Hololens AR Drone Project Doc

Hololens功能描述

Date 07/03/2017

1、 Introduction

This document is a functional description for the UAV project (hololens). At present, the main functions include real-time video display, parameter display, real-time map, and communication with PTZ.

2、 program function

1. development environment

The project is developed using Unity5.6 version, and the IDE is visual studio 2017. Note that visual studio needs to install a development package that supports the win10 platform. Unity requires the visual studio plugin to be installed.
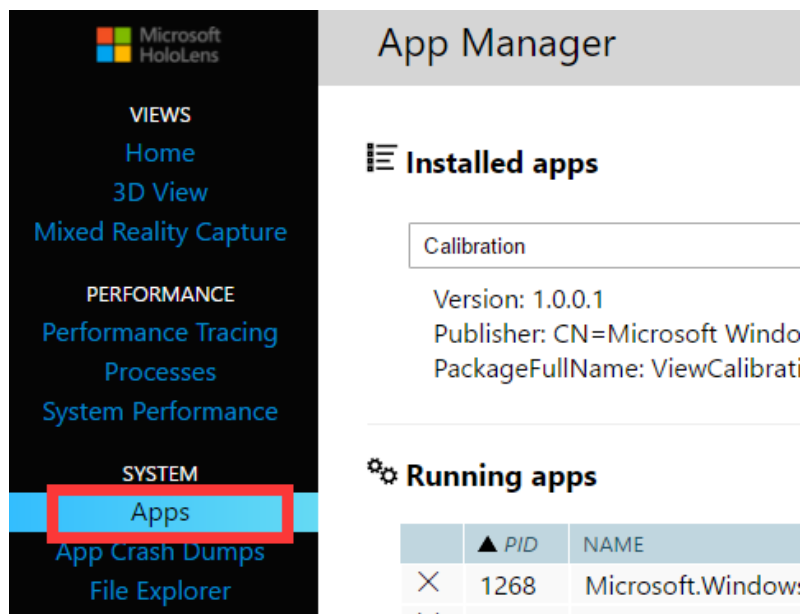
2. Software Installation

It is recommended to update Hololens to the latest version before installation.

Since the Hololens program is a non-public version and cannot be uploaded to the Microsoft App Store, the Hololens program is installed in the background.

    1   Turn on Hololens and connect to LAN.

    2   Connect to the Hololens management background. For example, my Hololens LAN Ip is

10.0.0.36, just enter in the browserhttps://10.0.0.36/ . After entering, you must enter the account password set when HoloLens was turned on for the first time.

3　Select Apps in the menu on the left side of the interface to enter the App management interface.

4　Unzip the software installation package and remember the decompression path.

5　Click Choose File on the right interface
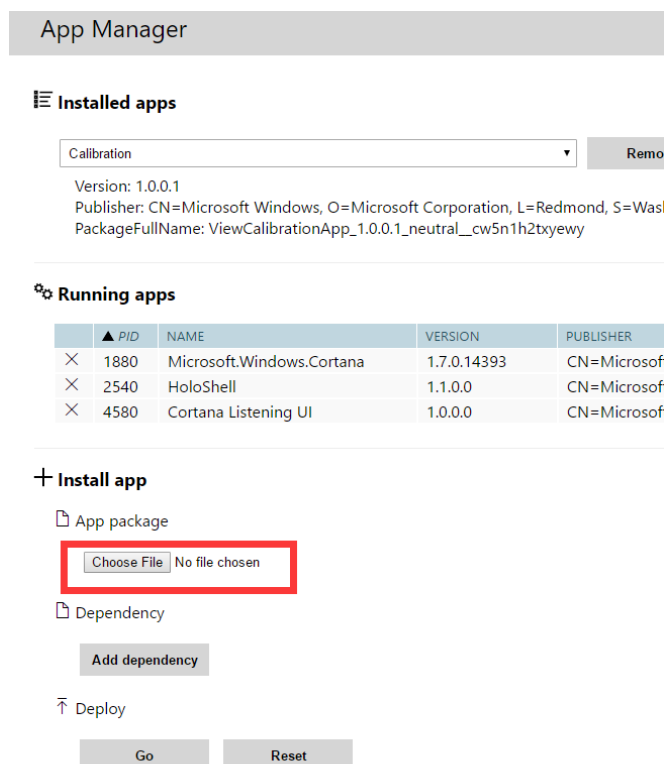
6　Select the .appxbundle file in the unzipped file

7 Click Add dependency

Import Microsoft.NET.CoreRuntime.1.1.appx and Microsoft.VCLibs.x86.14.00.appx under the Dependencies\x86 folder respectively

