SKIN DISEASES DIAGNOSIS SUPPORT SYSTEM USING FUZZY LOGIC

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Computer System & Networking) with Honours.

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Terdapat banyak jenis penyakit kulit dan sukar untuk mengenal pasti kategori penyakit kulit. Penyakit kulit mudah terjejas oleh semua umur yang berbeza sama ada kanak-kanak atau orang dewasa. Terdapat banyak jenis penyakit kulit termasuk lupus, jerawat, psoriasis, eksim dan impetigo. Walau bagaimanapun, kajian ini hanya memberi tumpuan kepada satu jenis penyakit kulit sahaja iaitu ekzema. Berdasarkan penyelidikan yang telah dijalankan, terdapat banyak penyelidik terdahulu menggunakan kaedah pemprosesan imej untuk menentukan penyakit kulit. Pemprosesan imej memerlukan lebih banyak masa untuk belajar dan memerlukan ruang memori yang besar untuk memasang perisian. Selain itu, pemprosesan imej juga memerlukan kamera yang berkualiti tinggi atau mana-mana peranti untuk menangkap imej untuk mendapatkan hasil yang tepat. Untuk membeli peranti itu adalah mahal dan tidak semua pengguna awam mampu membelinya. Oleh itu, kajian ini bertujuan untuk mengenalpasti jenis kulit ekzema yang berpenyakit berdasarkan faktor-faktor seperti kerengsaan kulit, keadaan kulit, lokasi kasih sayang dan sejarah keluarga. Model konseptual juga telah dicadangkan sebagai gambarajah logik untuk menunjukkan sistem kerja. Model konseptual berdasarkan peraturan diagnostik. Model dan peraturan konseptual telah diuji dengan menggunakan peningkatan pengetahuan pengguna sebelum dan selepas menggunakan penyelesaian yang dicadangkan. Ujian yang telah dijalankan tidak terlibat dengan pengesahan peraturan kerana masalah pakaian untuk bertemu dengan ahli dermatologi. Pengetahuan pengguna yang diuji menunjukkan bahawa pengetahuan pengguna meningkat ekzema berbanding sebelum mereka menggunakan penyelesaian yang dicadangkan. Oleh itu, penyelesaian yang dicadangkan memberikan manfaat kepada pengguna awam untuk memahami penyakit penyakit kulit mereka dan rawatan terdahulu yang mungkin mereka boleh memohon.

ABSTRACT

There are many types of skin diseases and difficult to identify the categories of skin diseases. Skin diseases can easily get affected by all different ages either children or adults. There are many types of skin disease include lupus, acne, psoriasis, eczema and impetigo. However, this research only focuses on one type of skin disease only which is eczema. Based on the research that has been conducted, there are many previous researchers use image processing method to determine the skin diseases. The image processing requires more time to learn and need a large space of memory to install the software. Other than that, image processing also requires a high quality of camera or any devices to capture an image to get the accurate result. To buy the devices is costing and not all public users afford to buy it. Thus, this research has purposed a system to identify the type of eczema skin diseased based on factors such as skin irritation, skin condition, location of affection and family history The conceptual model also has been proposed as a logical diagram to show the system work. The conceptual model is based on diagnostic rules. The conceptual model and rules has been tested by using user knowledge improvement before and after using the proposed solution. The test that has been conducted not involved with rules verification because of attire constraint to meet with the dermatologist. The user knowledge tested show that the knowledge of user is increase about eczema compared to before they used the proposed solution. Thus, the proposed solution gave benefit to public user to understand their skin disease diseases and earlier treatment that possible they can applied.

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LIST OF ABBREVIATIONS

SDSSS	Skin Disease Diagnosis Support System
XAMPP	Cross-platform Apache, Window, Mac, MySQL, PHP, Perl

CHAPTER 1

INTRODUCTION

1.1 Introduction

Human skin is the biggest organ of human which it masses is approximately around 4 kg to 5 kg. As it has the surface area of about 1.2 m^2, skin have high possibility expose to any skin infection (Damilola A. Okuboyejo, 2013). However, every person has different kind of sensitivity on their skin. Human skin has many functions, which is to protect human from microbes, any skin infection. It also helps to regulate body temperature and permits the sensation of touch.

