



LiDAR-only based navigation algorithm for an autonomous agricultural robot

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Auteur	Malavazi, Flavio BP [1], Guyonneau, Rémy [2], Fasquel, Jean-Baptiste [3], Lagrange, Sébastien [4], Mercier, Franck [5]
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Mots-clés	Crop navigation [6], LiDAR measurements [7], Line extraction [8], PEARL [9], RANSAC [10]
Résumé en anglais	<p>The purpose of the work presented in this paper is to develop a general and robust approach for autonomous robot navigation inside a crop using LiDAR (Light Detection And Ranging) data. To be as robust as possible, the robot navigation must not need any prior information about the crop (such as the size and width of the rows). The developed approach is based on line extractions from 2D point clouds using a PEARL based method. In this paper, additional filters and refinements of the PEARL algorithm are presented in the context of crop detection. A penalization of outliers, a model elimination step, a new model search and a geometric constraint are proposed to improve the crop detection. The approach has been tested over a simulator and compared with classical PEARL and RANSAC based approaches. It appears that adding those modification improved the crop detection and thus the robot navigation. Those results are presented and discussed in this paper. It can be noticed that even if this paper presents simulated results (to ease the comparison with other algorithms), the approach also has been successfully tested using an actual Oz weeding robot, developed by the French company Naio Technologies.</p>
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[1] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=29045>

- [2] <http://okina.univ-angers.fr/r.guyonneau/publications>
- [3] <http://okina.univ-angers.fr/j.fasquel/publications>
- [4] <http://okina.univ-angers.fr/sebastien.lagrange/publications>
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- [12] <http://dx.doi.org/10.1016/j.compag.2018.08.034>
- [13] <https://www.sciencedirect.com/science/article/pii/S0168169918302679?via%3Dihub>

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