

ALGORITHMIC CONTROL AND SUPERVISION FOR THE PREVENTION OF COLLISION BETWEEN ROBOTIC BEES

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ABSTRACT

Robotic bees are the future of agriculture in their process of production that is why, makes necessary having control and supervision of the exact location of these in order to achieve an optimal behavior. These collisions problems are usual in the gaming industry, finance and economics, etc.

INTRODUCTION

Faced with the decline of the population of bees that is happening nowadays and the importance of these in the process of pollination and in the agricultural sector it is possible to say that there is a risk in agricultural crops, so it is necessary to find a solution to this problem. This is how the idea of creating robotic bees was born, which can help in this process and, to supervise them, and control their behavior, develop and implement an algorithm that prevents their collision.

2. PROBLEM

The implemented robotic bees in agriculture for the pollination process can collide if they are less than 100 meters from other bees, that is why is so important solve the problem in order to achieve an optimal behavior and an improvement in their processes.

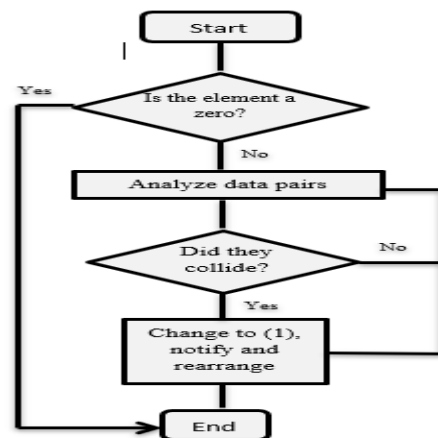
3. RELATED WORKS

We found related works with radiofrequency, some used in graphics computing, others related with privacy and the manage of data, each related with collision, in which they tried to prevent it or at least get benefit to solve bigger problems

3.1 Radio Frequency Identification System (RFIS) [1]

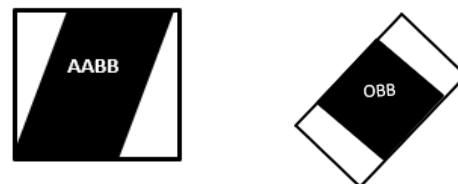
When there are several labels (used to store the information) and readers (read, change and verify the information on the label) in the same channel and signal transmission, a collision problem occurs due to mutual interference between the labels and the readers.

Solution: an anti-collision algorithm based on a matrix and a coding scheme. The decoded data is established in a matrix and then the reader is responsible for processing the data row by row, analyzed in pairs and finding a collision is replaced by a value (1), otherwise set a zero (0). After replacing the rows, the collisions are extracted and the following rows are analyzed until the algorithm finishes.



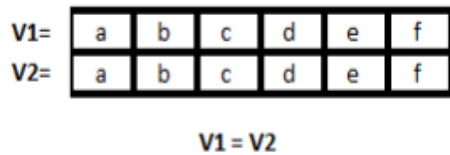
3.2 Bounded volumes to detect collisions [2]

Very used in graphic computing when making videogames. It is based on the use of basic geometric shapes bounding more complex figures and using the intersection of these to determine when a collision occurs; thanks to the figures you have control of the objects when there is movement or perspective changes, a solution used in AABB (Axis-aligned bounding box) and OBB (Oriented bounding box).



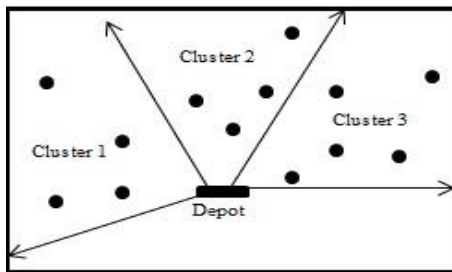
3.3 Key verifications using collisions [3]

Based on Megrelishvili's protocol to access a specific domain, a matrix data structure is used in which the components are stored and at the time of analyzing them, arrays (vectors) are established, which are compared with the string that entered. This process is done for the total of the length of typed characters. When a match is found, it is said that there was a collision in the data because these are identical and access is allowed.



3.4 Adaptive collisions culling using a parallel and sweep algorithm [4]

Collision problems with large datasets tend to use a huge amount of cache and are difficult to handle. By using a parallel and sweep algorithm, which is enhanced with temporal coherence and a double-axis sweep, you manage these problems while the algorithm also uses a work-division strategy to cover up the problem in an optimal way and an increase of context awareness for scenarios that involve intense clustering.



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