

13<sup>th</sup> GOLDEN SILICON AWARDS

A13-019

Relieved Pillow

安眠枕頭

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## 作品摘要

人的一生當中約有三分之一的時間花在睡眠，而且有很多成年人都有打鼾的現象。根據統計，四十歲以上的成年人有60%的男性及40%的女性會打鼾，這當中尤以肥胖者為最，下巴短、舌頭或扁桃腺過大，都容易引起打鼾，即使是正常的人，在極度疲勞時也容易在入睡之後打鼾。打鼾本身雖然不是嚴重的疾病，並不至於直接影響身體健康，但是常會使家人睡眠受干擾，配偶受不了分房睡，宿舍室友受不了鼾聲而要求換寢室，甚至連出外旅遊都被拒絕同遊，影響家庭及社會人際關係；在演講廳或演奏場所，低沉宏亮的「伴奏聲」更是非常不禮貌又尷尬的行為。打鼾人口當中大約四分之一會合併有阻塞性睡眠呼吸中止症，空氣無法正常進入肺部，血中含氧氣急遽下降，長期下來造成心肺額外的負擔，患者容易心律不整、肺動脈高壓，甚至引發腦溢血、心肌梗塞或半夜猝死。本專題利用微型麥克風及兩個氣囊安裝在枕頭內部製作成安眠枕頭，在偵測到打鼾聲音連續四響時，會自動啟動充氣馬達擺動枕頭，使人體頭部轉向側面，讓呼吸道不被堵住，解決了打鼾的困擾與睡眠呼吸中止症的危險。

許多人整天都待在電腦前工作，雖然上班過程中會改變姿勢起來走動，但是脖子還是長時間維持固定姿勢，長期累積下來，肌肉沒有獲得適當的放鬆，肌肉柔軟度變差，整個肌肉處於緊繃狀態，因此晚上睡覺就特別重要，必須使肩頸肌肉獲得充分休息。如果早晨起床頸、肩、背部痠痛，甚至頭暈、看東西模糊、胸悶、惡心，還有睡覺時打鼾，都可能是枕頭高度不合適所引起的，只有在睡覺時，維持頸椎正常的生理狀態，才能使頸部肌肉、韌帶、椎間關節，以及穿過頸部的氣管、食道和神經等組織與整個人體一起放鬆、休息。睡覺姿勢以平躺來講，應該是前額與下巴間呈現水平，且頸部與枕頭要密合，特別是枕頭下緣應與肩膀貼近，切勿讓頸部或背部懸空，但是也不宜連背部都壓在枕頭上，反而造成頭往後仰。由仰睡變成側睡時，由於肩膀會頂住床鋪，所以這時候枕頭高度顯得太低，導致頸椎側彎，容易造成肩頸肌肉痠痛，也就是所謂的

「落枕」。古代醫書裡說「仰臥時枕高一拳，側臥時枕高一拳半」；本專題在安眠枕頭下方安裝壓敏電阻器，在完全不干擾睡眠的情況下來感測睡姿，根據壓敏電阻器所受到的壓力來判斷人體睡姿，在偵測到人體側睡時，會自動增高枕頭高度使頭部與軀幹保持水平，防止頸椎側彎。

另外，現在獨居的老年人口比例不斷增加，老人家最怕跌倒，晚上睡覺起來上廁所時，萬一跌倒了又沒有家人發現的話，那後果可能就會很嚴重。安眠枕頭具有夜間照護功能，只要人一離開床，電燈便會緩緩點亮使眼睛不刺眼，如果在預定時間內沒有回到床上，則會自動撥打電話求救。對於身體衰弱無法自行起床，身邊又沒有照護人員的患者和老年人，安眠枕頭也具有聲控功能，即使是口齒不清的老人家也可適用，使用者只要讓喉嚨發出簡單的單音，不需開口說話就可以控制家電器具。



圖1 &gt; 一覺好眠

**指導教授****陳文耀 / 南臺科技大學電機工程系**

成功大學電機碩士，現職電機系副教授。陳老師是國內資深冷凍空調技師，近年來則帶領學生參加各種電機電子相關競賽，並且獲得許多獎項。

**研究領域**

電力電子、電動機控制、冷凍空調。

**Abstract**

Person's life which about one third of the time spent sleeping, and many adults have snoring phenomenon. According to statistics, over 40 years old will be 60% of adults snore, which were for the most obese people in particular, short chin, tongue or tonsils too large, are prone to snoring, even normal people, when in extreme fatigue easy to fall asleep after snoring. Although snoring is not a serious disease in itself, not as a direct impact on health, but often leaves his family sleep disturbance, spouses can not stand sleep in separate bedrooms. Dorm roommate can not stand snoring asked for bedroom, and even travel with the tour have been rejected, affecting family and social relationships. Snoring about a quarter of the population which will be merged with obstructive sleep apnea. Air can not enter the lungs, the blood oxygen level dropped sharply, resulting in long-term cardiopulmonary additional burden down, patients prone to arrhythmias, pulmonary hypertension, and even lead to stroke, myocardial infarction or sudden death at midnight. The project relies on miniature microphone and two airbags mounted inside the pillow made into a sleep pillow, snoring sound is detected when four consecutive ring, inflatable motor will automatically start swinging pillow, head turned to the side so that the body, so that will not be blocked airway to solve the problems of snoring and sleep apnea risk.

Many people stay in front of the computer all day, although the process will change their position to work up and move, but still a long neck to maintain a fixed position, the long-term cumulative, muscles do not get proper relaxation, muscle softness worse, the entire muscle in strained state, so it is particularly important to sleep at night, you must make the neck muscles get enough rest. If the morning neck, shoulder, back pain, and even dizziness, see things blurred, chest tightness, nausea, and sleep snoring is likely to be caused by a pillow highly inappropriate. Only in sleep, to

maintain the normal cervical physiological state, in order to make the neck muscles, ligaments, intervertebral joints, as well as through the neck of the trachea, esophagus and nerves and other tissues throughout the body along with relaxation. Sleeping posture to lying is concerned, it should be present between the forehead and chin level, and to seal the neck with pillows, especially the lower edge of the pillow should be close to the shoulders, neck or back Do not let unconnected, but it should not be connected are pressed back on the pillow, but caused heads thrown back.

The backs becomes positional, because the shoulder will withstand beds, so this time the pillow height seems too low, leading to cervical scoliosis, likely to cause neck and shoulder muscle pain, also known as "stiff neck." In the bottom of the topic sleep pillow install varistors, in the case of completely down without disturbing the sleep sleeping position sensing, based varistors to determine the pressure exerted on the body sleeping position, the human body is detected positional when automatically increased height of the pillow to maintain the level of the head and torso to prevent cervical scoliosis.

In addition, the proportion of elderly people living alone now increasing, the elderly are most afraid of falling to sleep at night up on the toilet, in case of fall and no family found, then the consequences might be very serious. Nighttime sleep pillow with care, as long as people left the bed, slowly lit the lamp will not dazzling eyes. If you do not go back to bed within a predetermined time, it will automatically call for help. For frail themselves unable to get up, side and no caregivers of patients and the elderly, sleep pillow also has voice features, even inarticulate elderly also apply, as long as the throat issue a simple user tone, without opening speak can control home appliances appliance.