# 藝術化影像之自動產生與資訊隱藏

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## 摘要

在本論文中，我們研究了三種藝術影像的自動產生與資訊隱藏技術。這三種不同類型的藝術影像分別是拼圖畫，點描畫，與圓圈畫。在拼圖畫中，我們找到了三種可供資訊隱藏的屬性，分別是拼圖塊的方向、大小和角度。依據各個屬性的特性，我們將秘密資訊隱藏於拼圖塊的方向之中，以達到祕密傳輸的目的。將浮水印隱藏於拼圖塊的大小之中，以達到版權保護的目的。最後將驗證資訊藏於拼圖塊的角度之中以達到影像與隱藏資訊完整性驗證的目的。由於此三種資訊隱藏的技術彼此獨立，所以使用者可以同時將這三種資料隱藏於拼圖畫中。甚至可以將拼圖塊隨機分群，分給不同的持有者，以達到秘密分享的效果。在點描畫中，我們利用色彩的控制來達到資訊隱藏的目的。在改變點描畫上色點顏色動作的同時，我們可以隱藏一個位元於其色點之中。在圓圈畫中，我們利用畫出圓圈的順序來達到資訊隱藏的目的。我們將點描畫資與圓圈畫的資訊隱藏技術應用於秘密傳輸和版權保護。而對於各種不同的應用，我們會對資訊隱藏的流程作少許的修改。在本論文中，我們會對於拼圖畫、點描畫和圓圈畫影像的生成和資訊隱藏提出完整的系統與流程，並透過實驗結果來證明此系統的實用性。

# A Study on Art Image Generation and Information Hiding

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## ABSTRACT

Three types of art images are investigated in this study, namely, digital puzzle image, digital pointillistic image, and digital circular-dotted image. Methods for automatic generation of these types of images and data hiding in them are proposed.

In digital puzzle images, three different puzzle piece features, namely, orientation, size, and angle, are utilized for data hiding in the proposed methods. The orientations of puzzle pieces are used for covert communication. The sizes of puzzle pieces are used for copyright protection. And the angles of puzzle pieces are used for image authentication. A complete system to create digital puzzle images is also proposed, which may be applied to hide three kinds of data sequentially. Besides, we can implement the concept of information sharing by separating a puzzle image into a number of puzzle pieces, and each secret sharing participant can take one part of them.

In digital pointillistic images, only one feature is used for data hiding. That is, we utilize the variations of the RGB values of each color dot of a digital pointillistic image to implement the data hiding works. In digital circular-dotted images, we also use only one feature for data hiding, namely, the drawing order of the circular dots of a digital circular-dotted image. We can achieve two applications of data hiding, covert communication and copyright protection by embedding data in digital pointillistic images or in digital circular-dotted images.

Experimental results show the feasibility of the proposed methods and systems.

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