

## 論文の内容の要旨

論文題目 X-Wall: Image Visualization for Personal Photo Repository  
(X-Wall : 個人写真リポジトリ用の画像可視化)

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Recent development in information science and multimedia technology not only makes the acquisition of digital images as free as air, but also brings new challenges to us. In our study, we propose X-Wall, a system that focuses on novel image visualization for personal photo repository. X-Wall is composed of three parts: *FriendWall*, *MangaWall*, and *PicWall*, focusing on different visualization challenges, respectively.

We propose *FriendWall* for social networking oriented image annotation and visualization. Motivated by the observation that photos come from social networking websites always contain rich information (e.g. relation with social friends, geo-locations, multiple tags and descriptions), we introduce ‘*social attributes*’, which simply refer to a set of intrinsic labels such as {*Who, When, Where, What*}. To effectively annotate social attributes, we obtain training images from social networking websites. Both of the visual features and metadata are extracted from the images and further imported into the graph-learning based annotation framework. A variance optimization-based post-processing step is proposed to refine the annotation results.

We propose *MangaWall* to help the user better interact with the images. Motivated by recent advances in computer graphics, which allow rich user interactions with images and enable a wide variety of expressive styles for digital art, our *MangaWall* system allows the user to interactively convert the input image into sketch, cartoon, painting, or manga. Besides, *MangaWall* can further combine the artistic effects with real-world images. Such ‘half-real’ image always provides an extremely intriguing sense of art. And the introduction of user interaction makes the visualization process much more creative and interesting.

We propose *PicWall* in order to cope with web-scale data and meet the requirements on various devices and platforms. *PicWall* advances previous works in generating real-time collages for large amount of input images. It tightly packs the input images while keeping their visual contents, aspect ratios, and orientations unchanged. Besides, we introduce several extensions and applications for *PicWall*. For instance, we propose ‘*shake & show*’ for image visualization on mobiles. We contribute ‘*VideoWall*’ for video

summarization and visualization. In '*rainbow collage*', we propose content-aware collage. And in '*high-light collage*' and '*interactive collage*', the user can interactively edit the output collage.

All the methodologies and approaches presented in this thesis are well implemented and demonstrated in the proposed X-Wall prototype system.