

A10-055

作品名稱

智慧型醫療點滴照護系統**Intelligent Healthcare System for Intravenous Fluid Device**

隊伍名稱

贏我是你不隊 Conquer All

隊長

侯玉翎 台灣大學生醫電子與資訊學研究所

隊員

蕭景隆 南台科技大學電機工程系**作品摘要**

醫療器材及儀器對醫院或病人來說都是非常的重要，人總會有生病或受傷的時候，到醫院就醫已是人生中不可避免的事，提升醫療器材的功能也就相對地重要，因此有了研究開發「智慧型醫療點滴照護系統」的想法。雖然大部分的點滴注射屬於較為安全的醫療行為，但是仍有可能因為人為的疏失或是外力的影響，對於使用者造成傷害希望藉由本作品「智慧型醫療點滴照護系統」來提高醫療行為的安全性，一方面使病患能更安心舒適的施打點滴，另一方面也能減少醫護人員需要不斷巡視病人點滴注射的困境，使工作效率提升，減少醫院人力的浪費，對於醫院將產生相當大的幫助。

「智慧型醫療點滴照護系統」的設計，包含點滴瓶液位與流量偵測系統、緊急通報與監控系統及點滴自動跟隨病人系統三大部分。點滴瓶液位與流量偵測系統主要為病人在施行點滴注射期間，由於醫護人員、家屬或看護人員無法時時刻刻在身旁，因此設計點滴偵測系統，來輔助醫護人員進行點滴施打期間的照護，同時也可以避免因為疏忽或意外所造成的醫療疏失。目前對於點滴液存量的偵測方法，有的是以秤重量的方法有的是以採用侵入式的方法來進行量測，有別於此，本作品利用兩個上下相鄰的反射型紅外線感測器，貼附在點滴瓶外側來進行點滴液面之量測，藉由比較兩個感測器信號的相對值大小來做為液面高度量測。

對於病人來說，醫護人員能在適當時機的照護是非常重

要的，例如在點滴液快要結束時，卻看不見醫護人員的來到，病人或家屬一定會產生心理上的慌張。緊急通報系統主要是進行點滴監控，系統設計以每一個病房作為獨立單位，每一間病房都有一個無線接收器，接收從點滴偵測器上所裝的無線發射器所發出的信號，再透過既有的呼叫鈴有線電路，將每一個病房中點滴施的打狀況傳到護理站監視器中。這些信號包括開始施打點滴時先發出的啟始信號，作為通知護理站並在監視器中自動記錄該病房中點滴注射的起始時間，之後當點滴瓶內液位過低或是輸液管阻塞出現問題時，再發出另一信號通知護理站，此時護理人員便可根據監視器中所呈現的燈號顏色，判別所發生的問題並盡速前往處理。

點滴自動跟隨病人系統的設計概念是當病人需要將點滴帶離病床時，點滴裝置可以自動跟隨病人，不再需要由病人自行帶著走，此自動跟隨病人裝置，源自於自動跟隨機器人裝置，結合點滴醫療裝置便可以跟隨病人行走；除此之外，考量到病人離開病房出去活動，萬一跌倒遭受傷害或是感到身體不適時，如果沒有及時協助，那後果可不堪設想，所以也利用加速度IC設計了一個跌倒偵測警報器，便於通知護理站或是請附近人員前來協助處理。結合上述三項系統，即為完整之「智慧型醫療點滴照護系統」，希望本研究對於醫療照護工作有所幫助，減少醫療糾紛，在有限的醫療照護人力之下，發揮最大功效。

指導教授

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- 1986年，畢業於成功大學電機碩士，目前為南台科技大學電機系副教授。
- 研究領域：電力電子、可程式控制器、電動機控制。
- 指導學生參加競賽：97年度大專學生參與研究計畫獲得研究創作獎、第四屆盛群盃HOLTEK 創意大賽獲得第二名、第13屆TDK盃創思設計與製作競賽獲得第二名、第四屆凌揚盃系統晶片創意大賽獲得第一名、2010年台灣智慧型機器人獲得第一名。



Abstract

Medical apparatuses and instruments have always been extraordinarily important for hospitals or patients. It is inevitable that people may fall ill or get injured and, therefore, may have to go to the hospital. Though most bits inject and belong to the comparatively safe medical behavior, but still possible because careless mistake or influence of external force whose people are, cause injury for user. It is thus essential to improve the functions of the medical apparatuses. In the present study, we aim to develop "Intelligent Healthcare System for Intravenous Fluid Device", hoping to enhance the security of medical treatments with this work. Once efficiency is achieved, the manpower would then be reduced, if not wasted, in the hospital, so would the hospital benefits greatly from the effect.

The design of "Intelligent Healthcare System for Intravenous Fluid Device" includes three parts: "Intravenous Fluid and Flow Detection Device", "Intravenous Fluid Alarm and Monitor Device", and "Intravenous Fluid Follower and Carrier Device". The first part is designed for assisting the nursing staff while the patients are undertaking the intravenous injection, since the nursing staff, the ward, and their family members are unable to stay by the side at every moment. Meanwhile, the problem caused by negligence and accidents may also be avoided. Different from previous literature, this works utilize two adjoin reflection type infrared ray detecting device, stick to outside bit bottle coming, carrying on bit quantity the liquid examine, by compare two person who detect relative value size of signal come high tolerance examine liquid.

To patient, it is very important that the medical personnel can look after in appropriate opportunity, such as when the liquid of bit will be finished soon, but cannot see the coming of medical personnel, the patient or relative is sure to produce the psychological one flurried. The Second part is mainly to

control intravenous drip, design and regard every ward as the independent unit in system, every ward have one wireless receiver, detect wireless launcher signal that send from bit out installed on the person who examine, and then through call bell wired circuit that have, whom bit construct play state pass to, attend to, stand monitor every ward. The ones that include beginning to construct sending out first while having an intravenous drip in these signal open the beginning signal, attend to standing and initial time that the bit injects in this ward of automatic record in the monitor as the notice, whether later passed low or infusion and in charge of blocking in the bit bottle while going wrong in the location of liquid, send out another signal notify, attend to standing and then. The nursing staff can follow the light number color appearing in the monitor at this moment, differentiate problems happened and deal with as soon as possible.

The third part embodies the concept that the intravenous fluid device can follow the patient automatically when he or she needs to leave the bed, instead of carried by the patient himself. The idea stems from the type of robot that automatically follows a person to anywhere in the hospital. In addition, consider, get patient leave ward activity of going out, fall, injure or feel health to be in right time, without assisting in time, that consequence is very too ghastly to contemplate, so utilize acceleration IC to design one to fall and detect and examine the siren, whether the convenient notice attends to the station or asks nearby personnel to assist to deal with. The three devices in combination, as described above, make up the "Intelligent Healthcare System for Intravenous Fluid Device". This research project intends to do well to the health care industry with a hope to reduce medical quarrels and to produce the best effects despite of limited nursing resources.

