

# RED BLOOD CELLS SEGMENTATION AND ESTIMATION

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*Specially dedicate to...*

*My beloved wife, son and family*

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## ABSTRACT

The erythrocytes are the most numerous blood cells in human body and it also called red blood cells. The number of red blood cells contributes more to clinical diagnosis with respect to blood diseases. The aim of this research is to produce a computer vision system that can detect and estimate the number of red blood cells in blood sample image. The proposed system takes an input, color image of stained peripheral blood smear images. Since the object of interest is the red blood cells, the system is capability to detect or differentiate between the red blood cells with other blood cell based on size of object. In order to detect red blood cells, the segmentation and extraction step must come early before proceeded to the detection process. In addition this system also can provide the capability to estimate the number of red blood cells. This process is based on the circle detection process by considering that the red blood cells always in normal radius and circle shape of red blood cells. Thus, the result presented here is based on images with normal blood cells. The tested data consisting 20 samples produced the accurate estimation rate close to 96% from manual counting.

## ABSTRAK

Sel-sel darah merah atau 'erythrocytes' merupakan antara kumpulan darah terbesar di dalam badan manusia. Jumlah bilangan sel-sel darah merah dijadikan penanda aras di dalam rawatan klinikal untuk menentukan berlakunya penyakit yang berkaitan dengan darah. Matlamat penyelidikan ini adalah untuk menghasilkan satu sistem berkomputer yang boleh mengesan dan mengira jumlah sel-sel darah merah di dalam sampel imej darah. Sistem ini menggunakan sampel imej dari kaca mikroskop. Sistem ini hanya fokus kepada sel-sel darah merah sahaja, maka sistem ini berkebolehan untuk kesan atau membandingkan sel-sel darah merah dengan sel-sel yang lain berdasarkan saiz sel-sel tersebut. Dalam proses untuk mengesan sel-sel darah merah, segmentasi dan pengekstrakan perlu dilakukan terlebih dahulu sebelum melalui proses pengesanan. Sistem ini juga berkebolehan untuk mengira jumlah sel-sel darah merah. Proses pengesanan ini berdasarkan mengenal pasti lingkaran objek dengan menjadikan normal jejari dan bentuk lingkaran sel-sel darah merah. Oleh sebab itu, keputusan yang diperolehi di dalam sistem ini adalah berdasarkan imej darah yang normal. Eksperimen ini menggunakan 10 sampel imej darah dan kejituan sistem ini hampir 96% daripada pengiraan secara manual.