Health Information System to Identify Dermatological Diseases by Software Agent

Eduardo César Contreras Delgado
Autonomous University of Coahuila, Mexico

Isis Ivette Contreras González
Instituto Tecnológico de Saltillo, Mexico

INTRODUCTION

A dermatological diagnosis needs from comparative visual support, which generally becomes by experience and/or it is find in the medical bibliography, due to the great amount of skin affections. Furthermore, great similarity exists between symptoms from a suffering to another. Due to the highly visual nature of specialty, most skin conditions must be diagnosed from an image specially if there is a data bank. (Muir & Lucas, 2008).

One way to reduce the problem is to provide to the general practitioners a didactic tool that allows them to identify skin diseases. This tool is an agent based on goals, that contains the information necessary to identify some of the more common diseases in our region, (Coahuila, México). The conditions differ by geographic region.

This project is a field research, applied to the medical area on the Dermatology specialty related with the Health Information Systems. It is in itself, an automated medical tool to identify skin diseases, based on a Software Agent from Artificial Intelligence specialty, and based on the heuristic compilation of the tacit knowledge of dermatologists.

This study involves education science, medicine and information technologies. In computer science an algorithm is proposed to develop a Software Agent, in education science a research method applied to engineering and in medicine an algorithm to identify skin diseases (Clinical Semiology).

The research objective is to determine the effectiveness of dermatological affections identification aided by a Software Agent, based on tacit knowledge of the Human Agent.

This study also employs an Information Systems Research method, in which concepts are defined; methodological consistency and research variables, linking an architectural design, the model of three layers or levels.

The arrogance of this development, has not as aim to identify all existing skin diseases, instead, just those typical from the Region (Coahuila), because the skin diseases depend on the geographic location, this is to support to our general practitioners in their task of detection of dermatological conditions, in those patients who require medical care in this regard.

BACKGROUND

Dermatological Diseases

The study and management of dermatological diseases in a rigorously scientific way has been in charge of the medical specialty of Dermatology.

Definition of the Common Ailments

- **Abscess:** An abscess is an enclosed collection of liquefied tissue, known as pus, somewhere in the body. It is the result of the body's defensive reaction to foreign material (Fauci, 1997).
- **Ulcer:** A local defect, or excavation of the surface, of an organ or tissue, produced by sloughing of necrotic inflammatory tissue (Gale Encyclopedia of Medicine, 2008).
- **Pustule:** A small inflamed skin swelling that is filled with pus; a pimple (The American Heritage, 2007).
- **Comedo:** A plug of keratin and sebum within the dilated orifice of a hair follicle (Miller-Keane, 2003).
- **Candidiasis:** An infection caused by a species of the yeast Candida, usually Candida albicans. This is a common cause of vaginal infections in women (Gale Encyclopedia of Medicine, 2008).
- **Elaioconiosis:** An acneiform eruption that affects metal-industry workers and vehicle mechanics exposed to cutting oils, also known as follicular dermatitis or oil acne (Ministério da Saúde, 2006).

SOFTWARE AGENT DEFINITION

In artificial intelligence, a software agent (SA) is an autonomous entity, which observes and acts upon an environment and directs its activity towards achieving goals (Rich & Knight, 1991). An agent is everything that can be considered that perceives its atmosphere by means of sensors and that response or acts in such atmosphere by means of effectors, (Russell & Norvig, 2003). A sensor is a device that measures a physical quantity and converts it into a signal, which can be read by an observer or by an instrument, for example, voltmeter, thermometer, thermocouple. Effectors are agents or structures that cause an activity, in robotics, an end effector is a device or tool that's connected to the end of a robot arm.

The structure of an end effector and the nature of the programming and hardware that drives it depend on the task the robot will be performing, (Resconi, 2004).

Software agents are often described schematically as an abstract functional system similar to a computer program. On the Internet, an intelligent agent (or simply an *agent*) is a program that gathers information or performs some other service without your immediate presence and on some regular schedule.

MODELS TO CONSTRUCT AGENT'S PROGRAMS

Agents based on goals: besides the states, agents need some kind of information about its goals. Goals will to detail the situations to that it is desired to arrive. The agent program could to combine goals with actions and in this way, to be able to choose those actions that allow reaching the goal. Design of an ideal agent (Russell & Norvig, 2003).

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