茄子收获机器人机械臂避障路径规划

姚立健 丁为民 陈玉仑 赵三琴

南京农业大学

关键词： 茄子收获机器人 机械手 避障 路径规划

摘　要： 提出了一种茄子收获机器人机械臂在笛卡尔空间的避障方法。将空间障碍物等效为可以用数学建模的圆柱扇环，将三维空间的路径规划简化为二维，提高了控制的实时性；将障碍从工作空间转换到C空间中，使对机器人的控制直接作用于关节，避免了使用雅可比逆阵进行复杂的坐标转换。将C空间映射到图像矩阵中，通过对图像进行适当的处理，规避了在使用A*算法寻优时可能出现的失败。实验结果表明，该避障路径规划方法计算量小，实时性好，适合自然生长状态下茄子的自动收获。A method was put forward to avoid obstacles for an eggplant harvesting robot manipulator in Cartesian space. The obstacles were supposed equivalently as cylindrical-rings, and then a three-dimensional planning path problem was simplified to a two-dimensional one, which improved the real-time control performance greatly. Transforming the obstacles from work-space to configuration-space could control the robot joints directly, which could avoid complex coordinate translation using Jacobian inverse matrix. Moreover, processing properly image matrix mapped from C space could avoid the path planning failure under A star algorithm. The experimental results show that this algorithm with less computational amount and excellent real-time performance is suitable for harvesting natural growing eggplant automatically.

查看全文（请使用Adobe Acrobat 6.0版本浏览）　返回首页　引用本文