內建於智慧眼鏡中的智能化眼球追蹤系統研發以評估病患眼球功能

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摘要

根據世界衛生組織(WHO) 的調查統計指出，全球至少22 億人口有眼球功能不佳致視力受損的問題，其中，約有1 億人口是白內障患者，在台灣，根據衛福部的資料，白內障是年長者常見的慢性疾病第2 名，在2018 年有逾115 萬人因為白內障而就醫，可見其盛行率相當的高，臨床上多以視力表來評估患者的眼球功能狀況，以便做治療方式的各項評估，但視力表的測量無法提供細緻的量化數字，且使用的場域往往限於門診，且容易因為人為或指令的操作而有結果的落差。

隨著智慧科技時代的進步，穿戴式裝置的應用也愈加的廣泛，此計畫團隊預計開發可客觀性的量化評估患者的眼球功能狀態的系統，團隊預計透過智慧眼鏡的眼球追蹤系統來達到此目的，期望所研發出其有創新與特色的執衍模式與評估眼球功能狀態指標參數。預計執行過程會包含眼球效正、圖像暖身、文字閱讀，然後透過分析軟體分析後，會圖像化產出熱區圖與固視園、指標參數等，過程中可選擇不同的文字語言及難易度，包含中英日文，也可調整字體與問距。執行團隊預期，透過研發此評估細部眼球功能系統，擴大使用於臨床服務中。

關鍵詞:眼球功能不佳致視力受損，智慧科技時代，眼球功能狀態，眼球校正

Abstract

According to statistics from the World Health Organization (WHO),at least 2.2 billion people around the world suffer from visual impairment, of which about 100 million are cataract patients. In Taiwan, according to the Ministry of Health and Welfare, cataracts are the most common among the elderly. Cataract ranks second among the most common chronic diseases. In 2018,more than 1.15 million people sought medical treatment due to cataract, which shows that its prevalence rate is quite high. In clinical practice, visual acuity charts are often used to evaluate the patient's eyeball function. In order to make various evaluations of treatment methods, the measurement of the eye chart cannot provide detailed quantitative figures, and the field of use is often limited to outpatient clinics, and it is easy for there to be a gap in results due to manual or commanded operations.

With the advancement of the srnart technology era, the application of wearable devices has become more and more widespread. It is expected to develop a system that can objectively and quantitatively evaluate the patient's eyeball function status. The team expects to achieve this goal through the eye tracking system of smart glasses. It is expected to develop an innovative and distinctive execution mode and indicator parameters for evaluating the eyeball function status. It is expected that the execution process will include eyeball correction, image warming, and text reading. Then, after analysis through analysis software, heat zone maps, fixation maps, indicator parameters, etc. will be graphically generated. Different text languages and difficulty levels can be selected during the process. Easy to use, including Chinese, English and Japanese,and the font and spacing can also be adjusted. The exedutive team expect to expand its use in c1inical services through the development of this system for assessing detailed eye function.

Keywords: Vision impairment caused by poor eyeball function, smart technology era, eyeball Functional status, eyeball correction