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Use of Semantic Segmentation for Autonomous driving

When it comes to driving a vehicle the first and the most rudimentary step is to understand the surroundings. In case of us as a human driver, we rely on our sense of vision, understanding and our cognitive skills to understand our environment effectively and thereby drive a vehicle safely. But when it comes for an Robot or AI to drive the vehicle the things get really complicated. One has to ponder about the thought that how could we make a machine understand what it is surrounded with? The solution was using a technique called Semantic Segmentation. The machine makes use of its camera to understand the objects its surrounded with like road, people, vehicles, obstacles at a pixel-level and process each frame captured to find various features that can be associated with its environment. By performing this semantic segmentation the machine gets an overall context with regards to its surroundings. By performing this group of pixels present in the frame are analysed and an appropriate label is assigned to it. For performing this kind of semantic segmentation FCNs or fully convoluted Neural Networks are used. Using FCN or Fully Convoluted Neural Networks the images are interpreted which can be used for classifying the objects that are present in the image. It is also used in scene understanding. The FCN can be also used as a way to understand the obstacles and once the obstacles are interpreted further processing such as obstacle avoidance or path planning can be carried out. Using the FCN the priority of the obstacles can also be predicted where the obstacles that are closer to the vehicle are given higher priority and the obstacles that are farther are given lesser priority. This is important as giving priority to the classified obstacles makes the driving more safer as all obstacles are not equally important to avoid.