基于机器视觉的苹果识别和形状特征提取Recognition and Shape Features Extraction of Apples Based on Machine Vision

司永胜 乔军 刘刚 刘兆祥 高瑞

中国农业大学

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摘 要： 提出了利用色差R—G和色差比(R—G)/(G—B)相结合的苹果识别方法。在顺光、逆光等不同情况下对拍摄的苹果图像进行了识别，并对识别后的图像进行消除噪声、区域填充等预处理，获得苹果的轮廓图像。针对轮廓图像，采用遗传算法进行形状特征提取。采取多次运行遗传算法，并依次转换目标轮廓点为背景点的方法，处理果实图像邻接、重叠问题。实验结果表明：苹果识别方法在一定程度上消除了阴影、逆光、土壤等影响，识别率达97%。基于遗传算法的形状特征提取方法，可对邻接、重叠图像进行有效分割，快速、准确地实现苹果图像圆心坐标和半径的提取。An apple recognition method with color difference R-G and color difference ratio (R-G)/(G-B) was presented.The apples in the images taken under frontlighting and backlighting conditions were recognized. The contour images were gained through the pretreatments such as noise removal, area filling etc. Shape features were extracted from the contour images based on genetic algorithm (GA). For the clustered or overlapped apples, the method of multiple running GA and converting the contour points of every apple into background in turn was applied. The experiment results showed that the proposed recognition method, to a certain extent, eliminated the influence of shade, backlighting and soil. The recognition rate reached 97%. The features extraction method based on GA segmented the clustered or overlapped apples successfully. Meanwhile, the center points and radiuses were quickly and accurately extracted.

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