

Abstract

Enriching Low-Density Terrain Maps from Satellite with Autonomous Robots Data †

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Abstract: Satellite imagery and remote sensing has been used for some years in agriculture, creating terrain maps for different soil features (humidity, vegetation index, ...). Multichannel information provides lots of data but with a big drawback: the low density of information per surface unit, that is, the multichanneled pixels correspond to a large surface, and it is not possible a fine characterization of the targeted areas. In this research, authors propose the enrichment of such a data by the use of autonomous robots which explore and sense the same targeted area of the satellite but yielding a finer detail of terrain, complementing and fusing both information sources. The sensory elements of the autonomous robots are in the visual spectrum as well as in the near-infrared spectrum together with Lidar and radar information. This enrichment will provide to the final user a high-density map of the soil to improve crops, irrigation, seedling and other agricultural processes. The methodology to fuse data and create high-density maps will be deep learning techniques. The system will be validated in real fields with the use of real sensors to measure the data given by satellites and robots' sensors.

Keywords: autonomous robots; satellite data; remote sensing; deep learning