Introduction to the Fourth Annual Lifelog Search Challenge, LSC'21

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ABSTRACT

The Lifelog Search Challenge (LSC) is an annual benchmarking challenge for comparing approaches to interactive retrieval from multi-modal lifelogs. LSC'21, the fourth challenge, attracted sixteen participants, each of which had developed interactive retrieval systems for large multimodal lifelogs. These interactive retrieval systems participated in a comparative evaluation in front of an online live-audience at the LSC workshop at ACM ICMR'21. This overview presents the motivation for LSC'21, the lifelog dataset used in the competition, and the participating systems.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in interaction design*; • **Information systems** → **Mobile information processing systems**; **Search interfaces**.

KEYWORDS

Lifelog, Interactive Retrieval Systems, Benchmarking

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1 INTRODUCTION

Since the MyLifeBits project [6], there has been an increasing level of research attention to the topic of lifelog data analysis, management and search. This interest initiated the Lifelog Search Challenge (LSC) comparative benchmarking workshop that began in 2018. The workshop aims to foster robust and effective retrieval technologies enabling the finding of "captured memories" from vast lifelog datasets. The search tasks are presented as short text descriptions of a lifelogger's memory. The goal of the competing teams is then to find an image representing this moment in the dataset within a limited time period. In this paper, we introduce LSC'21, the fourth iteration of the Lifelog Search Challenge.

2 LSC'21 BENCHMARKING CONFIGURATION

LSC'21 utilised a modified version of the LSC'20 dataset [7], a four month multimodal lifelog dataset gathered by one active lifelogger. For LSC'21, 8,126 images were removed from the collection for data governance reasons. The dataset consisted of 183,299 wearable camera images (37.35 GB), fully redacted in 1024×768 resolution, captured using wearable cameras. All images were anonymised, with faces and other user identifiable data blurred beyond recognition. Accompanying the images was a collection of metadata, consisting of textual annotations representing time, physical activities, biometrics (all years except 2015), and a continuous location log of the individual. For new teams participating at LSC, a list of available visual concepts was provided, which was extracted from the non-redacted version of the images. Additionally, the top-performing team from the LSC'20 workshop [19] donated a set of high-quality visual features for participants to use if they so wished.

The search challenge took place during the ACM ICMR'21 conference, planned for Taipei, Taiwan, but held virtually due to ongoing travel restrictions during the Covid-19 pandemic. Prof. Alan Smeaton opened the workshop with a keynote entitled "Lifelogging as a Memory Prosthetic." Prior to the search challenge, 24 topics were prepared with topic text and a manually generated ground truth. Participating teams were required, for each topic, to find a relevant image and submit it to a host server [16]. The configuration was the same as during LSC'20 [7], where the host server maintained a countdown clock and actively evaluated submissions against the ground truth. For each topic, a score was given based on the time of the first correct submission and the number of incorrect items previously submitted by the team. The actual overall score was instantly updated and displayed for each team, aggregating the

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scores of the topics up until that point. For more details of scoring mechanisms, see the review of LSC'18 [8].

3 PARTICIPATING SYSTEMS

Sixteen teams took part in LSC'21, meaning that sixteen interactive lifelog retrieval engines joined the challenge and live competition.

Many of the teams presented enhanced versions of systems from previous LSC workshops. The MyScéal retrieval system, developed to explore query expansion and word embedding approaches to interactive retrieval [20], participated with an enhanced version of the top-performing system from LSC'20. The SOMHunter system [13], successful at LSC'20 with temporal queries, relevance score updates with feedback and SOM-based screens, included more visual data search capabilities and an effective text-image retrieval model recently released by OpenAI. The Exquisitor scalable media exploration system [10] was enhanced for LSC'21 to better support tasks with a temporal component by adding features that allowed the user to build multiple classifiers and merge their results. Likewise the LifeGraph system [15] presented a new-iteration of the knowledge-graph-based retrieval engine incorporating enhanced retrieval facilities and a revised underlying graph traversal mechanism. The vitrivr system [9] introduced enhancements, such as image stabilisation to reduce image degradation caused by lifelogger movements for improved concept detection. The lifeXplore system [12] featured improvements to handle temporal queries and provide advanced day summary features. LifeSeeker 3.0 [14] featured enhancements to visual and location metadata, visual similarity matching and improved text ranking. Similarly, Voxento 2.0 [2] was improved by the addition of dynamic result filtering and a better retrieval engine. A technique based on concept recommendation [3] was also introduced based on multiple visual concept enhancements to an existing LSC'20 system. Finally, FIRST 2.0 [21] included a totally redesigned flexible query system.

There were a number of new systems developed for LSC'21. One such system was vitrivr-VR [18] which, based on the vitrivr system, leveraged VR to offer novel retrieval and user interaction models. The ViRMA virtual reality lifelog retrieval tool [4], was another VR system, which introduced an effective representation of large volume multimedia data in the VR space. Another new system, Memento [1], leveraged semantic representations of images and textual queries projected into a common latent space, while PhotoCube [17] mapped lifelog data into a hypercube in a multi-dimensional metadata space, which was then filtered and projected onto a 3D space. Finally LifeMon [5] explored the efficient use of MongoDB document stores for indexing and XQC [11] presented a novel interactive learning interface running on mobile devices.

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