



Pashmina authentication on imagery data using deep learning

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Abstract

Pashmina is one of the most luxurious and finest fibres in the world. It is a special kind of wool obtained from Cashmere goats. Counterfeiting Pashmina is becoming a prevalent malpractice because of limited supply, expensive pricing and high demand in western markets. Presently, there is a lack of a low-cost and easily available approach for distinguishing authentic Pashmina apparels from other similar-looking products. Because of technological advances and cost reductions in digital image processing, we have been able to implement a variety of image recognition systems on a practical level. In this study, we propose a deep learning model PashmNet for identification of Pashmina fabric using transfer learning. The technique proposed herein classifies Pashmina and non-Pashmina images accurately with classification accuracy of 97.4%.

Keywords Fabric · Pashmina · Cashmere · Deep learning · Transfer learning · Authentication

1 Introduction

In global luxury apparel industry, Pashmina fibre has been known for its finesse and lustre since fifteenth century A.D (Skarratt 2018). Pashmina fibre is known for its finesse, delicacy, warmth, softness and aesthetic value. It is woven by hand to preserve it from harsh machine processing. Pashmina weaving is a labour intensive process and takes several days to prepare a single piece of Pashmina apparel (Yaqoob et al. 2012). Given the limited supply of pure Pashmina wool and strenuous work required in making it, its availability is

modest in terms of quantity as such the handcrafted Pashmina products are considerably expensive. Owing to the fact that the Pashmina fibre is not only an expensive, scarce, and time-intensive product, numerous counterfeits adulterated with wool or silk flood the market. Purchasing of such items leads to customer deceit and dissatisfaction, which affects the Pashmina industry adversely. It is crucial for the textile industry to perform qualitative analysis of Pashmina fabrics.

Artificial Intelligence based Computer Vision opened up avenues to develop automated methods for identification of fibres. Researchers have shown the use of Artificial Intelligence based solutions in fibre identification from fabric and fibre imagery data for various kinds of animal and plant-based fibres further discussed in Sect. 2. Based on the knowledge found in the existing literature, we formulated the following relevant research questions to investigate the use of Artificial Intelligence (Deep Learning) in identification of Pashmina Fabric:

- RQ1: Whether pure Pashmina fabrics can be precisely identified using deep learning techniques from imagery data?
- RQ2: How do the different transfer learning approaches perform in Pashmina identification using deep learning models?
- RQ3: On which part of the image our Deep learning models will focus for identification of pure Pashmina fabrics

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