

# Spatial and Time Navigation in Multimedia

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For most people a photo gallery is a way how to present experiences from their holidays, trips and events. Taking photos is a process of saving emotions via a camera and therefore the visualization of photo albums should communicate these emotions to make events unforgettable. Moreover, people spent their special events not alone, because as social human beings they share their events [1]. This is the reason why the process of creating photo albums should be a collaborative process. Last but not least, photo albums aggregate various experiences during holidays and a user's story is created by the chronological ordering of experiences.

Our work is aimed at the augmenting user experience while browsing photos and also other multimedia supporting the storytelling. This can be accomplished by various ways but to make the solution attractive for users the process of creating photo albums has to be as automated as possible. On the other hand, to take advantage of the collaboration we can ask the user to make more unordinary tasks to like write short descriptions of events etc. This is possible because when users create photo albums from mutual events there are overlap activities accomplished by both the users and the saved time can be used in a better way. Moreover, collaboration mostly means the motivation to create more attractive results, it is funnier, users write more comments and also more users remember more memories that have be archived.

However, we must not forget the automated part of creating photo albums that is essential, because we can ask the user to complete just limited amount of tasks. We have made an experiment consisting of five people. The result shows that people emphasize five elements in their storytelling (elements are ordered by relevance):

- *Events*: The users pick few most important events as a base of storytelling [1].
- *Order of events*: If the storytelling takes less than 5 minutes, the tellers order the events by relevance otherwise chronologically.
- *People*: The users clearly define the event attending persons.
- *Geographical localization*: People mostly link their stories to a locality (e.g. here was the hotel, the beach was approximately at 0,5 km distance etc.).

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- *Other characteristics of the story:* Mostly pictured on photographs or varied facts connected to the place, weather etc.

We have also analyzed some portion of photo albums and we have found that there is a correlation between events and the amount of taken pictures during the hours of a day. So we can mark the local maximum of amounts and its surroundings as a single event and ask the user to name the event.

Moreover, a photography itself contains a lot of metadata in its EXIF, which can be analyzed and processed to augment the user experience while browsing the photo albums. For our work we identified two most important attributes in EXIF. The first one is geographical location where the photography was taken and the second one is timestamp.

Timestamp is important from two aspects – short time and long time aspects. Short time aspect is necessary to chronologically order events and also to order photos in these events to support the storytelling. The long time aspect is important because the digital photography has existed for 19 years and the timestamp is becoming more and more essential in archiving and browsing of photos. Users visit same places repeatedly and celebrate birthdays again and again etc. So it is important to provide visualization which can be used to navigate through time dimension.

The visualization of chronologically ordered photos should support the placement of photos in a space in a way that the storytelling would be easily recognized and understood. The solution of the placement is in the usage of maps as a background of visualization. The other advantage of the map placement is to offer another auxiliary element of storytelling. The information where the photo was taken says a lot about the photography even before a photo is viewed because the location is a kind of a connection between the photo and the events in the area. For example, we can easily gain the character of holiday (weather, beach, mountain, hiking etc.) from the location.

The main aim of our work is to propose an innovative navigation and browsing in photo albums according to the timestamps, geographical locations and collaborative storytelling. This kind of navigation in the combination with proper photo analysis and metadata discovering can create various views of a complex collection of photos in photo albums. This style of browsing photos can be used by the users for sharing photos in much higher quality, for finding photos which they miss in their photo collections, to view places where they intend to go in various time periods etc. It is also usable in the commercial sphere – in travel agencies, botanic monitoring etc. When we add the direction of taking photos to the location we can create an ideal presentation tool for real-estate companies.

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## References

- [1] Jomhari, N., Gonzalez, V. M., and Kurniawan, S. H. 2009. See the apple of my eye: baby storytelling in social space. In *Proc. of the 2009 British Computer Society Conf. on Human-Computer interaction* (Cambridge, UK, 2009). British Computer Society, Swinton, UK, 238-243.