**Title of the paper: A Method to Estimate Ball’s State of Spin by Image Processing for Improving Strategies in the RoboCup Small-Size-robot League**

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**1. Summary**

Having as a Domain the RoboCup Small Size League, this paper propose an image-based estimation method of the ball’s state of spin and therefore provide important information for ball interception as it is a key behavior in robotic soccer. A spinning ball varies its speed after the ball bounces off the floor. Preliminary results shows that by using inertia feature of co-occurrence matrix (a texture descriptor) of the image sequences it is possible to estimate the ball spinning speed and its relation to the inertia value.

**2. Relevance**

The work is relevant to this workshop/conference/journal.

**3. Contribution / Originality**

The work is a minor extension of two existing algorithm. It is original, and its application to mobile robotics is also original. But not a breakthrough, since the only accomplishment was build an architecture in which two approaches are used together and applied it in a real robot.

**4. Writing and Presentation**

Regarding the development of the argument, it was clear and well articulated. The abstract, even though repetitive, it express the paper contents. The paper has the correct length for the proposed work, as well as the format requirements, all the figures were readable. The citations and references are formatted properly and are easy to retrieve, with just one exception, one broken Internet link for a video showing the working robot.

**5. Related Work**

It is very important to review related work, so the readers of the paper can understand where you work comes from (what are the influences of this work) and to understand what is the original contribution of this paper. The paper makes a good review of the related work, however, seems that the authors have limited their vision to the middle size RoboCup environment papers. There are several others papers describing ball tracking in other domains. It has a correct number of appropriate and updated references. A referred website, in which, supposedly, a link to a video shows the robot estimating the ball velocity, seems to be broken. So I couldn't check its contents.

**6. Technical Content**

The research methodology could be improved – I do not think it is possible to reproduce the experiments using only the information in the paper (an important point in scientific research). When proposing a new algorithm, the best thing to do is compare its results with existing algorithms. The authors have shown that for system work. This is a good result, proving that it works. But, for a better paper, they must compare the “fitting moving trace curve algorithm” performance with the results using other algorithms or methodologies that are state of the art. In the case above authors should use statistics to show their results, mean and standard deviation. Remember to use statistical tests. A person throwing a ball from different positions about 5~9 meter, and from that information infer a 80% chance of defending is not a statistical test. Is the ball spinning?

Also, the results are very initial. They show that the robot works, but not much more. This book is very good as a reference when doing experiments with robots: Ulrich Nehmzow. Scientific Methods in Mobile Robotics: Quantitative Analysis of Agent Behaviour. Springer, 2006. http://www.amazon.com/Scientific-Methods-Mobile-Robotics-Manufacturing/dp/1846280192

**7. Strong Points**

The ball is the most important object in the soccer field in all domains. Estimating a model for ball motion in three dimensions is extremely important and is a problem that several researchers are studying. The proposed algorithm is interesting since it combines two vision systems to overcome different problems such as ball in the air and on the ground. The experimental results are promising.

**8. Weak points:**

The authors didn't provide their names or belonging institute. The lack of statistical tests for curve fitting. The results section should be organized. The experimental results are mixed with the proposed work section. Seems that the authors have limited most of their vision to the middle size RoboCup environment papers. There are several others papers describing ball tracking in other domains. In two opportunities the authors claim that because of computation complexity is quite low, a real time performance discussion is not needed. I disagree, the performance discussion helps other researchers to use the proposed algorithm in less powerful, or at least different, systems focusing the same acquired performance.

**9. Typos and minor errors**

**10. Overall Recommendation**

Although being a very interesting work, the paper has some flaws that do not allow it to be published in its current form.

I think that this paper should be refused, not because of its technical content, but because the way it is written. Therefore, I recommend to Reject the paper, But I strongly encourage its re-submission in a shorter written form.

**11. To the Editors/Committee**

In 6 hours reviewing this paper, I realized that it needs more information regarding how good the results were. I am note sure if the paper should be accepted with major revisions, or rejected. I leave this decision to the editor - but the paper clearly needs major revision.