草莓采摘位置机器视觉与激光辅助定位方法 Object Locating Method of Laser-assisted Machine Vision for Strawberry-harvesting

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关键词： 草莓 采摘机器人 机器视觉 激光辅助 目标定位

摘 要： 以地垄栽培模式下的草莓为作业对象，针对草莓果实娇嫩易损的特点，采用直接撷取果柄的采摘方案，提出了一种图像处理与激光辅助测距相结合的草莓采摘位置自动定位方法。采用镜像匹配法计算草莓果轴的平面位置信息，进而在扇形激光束的辅助下，利用几何光学计算采摘位置在深度方向的距离。对自然环境下生长的长圆锥型草莓进行了试验，结果表明，对于机器人锁定采摘位置所需的导航数据，该方法的平均计算时间为381ms，测距最大误差为1.6mm，平均误差为0.5mm。 An object locating method for strawberry-harvesting robot was proposed and evaluated in view of aimed at the “hill culture” planting pattern and characteristic of liable to damage for strawberry. The method includes two steps: “2-D information acquisition”, during which “mirror-image match method” is used to locate the strawberry’s fruit axis; “distance judgment between object and end-effector”, in which laser is used to assist distance judgment. The experiment results showed that the system is suitable for locating long-conical strawberries. The average time required for locating the picking position is 381 ms, the maximum measurement error of the distance is 1.6mm and the average error is 0.5mm.

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