

Lifelog Exploration Prototype in Virtual Reality

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Abstract. Efficiently exploring large lifelog datasets is the subject of much research in the lifelogging community. In this paper we describe a pioneer lifelog interaction prototype developed for virtual reality. This prototype was created as part of a larger research effort to explore the feasibility and potential of exploring visual lifelogs in virtual environments. In this paper we describe the prototype and its design.

Keywords: virtual reality, lifelog

1 Introduction

Dodge and Kitchin[1] refer to lifelogging as ‘a form of pervasive computing, consisting of a unified digital record of the totality of an individual’s experiences, captured multimodally through digital sensors and stored permanently as a personal multimedia archive’. The prevalence of modern technology and sensors has enabled people to capture this digital trove of life experiences automatically and continuously with newfound ease and efficiency [4] and ongoing research is constantly optimising the user experience on these systems. However, virtual reality, which has seen a recent resurgence in popularity due to advancements in technology, has gone largely unexplored in terms of supporting lifelog access. In this paper we describe a prototype lifelog exploration tool developed for the HTC Vive which was built as part of a pilot study to investigate the feasibility of lifelog exploration in virtual reality. The tool supports a user to query a large visual lifelog in VR and to browse temporally-ordered result sets to find items of interest. To the best of our knowledge, this is the first lifelog VR access tool.

When we consider the complex and multifaceted nature of lifelog datasets in the context of virtual reality’s multidimensional axes of exploration, there are numerous applications we can consider. For example, the SAS Institute [3] states that we are limited to processing less than 1 kilobit of information per second when reading from a screen yet the human optic nerve has an estimated bandwidth of about 8 megabits per second. In virtual reality it becomes possible to harness multiple axes and depths of information and we are able to fully utilise our peripheral vision, providing new opportunities for immersive information access.

2 Dataset

The lifelog exploration prototype described in this paper was designed based on a lifelog dataset[4] released for the NTCIR-12 conference[5] in Tokyo in 2016. This dataset consisted of 1000 - 1500 images per day generated by wearable cameras and captured by three lifeloggers (about one month each). These images were further enriched by an automatic image classification algorithm which described the content of each image using keywords (e.g. laptop, coffee, train, etc.) which we refer to in this paper as 'lifelogging concepts'. Additionally there were semantic locations and semantic activities, based from sensor readings on mobile devices, but we did not employ these for this research. Associated with the dataset were a number of topics (information needs) that formed the basis for our experimentation.

3 Prototype



Fig. 1. VR Lifelog Prototype - Clipboard Menu

The primary function of the prototype is to support a user to query a lifelog archive in the VR environment and to browse the result sets. In order to support directed exploration, users of our VR lifelog prototype were given topics (from the NTCIR-12 lifelog dataset) which required them to find certain moments that were known to exist in the collection. For example, moments in which the lifelogger was getting onto a flight or taking a photo of a lake.

The system allowed a user to generate faceted queries via a customised VR query interface (described below) and then explore the search results (a set of lifelog images). A typical query will consist of a selection of dates, a selection of lifelogging concepts and an optional range of time (e.g. 9am to 6pm). To

accomplish this, the user interface is presented as a virtual menu in the virtual environment and is divided into three sections: a date selector, a concept selector and a time range selector. The interface can be presented to the user in two different orientations depending on their preference. One orientation is directly attached to the user's wireless controller and is interacted with by pointing the opposing controller at the menu which will generate a blue beam that highlights the interactive elements. We refer to this as the 'clipboard' menu (see Figure 1). The other orientation works in a similar fashion, however the interface is presented at a distance in front of the user and in a magnified form. We refer to this as the 'billboard' menu (see Figure 2).



Fig. 2. VR Lifelog Prototype - Billboard Menu

Once the user has chosen a selection of dates and a selection of lifelogging concepts, the corresponding image results will appear in front of them at an adjustable size. The user has the option at this point to further filter the results by selecting a range of time. The image results can be explored by swinging the wireless controllers left or right in a momentum-based scrolling mechanism. An individual image can be further explored by pointing a controller directly at the image and enabling the blue beam. This will reveal a tooltip in front of the image result which displays the relevant metadata (see Figure 3). Once the relevant images for a topic are found, the user moves onto the next topic and begins the search again.

4 Conclusion

Our lifelog prototype was developed as part of a research effort to explore the feasibility and potential of virtual reality as a platform for visual lifelog explo-



Fig. 3. VR Lifelog Prototype - Tooltip

ration. This was the first prototype developed and was part of an evaluation to compare the speed and efficiency of executing typical lifelog interaction queries on a conventional platform compared to a virtual reality platform.

References

1. M. Dodge and R. Kitchin. Outlines of a world coming into existence: Pervasive computing and the ethics of forgetting. *Environment and Planning B: Planning and Design*, 34(3):431445, 2007
2. Y. Yang, H. Lee, and C. Gurrin. Visualizing lifelog data for different interaction platforms. *CHI 13 Extended Abstracts on Human Factors in Computing Systems on - CHI EA 13*, page 1785, 2013
3. SAS Institute - <http://blogs.sas.com/content/sascom/2014/04/25/using-virtual-reality-understand-big-data/> (Last accessed: August 2017)
4. Gurrin, Cathal; Joho, Hideo; Hopfgartner, Frank; Zhou, Liting; Albatal, Rami. *NT-CIR Lifelog: The First Test Collection for Lifelog Research*, 2016
5. NTCIR-12 - <http://research.nii.ac.jp/ntcir/ntcir-12> (Last accessed: April 2017)