Vinescout – Agricultural Autonomous robot including built-in sensors navigation system.

DESCRIPTION OF INVENTION

Autonomous navigation through agronomic terrains represents an enormous challenge due to great variability in operating conditions. The available technology has traditionally trusted on GPS-based autonomous guidance, and huge developments have been achieved in this area. However, GPS-based autonomous guidance presents problems when is used in agronomic environments with dense or tall vegetation, or near canopies and inside greenhouses. This limitation takes place due to the uncertain GPS signal, multipath errors, and lack of visibility under complex scenarios.

The present invention provides a method, system, and a robot for the autonomous navigation through rows of plants or trees grown in vertical trellises. This new system is based on the use of local perception sensors, instead of relying on GPS technology.

Three sensing devices are incorporated to the robot's front, and two of them allow the system to define and navigate a bi-dimensional grid, as shown in Figure 1. This makes the robot capable of operating without human interaction. The system allows the robot to keep moving on a straight line and avoid obstacles that may appear on the path. This system has been implemented in a robot whose main objective is to collect data from the crops, but it could be included in many other autonomous systems, such as medium-size orchard harvesters, weed removal machinery and plant protection sprayers.

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BUSINESS APPLICATIONS

• Automated crop harvesting and automated systems for plant protection products dosing.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The use of this invention allows a completely new approach to agricultural automatization providing multiple benefits:

- Fully autonomous system.
- Complete independence of GPS signal, opening the door to automation on crops where GPS technology was not an option in a regular basis.
- Higher accuracy on path-tracking.
- Real time path corrections to avoid collisions.
- Reliable under ever-changing environmental conditions.xxxxxxx

STATE OF TECHNOLOGY DEVELOPMENT

A fully functional prototype has been tested under real conditions in vineyards placed in Spain and Portugal. Figure 2 shows such prototype, meanwhile figures 3 and 4 show the input signal and the path travelled by the robot. The prototype was able to navigate the crops indistinctly during day and night while collecting data related to hydric and thermal stress. Also, public demonstrations of the prototype have been done, and media material has been released. (see all materials at http://vinescout.eu/web/)

INDUSTRIAL PROPERTY RIGHTS

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