



結合語義分割優化模型與光速點雲之物件辨識與測距

(以下內容一頁為限，不可揭露關鍵技術內容；填表完成後請刪除此行)

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簡歷：

http://www.me.ntu.edu.tw/main.php?mod=adv_custom_page&func=show_page&site_id=0&page_id=207 <http://140.112.14.7/~kangli1234/IVMechatronics/>

市場及需求：

在過去這些年當中，隨著卷積神經網路不斷發展下，除了本身用於物件辨識 (Classification) 上，在物件分類 (Object Detection)、語義分割 (Semantic Segmentation) 上都有了不錯的發展。對於透過視覺來了解當前的場景，語義分割是個極為重要的方法，它將圖像根據物件進行圖像上的分割。圖像分割對於產業應用上也極為廣泛，包含了醫學上透過 x 光片上圖像分割將腫瘤的邊界特徵萃取出來也可以進行細胞組織體積的量測，除此之外在自駕車產業上，透過語義分割將可開的道路和行人等將其分割出來，甚至在虛擬實境上也會使用到一些有關語義分割的方法。

技術摘要(含成果)：

1. 提出一套語義分割神經網路架構，降低當前卷積神經網路的模型參數量以及運算量，在單張低規的 Nvidia GTX 1060 的 GPU 卡下達到 6.5fps 的推論時間。
2. 所提出之深度神經網路相比於當今多數使用的深度神經網路，模型參數量上減少約 50%，同時於模型計算量上減少約 30%。
3. 在 Linux 作業系統下的機器人作業系統 (ROS) 中結合語義分割圖像與二維光速點雲進行物件辨識及距離偵測的實際應用。

優勢：

所提出之深度神經網路相比於當今多數使用的深度神經網路，模型參數量上減少約 50%，同時於模型計算量上減少約 30%，在單張低規的 Nvidia GTX 1060 的 GPU 卡下達到 6.5fps 的推論時間。

競爭產品：

Google 的 DeeplabV3

專利現況：

(1) 本研究團隊具有十年研究經驗，主要研究包含智能化電動車與自動駕駛技術、車輛即時控制系統、XiL 虛擬驗證技術、液壓伺服控制、結構混合模擬技術及太陽能系統研發。

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Object Recognition and Ranging Using Enhanced Image Semantic Segmentation Model and Lidar Point Cloud

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Experience:

http://www.me.ntu.edu.tw/main.php?mod=adv_custom_page&func=show_page&site_id=0&page_id=207 <http://140.112.14.7/~kangli1234/IVMechatronics/>

Market Needs:

In the past few years, with the continuous development of convolutional neural networks, in addition to its own use in object recognition (Classification), there has been good development in object detection and semantic segmentation. Semantic segmentation is an extremely important method for understanding the current scene through vision. It divides the image on the image according to the object. Image segmentation is also very widely used in industry, including medically extracting the boundary features of tumors through image segmentation on X-ray films, and also measuring the volume of cell tissues. In addition, in the self-driving car industry, through Semantic segmentation separates open roads and pedestrians, and even some methods of semantic segmentation are used in virtual reality.

Our Technology:

1. Propose a segmentation model which can reach 77% mIOU, and the inference time of 6.5fps can be achieved under a single low-profile Nvidia GTX 1060 GPU card.
2. Compared with most of the deep neural networks used today, the proposed deep neural network reduces the amount of model parameters by about 50% and reduces the amount of model calculations by about 30%.

Strength:

The model parameters reduce about 50%, and the model computation reduce about 35%.

Competing Products:

DeeplabV3, Google

Intellectual Properties:

Our research team has ten years of researching experience. Our main research project contains autonomous driving technologies, real-time vehicle control systems, virtual validation technologies, hydraulic servo control, hybrid simulation platform, and solar energy systems.

Contact (do not need to fill out):

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