20, pp. 569–571, Nov. 1999.
4. M. Wegmuller, J. P. von der Weid, P. Oberson, and N. Gisin, “High resolution fiber distributed measurements with coherent OFDR,” in Proc. ECOC’00, 2000, paper 11.3.4, p. 109.
5. R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, “High-speed digitalto-RF converter,” U.S. Patent 5 668 842, Sept. 16, 1997.
6. (2002) The IEEE website. [Online]. Available: http://www.ieee.org/
7. M. Shell. (2002) IEEEtran homepage on CTAN. [Online]. Available:

http://www.ctan.org/texarchive/macros/latex/contrib/supported/IEEEtran/ [8] FLEXChip Signal Processor (MC68175/D), Motorola, 1996.

1. “PDCA12-70 data sheet,” Opto Speed SA, Mezzovico, Switzerland.
2. A. Karnik, “Performance of TCP congestion control with rate feedback: TCP/ABR and rate adaptive TCP/IP,” M. Eng. thesis, Indian Institute of Science, Bangalore, India, Jan. 1999.
3. J. Padhye, V. Firoiu, and D. Towsley, “A stochastic model of TCP Reno congestion avoidance and control,” Univ. of Massachusetts, Amherst, MA, CMPSCI Tech. Rep. 99-02, 1999.
4. Wireless LAN Medium Access Control (MAC) and Physical Layer

(PHY) Specification, IEEE Std. 802.11, 1997.