

CHAPTER I

INTRODUCTION

1.1 Scientific Rational

In printing industry today, the halftone images can be created by screening technique. Two types of screen, AM (Amplitude Modulation) and FM (Frequency Modulation) screens, are principal and well-know techniques to achieve good tone reproduction on printed images. However, each screen technique has it own characteristic, which contains both strength and weakness. FM screen has characteristic, which is excellent to respond highlight and fine detail of the image, but there is deflection happened when dot gain is occurred particularly in mid-tone and shadow areas. On the other hand, for AM Screen, the obtained tone reproduction is better when dot gain occurred; while some fine detail in highlight is easily lost. Although, AM screen adequately serve in today conventional printing industry, the modern trend is to combine AM screen and FM screen which may be called “Hybrid Screen”. The concept is to gather an advantage of AM screen on mid-tone and shadow areas as well as an advantage of FM screen on highlight area. Nevertheless, there is a smoothless deflection occurred at mixture screen, boundary between both screen. This research proposed the technique to smoothen tone reproduction of hybrid screen, including, new technique used for FM screen. Innovated FM algorithm is used as Spiral Error Diffusion which compatible with threshold matrix of AM screen. In addition to banding screen, the tonal range is separated into three sections; AM area, FM area, and mixture area. The mixture area is used for smoothening algorithm composed of both screen by the cluster dot of Am screen surrounded by the tiny disperse dots of FM screen.

1.2 Objective

To define proper parameters of hybrid screen through algorithm for better smoothening tone reproduction at the boundary.

1.3 Scope of the Research

This research is aimed at establishing an effective algorithm in order to generate a halftone image using hybrid screen technique, these segments: Followings are the restriction of research:

1. Continuous tone at the boundary would cover all printed image from conventional printing process.
2. The pattern of mixing screen is that AM screen would covers on mid-tone and shadow area, and FM screen falls on highlight area. Besides, the ratio of mixing screen is upon an original image; therefore, in the algorithm, the ratio should not be restrained.
3. This research is designed to advocate only gray image.
4. In the other parts of image manipulation such as re-sampling data, extending size of image, opening and recording data, controlling output device for printing and so on, researcher would use an application software to process it.

1.4 Content of the Thesis

Chapter 2 overviews the theoretical considerations and literature reviews. Chapter 3 gives the description on Hybrid algorithm, materials under study, the experimental apparatuses, and experiment in establishment of skeleton, compatibility of digital print, and compatibility of conventional printout. Chapter 4 contains the result evaluation, the result and the discussion. Finally the results are concluded in Chapter 5 along with some possible suggestions.