

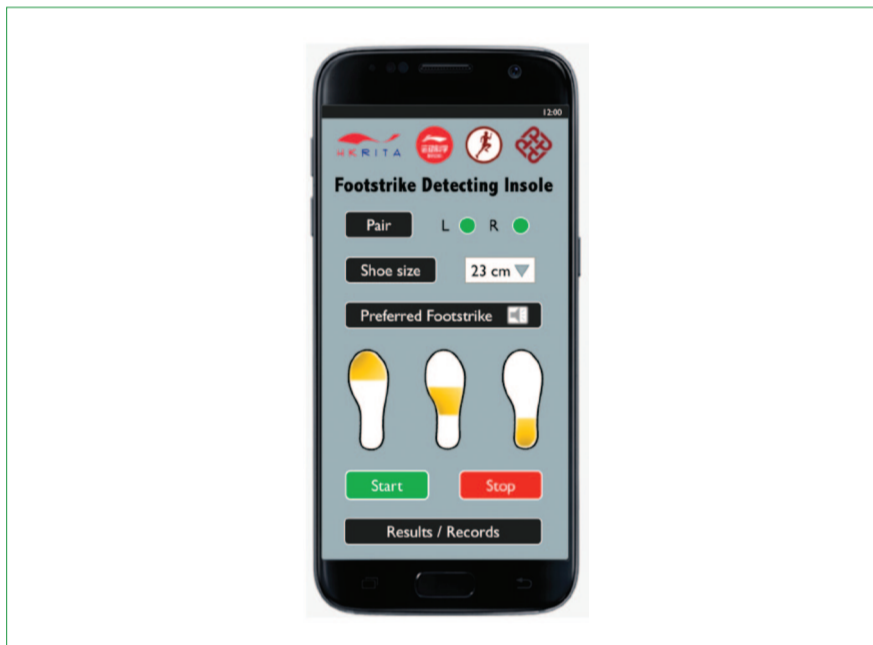
# 檢測跑步落地方式的鞋墊 Sensing Insole for Footstrike Pattern Detection in Runners

## 以實時生物反饋調節跑手落地姿勢

Mobile biofeedback device for footstrike pattern modification for injury prevention and rehabilitation in runners

專利申請編號及國家：201610192439.8 (中國)

有跑步習慣者每年因跑步引致受傷的風險高達80%，跑手的落地方式和受傷機會之間有著明顯關係。有證據顯示，後跟或前掌落地的方式容易造成疲勞性骨折及跟腱炎等傷患。根據生物力學分析，以全掌落地的跑法是最理想的方式，但跑手難以自行改變落地的習慣。此發明能實時檢測跑步時腳掌落地的方式，從而協助跑手改善跑姿，減少傷患，亦可用於復康方面，幫助傷癒的跑手避免訓練時加重受傷部位的負荷。



手機應用程式的界面  
Interface of the smartphone App

The annual injury risk for regular runners is up to 80%. It is largely related to how runner's foot hits the ground. Emerging evidence suggests that heel or forefoot strike may result in injuries such as stress fractures or Achilles tendinitis. According to biomechanical analysis, midfoot strike is an optimal pattern, but it is difficult for runners to attain on their own. This invention provides real-time information about footstrike patterns over the whole running bout and real-time feedback through a specially designed smartphone app. Runners may make use of the information to modify their gait mechanics for injury prevention and rehabilitation.

### 特色與優點

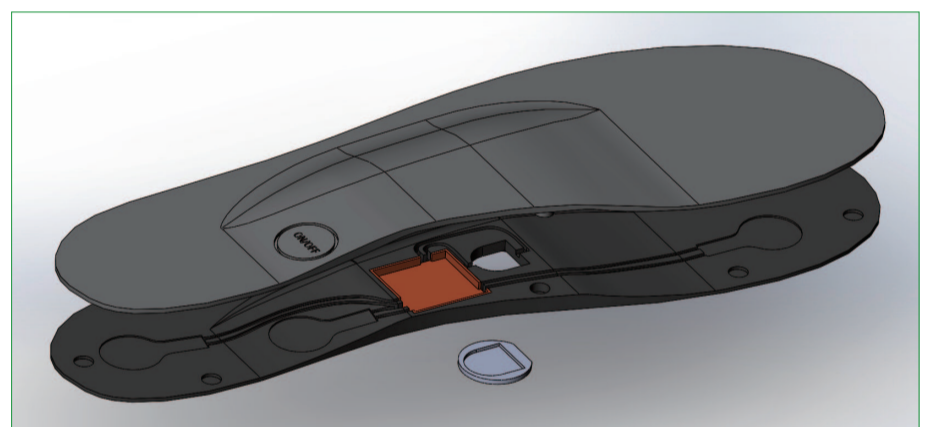
- 準確度高，可媲美實驗室儀器
- 成本低，其價格低於動作捕捉儀器的萬分之一，低於壓力傳感器的千分之一
- 能應用於戶外並持續測量，不受環境空間限制
- 可提供實時反饋，用家可因應即時數據分析而調整跑姿

### 應用

- 預防傷患 — 跑手可通過儀器的實時反饋，再配合訓練來改變落地方式。
- 復康用途 — 傷癒的跑手可通過儀器了解自己的落地方式，避免訓練時加重受傷部位的負荷。

### 獎項

- 第45屆瑞士日內瓦國際發明展 — 銀獎 (2017年3月)
- 羅馬尼亞創新科技協會特別獎 (2017年3月)



感應鞋墊的立體設計圖  
3D design of the sensing insole

Patent Application No. and Country: 201610192439.8 (China)

### Special Features and Advantages

- High accuracy - cross-validated with laboratory-based equipment
- Low cost when compared to motion capturing device (< 1/10000) or pressure sensors (< less than 1/1000)
- Continuous outdoor monitoring
- Real-time information and feedback for users to adjust their footstrike pattern accordingly

### Applications

- Injury prevention – Runners can use the device to have biofeedback training which modifies gait mechanics by adjusting footstrike pattern.
- Rehabilitation – Recovering runners are able to realize their footstrike pattern and avoid overloading of particular body structures e.g. runners with repaired Achilles tendon should avoid forefoot strike.

### Awards

- Silver Medal – 45th International Exhibition of Inventions of Geneva, Switzerland (Mar 2017)
- Special Merit Award – Romanian Association for Nonconventional Technologies, Romania (Mar 2017)

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