8 Click Go at the bottom to complete the installation.
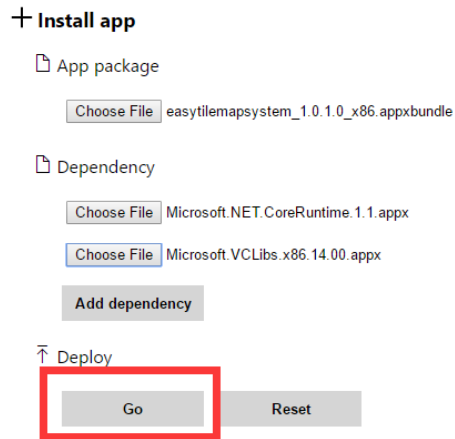
9　To run the newly installed file, find easytilemapsystem in Installed Apps in the current interface and click Start.**It is recommended to connect the Xbox control handle with Bluetooth before running.**
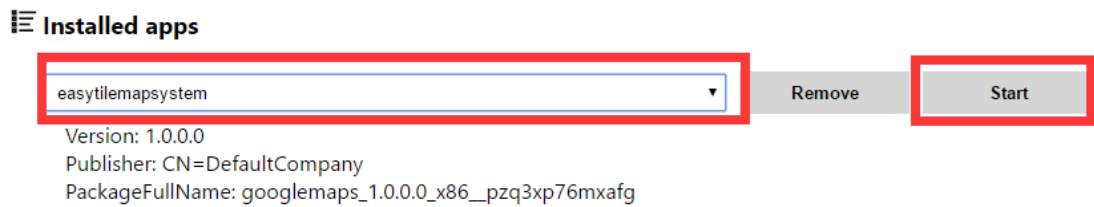
3.　Main interface

To run the program, click the "+" button on the main interface of HoloLens to find the easytilemapsystem program, or refer to ⑨ of 2 Software Installation to run the program.**It is**

recommended to connect the Xbox control handle with Bluetooth before running. Enter the main interface after running the program. The main interface consists of three areas. The upper left is the video display area, the upper right is the map display area, and the lower is the parameter display area.

4.   Video display and target capture

After entering the main interface of Hololens, the video stream can be received in real time and displayed in the upper left video display area (the default video receiving port is 6666). Because it is a real-time UDP video stream, HoloLens needs to capture key frames to start normal video playback, so it is recommended to start Hololens first, and then start sending video streams, which can reduce video delay.

Click on the video area in the upper left corner to enter the target capture mode. At this point the video area will switch to full screen and cover other interfaces. A square selection area will appear in the center of the field of view. Use the rocker on the right hand side of the handle, push it up or right to enlarge the selection area, push it left or down to shrink the selection area, and reduce the length of the square frame by 10 pixels each time. Moving the head can control the selected area to move in the corresponding direction. After capturing the target, you can make a click gesture in front of HoloLens (for details, refer to the hand gesture tutorial of HoloLens), HoloLens will fix the selected area and send the area information to the drone. Click the video area again, the video area will shrink, and return to the main interface, the previously selected box will remain on the video area.

5.   map display

The upper right of the main interface is the map display interface. Currently using Google Maps, the center point is the current position of the drone. The starting coordinates of the position are currently 116.4 longitude and 39.9 latitude.

1   Use the big (voice) command to make the map distance unit larger, and the small (voice) command to make the map distance unit smaller.

2　After Hololens receives the data packet, it will use the parsed coordinates to draw a point on the map every 2 seconds. The upper limit of the number of points is currently 6, and the points will be connected in the order in which they appear. When the number of dots exceeds the upper limit, the first appearing dots will be erased.

6.　Fixed and enlarged video area

The following commands can be used to fix or zoom in on the video area and observe the camera rotation angle.
1　Back (voice): Enlarge the video area and bind to the camera.
2　After zooming in on the video, the camera rotation angle will be calculated. The horizontal and vertical rotation angles of the direction the user is facing are 0 degrees. Because the camera needs an absolute fixed reference direction to calculate the rotation angle when it is rotating.
3　Then, the camera can be released by a release (voice) command, and the main menu is presented.

7.　PTZ command sending

1　You can start the head search state through the start (voice) command, and send three hovers at the same time, once every 20ms.
2　Hololens will send a manual search command to the gimbal every 20ms.
3　Targeted commands are automatically sent when the check box is confirmed.
4　You can click the hover button in the main menu to start the head search and send three hover commands at the same time, once every 20ms.
5　In the main menu, you can click the stop search button to stop the head search.
6　In the main menu, you can click the semi-automatic button to send three semi-automatic commands, once every 20ms.
7　In the main menu, you can click the fully automatic button to send three fully automatic instructions, once every 20ms.

8. Parameter information

1   The parameter information is located in the lower area of the main interface. Clicking each button will display the corresponding system parameters below it. Click the parameter area again to close the parameter information bar.

3、Notice

1   When the main menu cannot be found in the field of view, you can use the back voice command to help retrieve the video area and present it in front of the camera, and then use the release voice to release it and return to the main menu.

2   Considering that clicking the hover button through the camera will make the user unable to independently choose the zero direction required in the head search, the voice command start is added, and the effect is equivalent to clicking the hover button.