别尽量接近对应的真值, 通过训练可以得到能够识别绿地区域, 大棚区域和其他区域的深度神经网络模型, 本文对待检测图像进行超像素分割并将分割得到的超像素块输入训练得到的 DNN 模型后, 可以得到输入的超像素块的输出结果, 将输出结果可视化到图像上后, 就得到了对目标区域图像检测的识别结果, 本实验中识别结果如图 8 所示, 由于本次实验中的 DNN 只对绿地, 大棚以及其它区域进行了训练, 因此本文得到的输出结果中只识别了这三种区域类型.

本文对模型的检测结果进行了分析, 其数据如表 3 所示, 从表 3 中可以看出, 本文中使用的算法的检测成功率可达 95.6%.

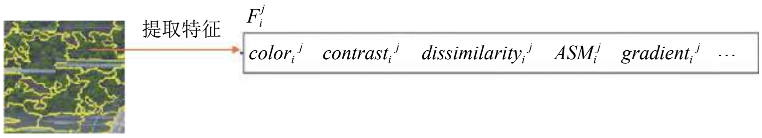

图 6　分割后的图像超像素块提取特征示意图

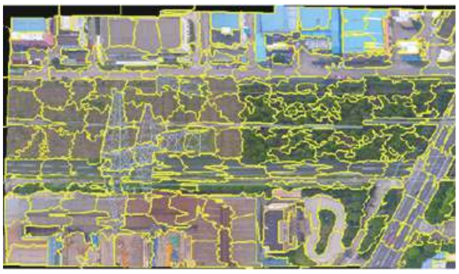

图 7　图像超像素分割结果

图 8　图像识别结果, 绿色代表绿地区域, 白色代表大棚区域, 灰色代表其他区域

表 3　检测数量以及成功率

检测图像总数	114
检测成功图像数	109
检测失败图像数	5
检测成功率	95.6%

4　结论与展望

本方法从基于无人机的高压线路通道环境巡检这一现实要求出发, 实现了一种基于超像素和深度神经网络的航拍高压输电线路环境检测的方法. 实验包括对基于 SURF 特征的图像拼接算法, 基于 SLIC 超像素分割技术, 对超像素块的特征提取以及使用 DNN 进行图像分类检测.

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