基于视觉的固定翼小型无人机自主降落技术研究

Research on Autonomous Landing Technology of fixed Wings Small Unmanned Aerial Vehicle Based on Vision

abstract

摘 要: 以固定翼小型无人机的自主着陆控制为研究背景，提出了一种基于光流的固定翼小型无人机在移动降落架上的自主着陆控制方法。该方法首先.....; 其次.....; 最后在 *simulink* 环境下搭建动态仿真系统，仿真结果表明，使用本文方法可以有效实现飞行器的自主着陆控制.

关键字: 固定翼小型无人机; 计算机视觉; 自主降落; 目标追踪; 光流

Abstract: *Taking the autonomous landing control of fixed-wing small unmanned aerial vehicles as the research background, a method of autonomous landing control of fixed-wing small unmanned aerial vehicles based on optical flow is proposed. This method, first of all, is ....., and ....., then uses the runway line as a feature to calculate its sparse linear optical flow field and combines The camera model and the relationship between the optical flow field and the velocity field use the horizontal flow of the runway line as system feedback to design the control system. Finally, a dynamic simulation system is built under the simulink environment. The simulation results show that the method of this paper can effectively achieve the autonomous landing control of the aircraft.*

keywords— *fixed-wing, Computer Vision, Autonomous landing, Target Tracking, light flow*

introduce

1 引言

- 本课题研究背景
- 本课题研究前景
- 本课题知识难点
- 本课题结构罗列

controllers

2 无人机控制器

无人机总的概述 ....

- 无人机三大控制器介绍
- 无人机内部控制器数据流走向

landingLogical

3 飞行器着陆原理分析

通常的基础方法,

- 光流场, 三个阶段
- 横向控制
- 纵向控制

visionGuidence

4 无人机视觉引导

4.1 视觉体系结构

- 视觉体系结构阐述
- 视觉数据流走向

visionGuidence

5 融合

若内容太多, 继续拆分
数学模式方法公式推导, 可以对应的说(分节), 也可以整合到一起, 看内容的多少
传感器选择
横向控制
纵向控制
引导算法 simulations

6 仿真平台的搭建

这个不太了解....
目前还是需要多看, 多了解. conclusion

7 结论

1. HITL(60%) –¿ 控制理论 –¿ 仿真
2. 仿真(60%) –¿ 控制理论

dubins 注释 literature

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