

# IllustStyleMap: Visualization of Illustrations based on Similarity of Drawing Style of Authors

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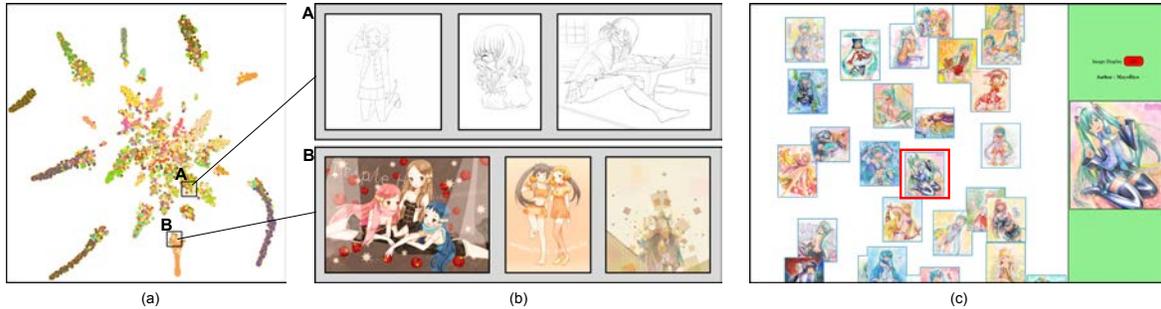


Figure 1: (a) IllustStyleMap, (b) examples of illustrations, (c) example of illustration visualization on IllustStyleMap.

## 1 Introduction

Illustration is one of the most familiar forms for people to express their mind and communicate with each other. A lot of illustrations drawn by novices or hobbyists are viewed and shared on illustration-sharing SNSs. (Pixiv<sup>1</sup> is one of the most popular services.) However, how to retrieve and display illustrations has received relatively sparse attention. In conventional retrieval interface, we can retrieve illustrations only by keywords and tags, and results are always displayed in a grid layout (Figure 2).

We propose *IllustStyleMap*, a method of retrieving and visualizing illustrations based on similarity of drawing style of authors, which is beneficial to illustration-sharing SNSs.



Figure 2: Retrieval results by keywords in pixiv.

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<sup>1</sup><http://www.pixiv.com/>

## 2 IllustStyleMap

IllustStyleMap consists of two steps, training classifiers for author identification and visualizing the illustrations onto 2D space. A feature vector for an illustration is represented by a set of probabilities belonging to specific authors, which is calculated by a classifier, and projected onto 2D space.

First, we prepare illustrations whose authors are known and extract image features from them. We use a combination of Fisher Vectors and Classemes [Douze et al. 2011] because it produces the best score in our preliminary experiments among BoF, VLAD, Fisher, and Classemes. Next, we learn a multi-class support vector machine classifier, where one class corresponds to one author. Given an input illustration, it produces a probabilistic vector where each output element corresponds to a similarity to each author. For each illustration, features are extracted and a probabilistic vector is computed by the classifier. Finally, We compress it into two-dimensional vectors for visualization using t-SNE [van der Maaten and Hinton 2008].

## 3 Results and Conclusion

We show IllustStyleMap in Figure 1. Each point in Figure 1(a) represents an illustration, and the points from the same author are shown as the same color. As shown in Figure 1(b), users can click a point and view an illustration which the point represents. By browsing IllustStyleMap, users can enjoy seeing illustrations. For example, a user starts a favorite illustration on IllustStyleMap and wants to see other illustrations which have similar drawing styles as her favorite one. She simply selects points which are close to her favorite one and enjoy seeing illustration as shown in Figure 1(c). Therefore, IllustStyleMap could achieve better user experiences in illustration-sharing SNSs.

## References

- DOUZE, M., RAMISA, A., AND SCHMID, C. 2011. Combining attributes and fisher vectors for efficient image retrieval. In *CVPR*, 745–752.
- VAN DER MAATEN, L., AND HINTON, G. 2008. Visualizing data using t-sne. *JMLR* 9, 2579–2605.