Humanoid robot obstacle recognition via data filtering, localisation and robot-to-robot communication in context of RoboCup

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Abstract. The abstract should summarize the contents of the paper. It will be set in 9-point font size and be inset 1.0 cm from the right and left margins. There will be two blank lines before and after the Abstract. Use the abstract section to provide a teaser for the contents of your report I Do not attempt to write a review or summary I Be concise: Your abstract should have 200 words or less (do not use more than 250 words)

Key words: obstacle recognition, obstacle avoidance, localisation, filtering, data smoothing, vision, swarm intelligence

1 Introduction

In this project our aim was to improve the way the robots are playing football together. Until then, each robot had its own view/opinion of the surrounding field and so was able to make decisions only due to this information. Our idea was to build an intern team communication system, that provides one robots information for every team member. Thus a form of swarm intelligence could increase the quality of the robots acting together as a whole team. Considering that, it was necessary to develop a world model to make the information transfomable, unique and easy to provide. Furthermore we detected, that the image prosessing quality was not good enough to precisly determine the robots position and so we did some vision modifications and added some filters.

Outline of underlying concepts
Brief summary of relevant theoretical background knowledge
Review of existing (published) work relevant for your topic(s)
Motivate the reader for the issue(s) you are trying to solve
Explain why your work (your approach) is necessary

1.1 Motivation

Obstacle recognition and dynamis behaviour towards this is very important if several robots shall act together in a certain way. One of the main reasons for

this is to avoid the physical contact between robots. As long as their hardware is not good enough to hold balance when beeing touched, they are very likely to fall and - in worst-case-scenario - bring about anothers robots downfall. This usually causes hight costs for hardware fixes and also disturbs the gameplay. Getting up again can take several seconds and toward the opposite robots it is not within the meaning of fairplay. Besides more and especially better knowledge about the surroundings is strategically important in the RoboCup competition. Having a reliably prospect of its own positions, the position of the ball and the opposites robots position combined with a good path finding algorithm can raise the number of scores significantly. was war das problem bisher?

1.2 Problem

Vision When we checked how good the already implemented algorithm worked we discovered, that ot even the goals were recognized suffinciently. The kind of jumoed from one point to the other and most of the time their were more than two goal postst recognized fo one goal. In addition obstacles at least could be recognise, but there was no behaviour to react in a senseful way. Moreover it was no possible for the robot to distinguish between obstacles, such as team mate or opposite player. was haben wir uns als aufgabenstellung gesetzt? (teilprobleme)

2 Solution

What did you do and how did you do it?
Methods
Design
Implementation
Do not include every possible detail and avoid redundancy
Use subsections to emphasize certain aspects/components of your work - but do not overuse them!
Avoid the passive voice: Y was done by X, use the active voice: X did Y

2.1 Vision

2.2 Filtering

2.3 Localisation

2.4 Communication

3 Results

Present your results in a logical sequence
Highlight the importance of your results and explain your analysis methodology

Discuss the results you infer from your work
Important: Adopt a critical approach in your discussion
Do not oversell your results - put the advantages first, but dont forget to mention the shortcomings!

4 Summary

Be more informative than your abstract!
Include a concise version of your discussion
Highlight what you found out
Highlight the problems you encountered
Explain how your results support your conclusions!
Provide suggestions for future research and briefly outline how suggested research can be attempted
Important: Make this section readable

5 References

Very important section of your report
If you used external information/results) Provide a reference!
References will help the reader understand the basis of your work and provide context for comparison
Use of references might also help you to be more concise
There are several types of reference
Book
Journal article
Conference publication
Web site
Web sites are usually unchecked sources - be careful

Notes and Comments. The first results on subharmonics were obtained by Foster and Kesselman in [3], who showed the existence of infinitely many subharmonics both in the subquadratic and superquadratic case, with suitable growth conditions on H'. Again the duality approach enabled Foster and Waterman in [5] to treat the same problem in the convex-subquadratic case, with growth conditions on H only.

Recently, Smith and Waterman (see [1] and May et al. [2]) have obtained lower bound on the number of subharmonics of period kT, based on symmetry considerations and on pinching estimates, as in Sect. 5.2 of this article.

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