Human skin has three layers known as epidermis, dermis and hypodermis. Epidermis is the most outer layer of skin that is waterproof barrier and generates our skin tone. Human skin's tone is form by cells that called melanocytes which produce the pigment known as melanin. Melanin protects the human skin from damage cause by sun exposure. The more melanin produces by the melanocytes, the ability to get darker skin is high. Meanwhile, dermis is the thick layer beneath the epidermis that consists of many important structures such as hair follicles, sweat gland, blood vessels and any other structures. Furthermore, the deeper subcutaneous tissue called hypodermis is made up of fat and connective tissue (Islam et al., 2017).

Skin is the most easily infected organ by skin diseases. Many factors are contributing to the occurrence of skin diseases. Understanding the nature of our skin problems is the most important thing in order to prevent from any skin infections occurred in future. One of the factors is diet. A physician named Yan reveals that daily diet such as seafood, coffee, tea, cold beverages and also the food that is raw, spicy or fried should be avoided if a person wants to make sure a healthy skin. Other than that,

climate also the factors of the skin become drying. It is because, the cold or dry climate causes the patients that suffer from eczema to flare while for the hot or humid climate, the skin will affect by the growth of acne.

There are many types of skin disease has been faced by the citizen in the whole world. Skin diseases can easily get affected by all different ages either children or adults. There are a few types of skin disease, lupus, acne, psoriasis, eczema and impetigo. This research only focuses one type of skin disease only which is eczema. Eczema or also called as dermatitis is a common skin condition marked by itchy and inflamed. It is caused by an overactive of immune system in human body. Commonly, eczema found in family with history of asthma and allergy. For some reason, it also caused by certain exposure to household products like detergent and soap or directly contact to animal dander may cause an infection. Respiratory infections or colds also can trigger the disease. Young children and babies are commonly affected by this disease and normally occur on the faces of toddlers. It also frequently presents on fold parts of the skin like inside the elbow and behind the knees of children, teenagers and adults.

Nevertheless, the type of skin disease has their own treatments to cure them. Every disease has different types of treatments. The treatments also depend on how serious or moderate the skin that has been exposed by the diseases. Furthermore, the medication can be any. For medium infection, normally the physician prescribes to apply cream or ointment and also moisturizer in ointment. For severe inflammation, the physicians will suggest the oral medication, light therapy and injection. Sometimes counselling session also can be done for a person that faces with depression.

Thus, this research will propose a system to identify the type of skin disease that focuses on eczema by using fuzzy logic rules based on age, symptoms and history factors. This is an initiative for users or patients identify their skin disease on their own.

1.2 Problem statement

Based on research that has been done, found that the method used to diagnose skin diseases usually is by using image processing. It is a safe and no side effects, risks or disruption from the user prospect. Moreover, it also gives benefit of the doctors to use it because it is fast and can be implemented in any device such as mobile phones, computers and also digital cameras (Florence Tushabe). However, this approach has its own disadvantages which is image processing is depends on camera resolution. In this case, camera with best resolution demands a high price device such as mobile phones that not all affordable to have. Additionally, capability to perform the operation of the method take time depends on a person expert. It is also requiring high capacity of processor and large amount of battery consumption.

Therefore, to make sure the public user able to use a method to detect their skin disease, this system will use age, symptom and history as a solution for this problem. A person can identify what are the types of skin disease that the user infected as he or she can see and feel the changes happen to them. Additionally, to care of eczema it needs intensive care. Therefore, the users or patient will be given suggestion of home remedies and some medication in order to taking care of their skin and. The symptom identification of skin disease may help users to detect the disease earlier before do check up to the hospital.

To make this research successful, the method or technique will be used is fuzzy logic that focused on fuzzy rules. To develop fuzzy rules, users have to enter several inputs. The fuzzy rule can be defined as a conditional statement by the form of:

IF x is A
THEN y is B

The x and y are grammatical variables, A and B are grammatical values purpose by fuzzy sets on the universe of acknowledgements X and Y commonly.

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