Virtual and Mixed Reality Technology

MagicPaper Application

Interaction with 3-dimensional augmented reality on paper

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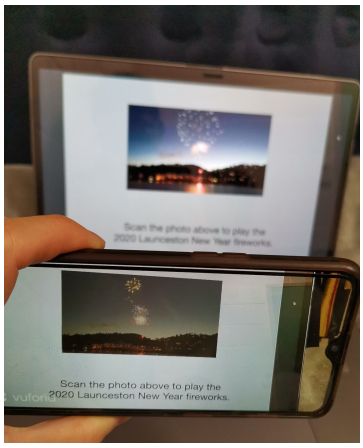
MagicPaper screen captures



Description of the MagicPaper

Paper has been used by humans to record knowledge for thousands of years. Text, pictures and diagrams are the main forms of recording knowledge and information on a paper book. Nowadays, digital media has taken an important role in knowledge recording and transferring, such as videos, photos and 3D animations models. However, is there a way for the traditional paper book and digital information to work together, enhance the reading and learning experience of human?

MagicPaper is a reading enhancement education app that builds on AR technology. It transfers the text and pictures in the traditional paper book to videos and 3D animations, and many more. It allows the user to zoom in, rotate the virtual 3D animations and items in the application. There is also video and audio playing features, where the user just needs to hold the smartphone over a picture on a book, the story of the picture will be played via the form of a video. All digital data are save in the cloud database, the user's personal devices will be connected to the database while the application starts running. The MagicPaper or service providers (book publishers) able to add, remove or edit its virtual content even after the book has been published.

Interaction Design

The interaction design of the MagicPaper is simple and smooth, the user just needs to hover the device on top of the page where the text or picture is, and the virtual item such as 3D animations, videos, audio, will be shown and displayed.

MagicPaper uses AR technology to connect the virtual world to reality, the user will find reading is more interesting and able to get more information around the abstract concept with the help of MagicPaper. According to the research by Papanastasiou et al (2019), adopting AR technology in education able to enhance learning and memory by immersing multimodal environments, it has a significant improvement in students' learning, social and creative skills. If a picture is worth more than thousands of words, then a video will be even more. Video-based learning can help students performed better than text-based learning in practical knowledge (Buch et al, 2014). Research from (Yadav et al, 2011) also suggests that video plus text types of story content lead to a higher level of engagement and recall of particular information.

In the next step of the application development, more interactive features such as hand gestures, virtual slid bar, buttons will be added to the MagicPaper. It allows users to have a higher level of interaction and immersing experience.

User Stories

User A: AR Book with MagicPaper

In a school, the book still plays a big part in the day to day class. If there are some notes and additional information that the teacher wants to add to help the student to learn, the teacher just needs to put that information on MagicPaper database, and link it to a special picture or sentence in the book, all the students will able to get the information while they are using the MagicPaper app to read the book in school or at home. The information can be a 3D model animation for concepts in science and biology subject, can also be a short film that shows an event in the history or an interactive animation model for the physics subject, students able to interact with the model to enhance their learning experience.

User B: AR Album with MagicPaper

It seems like digital information has taken everything over. However, it has its own limitation. There are various of information all over the internet, your personal computer and hard drive. How to correct retrieval the relevant information is a challenge. At the end of the day, you only got 24 hours, and if everything is sorted in your computer, smartphone, it will require a better human-computer interface to sort out, organise the data and information you have. With magic book, if you are looking for an album memory that was from the trip 3 years ago. You just need to find the actual photo album that you keep in the draw of your desk. Take a look at the album via your the MagicPaper app on the smartphone. A video clip of the photo will be played over the photo in your actual album.

3D Models

1. Farm Animals Set are created by Vertex Cat, downloaded from https://assetstore.unity.com/packages/3d/farm-animals-set-97945#description

2. Farm animals text “Chicken”, “Duck”, “Sheep”, “Pig” and “Cow” are created in Pages by me (Xiating Cai).

3. Videos and screen capture of the flip in Sydney and 2020 new year fireworks of Launceston made by me (Xiating Cai).

References

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