Bee-Bots: A blockchain based approach to decentralised swarm robotic systems

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Index Terms—Blockchain, Swarm Robotics, Decentralization, PathPlanning

I. INTRODUCTION

Combining the and using Blockchain Technology to This document is a model and instructions for LaTeX. Please observe the conference page limits.

A. Swarm Robotics

swarm is about simpe entities performing a complex tsk. little knowledge in each but when they collaborate more knowledge. eg. ants can lift 3 times their weight.

B. Blockchain Technology

structure of blockchain. properties of blockchain stemming from deecntralisation like fault tolerance, security, etc.

II. RELATED WORK

stuff from other papers papers which use centralised also to show our difference

III. METHODOLOGY

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A. Experimental Setup

Bot design Building the bee bots Simulation Testing with Hardware what is stored in the blockchain, how data is transferred, etc.

B. Algorithm

blockchain algo logic algo about path planning etc. Does equations for path planning come here?

- Algorithm:

```
path=getpath() pos=1 dis=0
while destination not reached do
    fix temptarget
    find C
    find phi and dis
    vdes=const
    omdes=0.8*phi
    vr=vdes+d*omdes and vl=vdes-d*omdes
    if dis¡threshold then
    |   pos++
    else
end
```

Algorithm 1: Trajectory Tracking

C. Implementation

software, tools used? actual story like what we see physically/in our simulation

1) Equations For Motion in Vrep:: For Trajectory Tracking:

- Euler angles and positions of the bot:

$$\gamma, \beta, \theta$$

$$x, y, z$$

$$A =$$

$$\begin{vmatrix} \cos\gamma\cos\beta - \cos\theta\sin\gamma\sin\beta & -\cos\gamma\sin\beta - \cos\theta\sin\gamma\cos\beta & \text{si} \\ \sin\gamma\cos\beta + \cos\theta\cos\gamma\sin\beta & -\sin\gamma\sin\beta + \cos\theta\cos\gamma\cos\beta & - \\ \sin\beta\sin\theta & \sin\beta\sin\theta \\ 0 & 0 \end{vmatrix}$$

- B being the Trajectory of the bot calculated from the OMPL plugin of Vrep

$$B = \begin{vmatrix} Path[pos] \\ Path[pos+1] \\ Path[pos+2] \end{vmatrix}$$

- We Get the C vector oriented in the direction, Which gives the distance and the orientation for the diffferential Drive bot

$$C = AB$$

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".

An excellent style manual for science writers is [7].

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).

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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 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".

IV. Conclusion

V. Results

with 2 as well as 3 bots. compare and draw inferences about failure tolerance, etc.

VI. Future Scope

Acknowledgment

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