

Introduction to the Third Annual Lifelog Search Challenge (LSC'20)

Cathal Gurrin
Dublin City University
Ireland

Tu-Khiem Le
Dublin City University
Ireland

Van-Tu Ninh
Dublin City University
Ireland

Duc-Tien Dang-Nguyen
University of Bergen
Norway

Björn Þór Jónsson
IT University of Copenhagen
Denmark

Jakub Lokoč
Charles University
Czech Republic

Wolfgang Hürst
Utrecht University
Netherlands

Minh-Triet Tran
University of Science & VNU-HCM
Vietnam

Klaus Schöffmann
Klagenfurt University
Austria

ABSTRACT

The Lifelog Search Challenge (LSC) is an annual comparative benchmarking activity for comparing approaches to interactive retrieval from multi-modal lifelogs. LSC'20, the third such challenge, attracts fourteen participants with their interactive lifelog retrieval systems. These systems are comparatively evaluated in front of a live-audience at the LSC workshop at ACM ICMR'20 in Dublin, Ireland. This overview motivates the challenge, presents the dataset and system configuration used in the challenge, and briefly presents the participating teams.

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

Lifelogging is the action of digitising one's everyday life activities with the aid of technology such as electronic devices and computer applications. It has been an active topic of research for almost two decades since the MyLifeBits project [5] introduced an early prototype digital lifelog in 2002. Since then, the proliferation of

low-cost sensing technologies and cheap storage have resulted in a massive increase in the volumes of personal lifelog data in existence. The Lifelog Search Challenge (LSC) comparative benchmarking workshop was founded in 2018 to answer a call for more robust and effective technologies to assist individuals in managing and locating content from these vast archives. The LSC workshop joins a number of related activities, such as the NTCIR-Lifelog tasks [8] (2016-2019) and the ImageCLEF Lifelog task [3] (2017-2019). Yet, it is different from these other challenges in that it focuses on evaluating approaches to real-time interactive retrieval from media-rich personal lifelogs [9], with a particular emphasis on evaluating the usability of the retrieval systems for novice users.

2 LSC'20 DATASET

LSC'20 uses a new multimodal dataset containing four months of lifelog data gathered by one active lifelogger. The dataset has been constructed by merging parts of the three NTCIR Lifelog datasets from 2016 [6], 2017 [7], and 2019 [8], with images from 2015, 2016 and 2018, respectively. It consists of an image dataset of 191,439 wearable camera images at 1024 x 768 resolution (38.5GB). They were captured using the OMG Autographer and Narrative Clip wearable cameras, typically at a rate of 1-3 per minute during waking hours. The images have been anonymised, which means that faces and most readable text have been blurred in a manual or semi-manual process. Accompanying the images is a collection of textual metadata, consisting of timestamps, physical activities, biometrics (all years except 2015), and locations of the individual for every minute. Finally, to reduce the barriers to participation, the images come with a list of visual concepts extracted from the non-redacted version of the image dataset, which includes bounding boxes for objects.

3 LSC'20 BENCHMARKING CONFIGURATION

The search challenge takes place during the ACM ICMR'20 conference in Dublin, Ireland. During the search challenge, each participating system is evaluated twice, once with its expert users and once with novice users. In order to evaluate each system, participating teams are required to return results to a host server for a number of novel retrieval topics under strict time-constraints. For each topic, a participating team has a user (expert or novice)

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use their system to find a relevant item and submit it to the host server. The host server maintains a countdown clock and actively evaluates submissions against a manually generated ground truth. Throughout the competition, an overall score is maintained for each team, which is the summation of the scores of the topics that have been processed up until that point. For each topic, a score is given based on the time taken to find the relevant content and the number of incorrect items previously submitted by that team to the host server during that topic. Full details of the scoring equation can be found in a review of LSC'18 [9]. The overall winner of the challenge is the team with the highest score, across both expert and novice users, when all topics are processed.

4 PARTICIPATING SYSTEMS

For the 2020 edition of the Lifelog Search Challenge, fourteen participating teams take part, each of which has built an interactive lifelog retrieval engine for the live competition at the challenge. Following is a list of the challenge entries, along with a short description. Vitivr [18], the winning system from 2019, provides an enhanced version of their video search engine. The VIRET Tool is an adapted video search tool that provides advanced options to construct temporal queries and browse results [11]. VRLE [4] is a refinement of the top performing system from LSC'18 that supports interactive querying within a fully-immersive VR environment. The Myscéal retrieval system is developed to explore query expansion and word embedding approaches to interactive retrieval [19] and introduces a novel concept-weighting methodology. LifeGraph [17], a knowledge graph for lifelogs, integrates external data to enrich the semantic content and organises it as a semantic graph. Exquisitor [10] is an interactive learning system designed for large-scale collections. Li et al. [14] introduce a multi-level interactive engine that indexes multi-level features and supports multiple query modes. LifeXplore is a video exploration and retrieval tool [13] combining feature map browsing, concept search and filtering, as well as hand-drawn sketching. Mai-Nguyen et al. [15] bring an interactive multimodal search engine with Query-to-Sample attention-based retrieval with the aim of enhancing query formulation using text-to-image mapping. Che et al. [2] integrate relationship-mapping between objects and subjects in the lifelog images. LifeSeeker 2.0 is an enhancement to the 2019 tool of the same name [12], supporting interactive graph-based filtering. The FIRST system [20] is designed to be a flexible integration platform for easy use of new query workflows and visualization layouts. SOMHunter, the winning system from VBS 2020, is another adaptation of a video search engine combining temporal queries and a relevance feedback model with specific additions to support lifelog retrieval [16]. Finally, Voxento is a prototype voice-controlled lifelog retrieval engine [1].

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