Ackermann-like car model autonomous modules

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*Abstract* – This paper Highlights important findings in several papers regarding several topics of autonomous systems: control Module: Speed (Cruise) control for lane keeping purposes, Lateral control for lane changing purposes, localization Module: Sensor’s filtration for inputs and states measurement, Navigation/Planning Module: Path planning and obstacle avoidance, Autonomous car architecture to connect all modules.

#### ****Control Module****

These instructions serve as a template for Microsoft *Word* (Office 2013 used), and give you the basic guidelines for preparing camera-ready papers. Please follow the instructions provided in these guidelines carefully to ensure legibility and uniformity. The guidelines are designed to reduce the amount of white space and maximize the amount of text that can be placed on one page. **Please do not use LaTex.**

Follow these instructions to help you use this template more easily. When you use this file, select “Print Layout” from the “View” menu (View | Print Layout), which will allow you to see the two-column format. You may then type over sections by using the cut and paste commands listed under the Edit menu (Edit | Paste) into this document and/or by using the markup styles. Finally, enable “Show” (paragraph mark icon) so you can see the various formatting features. **We suggest you use this document as your guide and simply cut and paste your text over the material in this document. If you MUST use Google docs, focus on your content and when that’s set, cut and paste it into this template.**

#### ****Control Module****

Set all these values using the “FILE” Menu. Select the Page Setup – Margins tab option and click on portrait orientation option. The above margin dimensions can then be inserted into the Page Setup Window. Now select the Paper tab and click on the paper size and select the letter paper size. Next, select the Page Setup – Layout tab and set the Header and Footer to 0.5 inches. To set the column width, click anywhere in the document within the two column format, then Select the Columns for the Format menu. Click on the Equal Column Width and set the spacing. Make sure you also apply these changes to “This Section.”

When formatting your document, make consistent use of punctuation marks and spelling. Either American or British formatting is acceptable, but it must be consistent, not a mix. For example,

* Putting all commas and periods either inside (American) or outside (British) of quotation marks
* Use of single/double quotes, e.g. 'service center' (British) rather than “service center” (American).
* Spellings such as grey and disc (British) vs. gray and disk (American).

#### ****Control Module****

The title and author data is in a one-column format, while the rest of the paper is in a two-column format. To accomplish this, a continuous section break is used. There are two ways to setup this format: 1) Use this template as a guide or 2) make your own. If you wish to make your own, it is suggested that you open a new document and begin by inserting the title and author information in the standard one-column format. **Please adhere to the following style guidelines:**

* **Paper title**: This information should be placed at the top of the first page in 24 point, Times New Roman in Title case, and centered. This style is defined under the style menu of this document as “TITLE.” It is NOT bold.
* Insert a 11 point blank line between the Title and the Author listing.
* **Author listing**: 11 point, Times New Roman, centered. This style is defined under the style menu of this document as “Author.” Include only the author names in the author listing. Use the full first name for the authors. If an author is submitting more than one paper please provide the same name on both papers. Be consistent as the name you provide on the paper will be what is used to create the author index for the proceedings.
* **Author Affiliation**: 10 point, Times New Roman, centered under the author name. This style is defined under the style menu of this document as “Affiliations.” List the institution and email address. If the email address becomes a live link, you must disable it. (If the email address turns blue, that means the hyperlink is active. To remove: right click on the address and select Edit Hyperlink and then Remove Link.) There are 3 basic types of setups possible: One author, multiple authors from the same institution, and multiple authors from multiple institutions. If the paper has one author use the affiliation layout as shown at the top of this document where all the author information is listed under the paper title. For multiple authors, from the same institution, list the common university, then list the email addresses at the end in the same order as the authors appear in the Author Listing. ONLY the last email id should have the address extenstion (e.g., @virginia.edu). For multiple authors from multiple institutions list the author names under the title, then list the author emails under their names. Additional information for multiple authors can be added to the Author Information section at the end of the paper.
* Have two 10 point blank lines between the title portion of the paper and the paper’s body.

#### ****Autonomous Car Architecture****

I. Column Format Instructions

The title and author data is in one-column format, while the rest of the paper is in two-column format. To accomplish this, most word processors have a section break that is installed to separate the one and two-column format. For example, in *Word*, under the Insert menu select Breaks – Continuous.

After you enter the title and author information enter a few blank lines and then insert a Continuous section break. Now you must define this section to be in two-column format. To do this in *Word*, under the “Format” menu select “Columns.” This option will open the Columns window. It has an input box for the number of columns. Enter 2 and then set the spacing to 0.2” and select equal column widths. If you have the margin widths set correctly, the width of the column should display as 3.40”. If it does not, go to the “File” menu and select “Page Setup - Margins.” This will open the “Page Setup” window that will allow you to set the top and bottom margins to 1” and the right and left margins to 0.75.”

II. Font and Spacing Instructions

Use the full justify option for your paragraphs, and use two-columns for all text. The two columns must always exhibit equal lengths and you should try to fill your last page as much as possible. To obtain such results, you are free to adjust the figure sizes provided this does not compromise their clarity. Use one line of space between text and section headings. Use one line of space between text and captions, equations, and tables. Use the spelling and grammar checkers. Do not use the “hyphenation” feature in *Word*. Please use the following font and alignment instructions:

* **Text**: Use the style “First Paragraph” for the first paragraph in each section, and “Text” for succeeding paragraphs in the section. 10 point, Times New Roman, full justified, single space, no blank lines or other space between the paragraphs. Indents - first paragraph of section - none; all other paragraphs - .25”. Follow the examples shown in this document. DO NOT USE SPACES TO INDENT YOUR PARAGRAPHS. Times New Roman is not a proportional font.
* **Section Headings**: 10 point, Times New Roman, bold, centered, use Small Caps with paragraph spacing of 8 points above and 8 points below. For example, “Page Layout” on page one of this document is a Section Heading (this style is defined under the style menu of this document as “Section Headings”). To convert the text to small caps, click on Format, Font. This will open the “Font Window” where you can select the Small Cap option. If a section heading is at the top of a column, set the “above” spacing in the paragraph window to 0 points. See “Copyright” and “References” on p. 3.
* **Section Sub-headings**: 10 point, Times New Roman, italic, left justified, with spacing of 6 points above and below. For example, “Font and Spacing Instructions” on this page is a Section Sub Heading (this style is defined under the style menu of this document as “Subheading”). For multiple levels of subheadings, use *Ia* and *Iai*, for example.
* **Bullets**: 10 point, Times New Roman, left justify and indent the text 0.25.” Insert a blank line after the bullet list but not before, follow the examples in this document (this style is defined under the style menu of this document as “Bullets”).

Figures, Tables, and Equations

All figures and tables must fit either one or two-column width, 3.4” or 7” wide respectively. It is suggested that you use one-column figures and tables whenever possible. If your table or figure will not fit into one column, then insert a continuous section break before and after the table or figure, as described above and define it as one-column. To make the paper read easier, you may want to position any table or figure that requires the full width of the paper either at the bottom of the page or the top of a new page.

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