

RotateEntry: Controller-rolling-style Text Entry for 3 Degrees of Freedom Virtual Reality Devices

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I. INTRODUCTION

RotateEntry is a “controller-rolling-style” text entry method designed for three degrees of freedom (3DoF) virtual reality (VR) devices. It moves a key-selecting cursor through the virtual keyboard using the controller’s rolling angle and relative pitching angle. This interaction improvement frees the VR users from entering text with a fixed posture like using the current mainstream raycasting solution. Instead, the user can put his/her hand holding the controller in any spatial position, which means the users can use our proposed text entry method in a relaxing posture.

The paper submission of this demo is Submission 17.

II. IMPLEMENTATION

The demo application of RotateEntry is developed on the Unity game engine and deployed on an Oculus Go head-mounted display (HMD). It uses a QWERTY keyboard layout to reduce users’ learning-curve (see Fig. 1) since this keyboard layout was implemented on the default text entry method for most HMDs (Dube and Arif 2019).



Fig. 1. The user interface of the RotateEntry demo. <https://youtu.be/vYBXWvidsOc>

The implementation of RotateEntry is to capture the controller’s rotational input of a particular axis. By dividing the effective rotation interval (See Fig. 2) by the number of rows or the number of columns of the QWERTY keyboard layout, a specific rotation interval is allocated to each key. The key whose given rotation interval includes the controller’s current effective rotation angle will be highlighted.

RotateEntry provides three interaction methods with different ways of moving the cursor across the virtual keyboard: Rotate Key (RK), Rotate Column Point (RCP), and Rotate Column Rotate (RCR).

1. RK uses a cursor for keys selection on the virtual keyboard. The user can roll the VR controller to move the cursor among columns. And they can pitch the controller to move the cursor among rows.
2. RCP uses a two-step interaction. Firstly, the user can roll the controller to move a cursor among columns. The user can press a key to select a column and then move the key-selecting cursor within the selected column by pitching the controller.
3. RCR also uses a two-step interaction. The user can move a cursor among columns by rolling the controller. After pressing a key to select a column, he/she can then move the key-selecting cursor within the selected column by rolling the controller.

When a particular key is highlighted, the final confirmation in the above three interaction methods to select the focused character is pressing the controller’s trigger button.

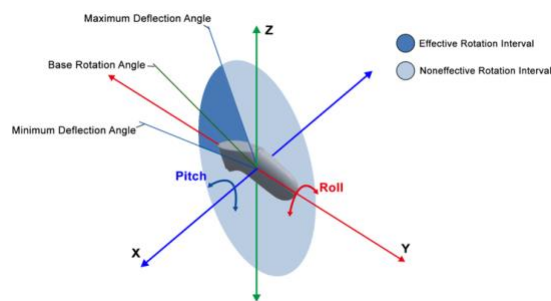


Fig. 2. The concepts of “roll”, “pitch”, “effective rotation (pitching) interval” for RotateEntry

The user can experience all three interaction methods in the demo application. A dashboard web admin interface is used to choose the current interaction method presents on the demo application.

III. REFERENCES

- Dube and A. Arif. 2019. “Text Entry in Virtual Reality: A Comprehensive Review of the Literature.” *HCI*.