PEVIAR
Longterm Storage for Digital Data on Photographic Color Film Material

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Project Summary

The Imaging and Media Lab has been working in the field of digital information preservation for more than 15 years. The group gained wide experience in digital archiving through various projects. Our interactions with archives and museums showed the need for a solution to store digital cultural heritage for future generations. Today, institutions have to rely on proprietary technology. Most of them, hard-drives, magnetic tapes, or DVDs, do not fulfill the requirements of long term stability and accessibility. The fast technological evolution of digital equipment causes an unpredictable lifetime of storage media and systems. Thus, an ideal storage solution for archival purposes should meet the following requirements: it should offer high stability, high data density, low costs per GByte, should be easy to handle, undemanding regarding to the infrastructure, and technology independent. The aim of this Peviar project is the development of such a digital data carrier designed for archiving purposes.
An example of a technology independent and reliable method to store data is human readable symbolic code, such as written text. In this case, the interface to access the data is reduced to the eye of the observer. Considering this fact, we propose to investigate a data carrier based on photographic material of high stability, on which digital information of any kind can be stored as visible digital barcode. Thanks to the visibility of the data, it is possible to recover the information with any digital scanning or camera device of appropriate quality. As photographic material is usally based on more than one layer of dyes, each layer can be used as a separate data channel. The quantization depth of each channel leads to a digital code over a higher than binary alphabet. By fragmenting and distributing the data on the film, resistance against local deterioration can be increased.
The available technology at the time of the future digitization and interpretation of the archived information is unknown. Thus, the complexity of information retrieval will be simplified by a sophisticated encoding procedure, an asymmetric approach common in data compression. Such a sophisticated asymmetric codec requires an optimized interaction of information carrier and digital code. We will analyze state of the art photographic material to evaluate its properties. Taking into account the characteristic features of the data carrier, the digital code will be optimized regarding data density, robustness and simplicity. Furthermore, highly sophisticated error correction will be applied to the data to enhance security. The presented approach combines the positive aspects of digital data and an ultra stable medium like microfilm (estimated lifetime up to 500 years) and leads to an archival media with an expected storage capacity of up to 700 MByte per sheet ($104x148mm^2$ color microfiche).
This projects is endorsed by various institutions like the Swiss National Library, the Association for the Preservation of the Audiovisual Heritage of Switzerland (Memoriav), the Swiss Committee for the Protection of Cultural Property (SSPCP) and the Library of the Swiss Federal Institute of Technology Zürich.