

Mixed Reality Based 3D Development Simulation Tool

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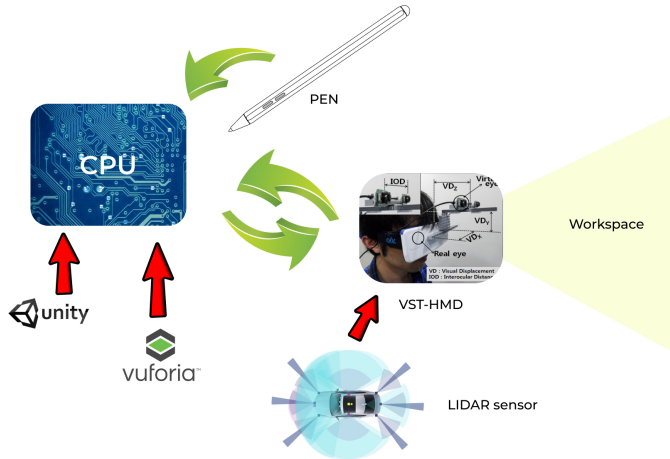
Problem Statement

- Visualisation difficulty of 3D model in a 2-D plane.
- Depth analysing difficulty of the machine being designed.
- Physics is not easily simulated and are not satisfactory **reliable** in a 2D design environments.

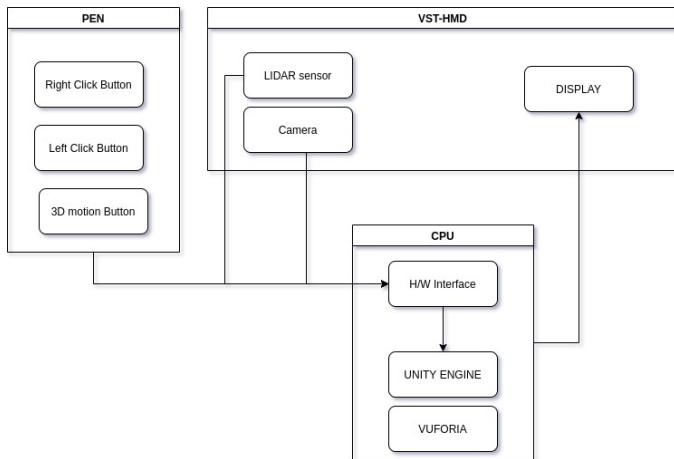
Proposed Solutions

- Visualisation difficulty is solved by presenting 3D model in the environment of the user using an MR application with measurements being shown.
- Depth analysing issue is solved using LIDAR sensors and 2 VGA cameras in VST HMD's
- Physics is simulated using Unity PhysX Engine and shown and an aesthetic feel of designing is produced.

Design



Architecture



Software tools



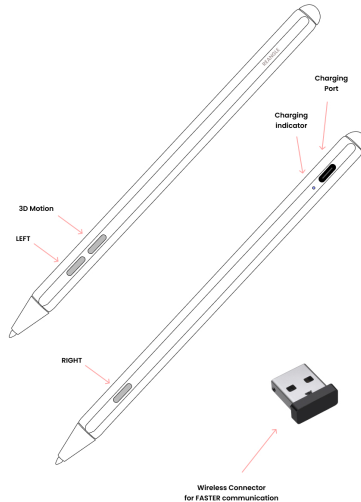
- Inventory and other parts made as GameObjects and physics simulated using Unity PhysX Engine.

Hardware

1. The Pen Design.

- The pen can be interfaced with the computer through an HC-05 module connected to the Arduino.
 - ▶ Left Button - selecting and dragging the 3D object
 - ▶ Right Button - show the properties of the 3D objects we choose or make
 - ▶ 3D Motion Button - used to View and Rotate the object in 360 degree.

Hardware

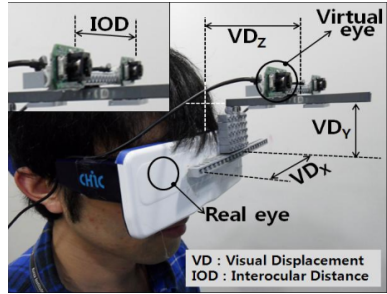
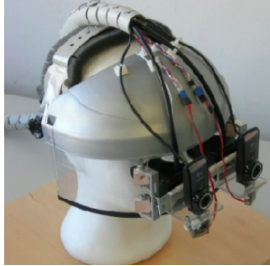


Hardware

2. VST HMD.

- Video See Through Head Mounted Display
- Display device, worn on the head or as part of a helmet with 2 camera rendering the external environment to the user.
- LIDAR sensor for depth measurement.

Hardware



Working Flow

- Flow Diagram

Future Scope

- The MR model we suggest can be re-modified to adjust to the demands of various other industries like healthcare, tourism etc.

Limitations :

- Creating Mixed Reality (MR) applications currently is one of the most challenging tasks in the field of computer graphics.
- Traditional I/O devices cannot be used with an MR system, hence the new system architecture and operating system exclusively for MR should be developed.
- No widely adopted standards exist in this area.

References

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Thank You