



Riassunto dell'elaborato

VOLUMETRIC DISPLAY FOR A CONTINUOUS VIEWING OF A 3D OBJECT THROUGH PROJECTION

Context

The aim of the project is to create a system that allows a user to view a volumetric display without the need of intermediary devices or objects, like a smartphone, glasses or headgears. The developed device tries to imitate the `hologram projectors` that are often portrayed in the science-fiction genre. The device takes its name from the Pepper`s Ghost, an illusion technique that use a semi-transparent reflective glass to project a secondary or a virtual scene onto a `real` scene, like the stage of a theater, to overlap it and create an illusion. The same illusion is used to show the projected object in our Pepper`s Display. The Pepper`s Display is a volumetric display that shows a 3D virtual object through projections and enables the user to view said object from all the angles around it and afterwards interact with the projection.

The display

In this paper we present every step of the development of the device, with a heavy focus on the research conducted to determine which of the various options considered to achieve each step is to be considered best fitting for the desired result. The operating principle of the device can be divided in steps: - user`s position tracking: using a depth sensor such as the Microsoft`s Kinect we can track the user`s position, - camera movement: the position is then used to calculate and show the right point of view of the 3D object, - image creation: the image is displayed on a screen and, through a semi-transparent reflective cone, is viewed by the user, - interaction patterns: the user can then interact with the projection with his voice, through a device like the Amazon`s Echo Dot and Amazon`s Alexa, or with gestures, through the same Kinect.



Conclusion

The result is a device that, compared to the other volumetric displays and similar devices in the market, is the only one that allows the user to physically walk around the projection, enabling him to observe every angle of the 3D object, with a continuous 360° view, albeit with some limitations that, however, can be hidden with a properly setup environment. The designed interaction feels fluid and organic throughout the session, giving the impression of naturally speaking with the virtual projections. The final result gets close to the desired 'hologram projector', with future additions that can bring science-fiction even closer to reality.

Data

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il Relatore

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