改良約略集決策機制以提昇雷射醫學美容診斷品質之研究

摘要

「雷射醫學美容」的主要原理：是利用高能量雷射光束，將皮膚中色素顆粒「燒燬」，並由皮膚自行代謝吸收，以達到除斑的效果；而本研究改良「約略集」理論的決策機制，來輔助並提昇初期診斷的品質，用以強化雷射醫學美容的效果。

本研究歸納雷射醫學美容中較常使用的療程種類，及其所專精處理的膚質狀況，區分出「雷射療程」－「膚質」兩構面，以對應「約略集」(Rough set)理論中的「字集合」(Universe)與「屬性集合」(Attribute)，透過收集各個醫學美容中心與網站資料分析，建構出「不可辨識關係表」(Indiscernibility relation table)，進一步簡化出「可辨識分類函數」(Discernibility classification function)，根據約略分類(Rough classification)的精確度分析，將「核心」(Core)與「可簡化」(Reduct)膚質屬性分離，用以確定雷射療程所主要與次要處理的多重膚質屬性狀況為何！
再則，依據約略分類所建構出的「膚質資料庫」，將實驗客戶所期望處理的膚質狀況，設計為新決策需求，對應原有雷射療程元素間的決策規則，本研究改良原約略集的決策機制，使用「二階範數」(2nd Norm)的平均值，作為判斷療程與客戶膚質間的分類「距離」(Distance)，取最小的數值作為最適雷射療程，整體推導過程與相關文獻探討將被探討！

ABSTRACT

The basic concept of Laser medical cosmetology is to utilize high-energy laser beam to penetrate the skin surface, and “burning” the pigment particle inside. The skin itself would absorb and metabolize the pigment, and achieve the effect of removing specks. In this paper, the modified decision algorithm of the rough set theory would be applied to upgrade the diagnosis quality of Laser medical cosmetology.

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In this research, laser treatment programs and related skin conditions would be collected and used to build up the universe and the attribute of the rough set. By means of surveying Medical cosmetic centers and investigating websites information, the indiscernibility relation table could be facilitated, and discernibility classification functions would be simplified by applying Boolean algebra. Simplified discernibility functions would be deduced from the discernibility classification matrix. According to the rough classification, the core and the reduct attributes would be separated, and the skin condition database would be defined. Therefore, the optimal treatment program could be located for the specific skin condition.

Based on the skin condition attribute database, the requirement of the designated customer could be transformed as the new decision of the rough set, and the average 2nd norm would be introduced to find out the distance between the treatment program and the customer's need. The smallest distance would be the most appropriate treatment program for the designated customer. An experimental case would be discussed, and the feasibility and precision of this method would be examined. The overall analysis procedure would be discussed, and the new perspective of upgrading the diagnosis quality of the laser medical cosmetology would be provided in this paper.

Keywords: Laser Medical cosmetology, Rough set theory, Indiscernibility relation table, Discernibility classification function, Norm

壹、緒論

「雷射醫學美容」是利用雷射光波長，對特定皮膚組織的破壞性，所進行局部去斑的美容治療程序，隨著醫事科技的進步，與美容除斑觀念的普及，新的雷射技術及術後保養成份不斷被開發出來，使得雷射醫學美容市場蓬勃發展。

雷射是目前「非侵入性」皮膚美容的主流，但是產生雷射的機種琳瑯滿目，且日新月異，不僅醫師，民眾也需隨時吸收新的知識，以獲最好的治療效果。因為，雷射並非萬用，且所對應皮膚狀況與療效，皆需經過仔細的評估，因此才不斷有新的機型及療程推陳出新，選擇適合自己的皮膚療程，再加上術前術後與醫師充分的溝通、配合，才能達到完美的療效，否則只會盲目輕信夸大不實的廣告，浪費寶貴的金錢及時間。