基于 Vive VR 的遥操作机械手

（申请清华大学工学硕士学位论文）

培 养 单 位: 天 空 工 场

学　　科: 计 算 机 科 学 与 技 术

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摘 要

目前机械臂远程控制普遍采用手柄或键盘控制方式，且监控方式普遍为摄像头图像显示在监视器上，与现场操作差别很大。我们开发了一套用 VR 设备远程控制机器人的系统以及配套的三维实时场景采集及图传系统，使操作者能有身临其境的操作体验，同时大幅降低成本，减小了延迟。

本文的创新点主要有：

- 为使操作者看到具有立体感的实时画面，我们开发了由双目摄像头及 VR 显示系统组成的三维实时场景采集系统，此系统较图像拼接和场景重构实时性好，且对算力要求不高。
- 手持 Vive 追踪器操作机械臂末端符合人类日常使用手进行操作的习惯。较外骨骼和 Optitrack 运动捕捉系统廉价，且能够满足绝大部分需求。

关键词：机器人；虚拟现实；远程控制

Abstract

An abstract of a dissertation is a summary and extraction of research work and contributions. Included in an abstract should be description of research topic and research objective, brief introduction to methodology and research process, and summarization of conclusion and contributions of the research. An abstract should be characterized by independence and clarity and carry identical information with the dissertation. It should be such that the general idea and major contributions of the dissertation are conveyed without reading the dissertation.

An abstract should be concise and to the point. It is a misunderstanding to make an abstract an outline of the dissertation and words “the first chapter”, “the second chapter” and the like should be avoided in the abstract.

Key words are terms used in a dissertation for indexing, reflecting core information of the dissertation. An abstract may contain a maximum of 5 key words, with semi-colons used in between to separate one another.

Key words: TEX; LATEX; CJK; template; thesis

目 录

主要符号对照表

VIVE	
ZED	
CUDA	
DOBOT	
NAO	
TX1	
ΔG	活化自由能 (Activation Free Energy)
χ	传输系数 (Transmission Coefficient)
E	能量
m	质量
c	光速
P	概率
T	时间
v	速度

第 1 章　带 English 的标题

这是 ThuThesis[1] 的示例文档，基本上覆盖了模板中所有格式的设置。建

1.1　封面相关

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