The Impact of Artificial Intelligence on Agricultural Machines and Plant Nutrition

Authors : Kirolos Gerges Yakoub Gerges

Abstract : Self-sustaining agricultural machines act in stochastic surroundings and therefore, should be capable of perceive the surroundings in real time. This notion can be done using image sensors blended with superior device learning, mainly Deep mastering. Deep convolutional neural networks excel in labeling and perceiving colour pix and since the fee of RGB-cameras is low, the hardware cost of accurate notion relies upon heavily on memory and computation power. This paper investigates the opportunity of designing lightweight convolutional neural networks for semantic segmentation (pixel clever class) with reduced hardware requirements, to allow for embedded usage in self-reliant agricultural machines. The usage of compression techniques, a lightweight convolutional neural community is designed to carry out actual-time semantic segmentation on an embedded platform. The community is skilled on two big datasets, ImageNet and Pascal Context, to apprehend as much as four hundred man or woman instructions. The 400 training are remapped into agricultural superclasses (e.g. human, animal, sky, road, area, shelterbelt and impediment) and the capacity to provide correct actual-time perception of agricultural environment is studied. The network is carried out to the case of self-sufficient grass mowing the usage of the NVIDIA Tegra X1 embedded platform. Feeding case-unique pics to the community consequences in a fully segmented map of the superclasses within the picture. As the network remains being designed and optimized, handiest a qualitative analysis of the technique is entire on the abstract submission deadline. intending this cut-off date, the finalized layout is quantitatively evaluated on 20 annotated grass mowing pictures. Light-weight convolutional neural networks for semantic segmentation can be implemented on an embedded platform and show aggressive performance on the subject of accuracy and speed. It’s miles viable to offer value-efficient perceptive capabilities related to semantic segmentation for autonomous agricultural machines.

Keywords : centrifuge pump, hydraulic energy, agricultural applications, irrigationaxial flux machines, axial flux applications, coreless machines, PM machinesautonomous agricultural machines, deep learning, safety, visual perception
Conference Title : ICATPN 2024 : International Conference on Agricultural Technology and Plant Nutrition
Conference Location : New York, United States
Conference Dates : December 09-10, 2024