

基于LBM的苹果采摘机器人视觉图像自动修复算法 Automatic Image Inpainting Algorithm for Apple Harvesting Robot's Vision System Based on LBM

陈玉 赵德安

江苏大学

关键词: 苹果 采摘机器人 格子波尔兹曼方法 图像修复

摘要: 为恢复被果树枝叶遮挡后丢失的信息, 首先通过计算遮挡因子, 确定果树枝叶对苹果的遮挡区域; 然后, 利用格子波尔兹曼方法求解各向异性扩散方程, 估计丢失的信息, 提出了基于格子波尔兹曼方法的图像修复算法。实验证明, 该算法能够有效实现苹果图像中枝叶遮挡部分的修复。与基于曲率驱动扩散的图像修复算法相比, 该算法具有较高的峰值信噪比。由于算法的高度并行性, 可以将其用于构建并行图像处理系统, 并且适合苹果采摘机器人视觉系统。 With the aim to recover the lost information of the apple harvesting robot's vision caused by the branches and leaves, an automatic image inpainting algorithm was proposed. By calculating the so called blocked factor, the area blocked by the branches and leaves was confirmed at first. And then, a Lattice Boltzmann method based on image inpainting algorithm (LBMI) was used to recover the lost information. The examination results show that the LBMI can recover the apple image effectively, and has higher PNSR than the algorithm based on the curvature-driven diffusions. More over, the parallism of the LBMI can be used to build the high speed parallel image processing system for apple harvesting robot.

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