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Exposing Splicing Forgery Based on Color Temperature Estimation

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HIGHLIGHTS

- Color temperature based image authentication method is provided.
- Random Restricted algorithm is exploited to calculate reference color temperature.
- OSTU method is applied to further reduce human interactions.

Abstract: Splicing is one of the most common tampering techniques for image manipulation in many forensic cases. Normally color shift in images due to color temperature of illumination can be seen as intrinsic features relative to imaging process. In splicing forgeries, copied area and pasted target image come from different imaging process, and are likely to have different color shift. In this paper, a novel automated authentication method is presented to expose splicing manipulation and locate manipulated areas by discriminating the inconsistencies of color shift in an image. In order to minimize human interaction on detection of splicing forgeries as well as localization of manipulated areas, a forensic image is divided into blocks with grid-based strategy. After calculation on color temperature of each blocks with white-point algorithm, reference color temperature is obtained with a random restricted algorithm. Then color temperature distance between each block and reference area is calculated sequentially. At last, by comparing color temperature distance with an optimized threshold determined by OSTU algorithm. This method enables us to judge if splicing has occurred and furthermore localize manipulated area simultaneously Experiments show that the proposed method can speed up the quantitative detection of possible splicing manipulation and localize manipulated area automatically.

Index Terms—**Image Authentication, Manipulation Localization, Color Shift, Color Temperature Estimation**

1. INTRODUCTION

Images are always presented as important forensic evidence in court [1]. However, the authenticity of a forensic image has become very uncertain due to the advent of powerful image editing software. In most forensic application, splicing is the most popular manipulation to forge images. A splicing forgery can be easily made by copying an area in one image and inserting it into another [2]. Different from homogeneous manipulation as copy-move[3], splicing manipulation can be specified as a kind of heterogeneous one. It is well known, splicing manipulation is more powerful than copy-move manipulation in distorting the truth in news reports, destroying someone's reputation and privacy, and influencing the judgment in court, especially by copying one