智慧球拍擊球分析系統

The Analysis System for Smart Racket / Paddle

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The cross-disciplinary project can effectively demonstrate and integrate the multi-research field, which would improve the research quality of the university. In this project, our cooperation research group formulated the "smart racket/paddle analysis system" based on the specialized knowledge of the Sports Science (Physical Education) and Materials Engineering departments. According to the concepts of the cross-disciplinary project, we plan to combine and organize the charge-induced materials sensors into the self-powered detected system, which can be applied in the development of an intelligent racket/paddle. Currently, Taiwan's badminton strength is ranked 6th in the Badminton World Federation (BWF). In addition, Tai Tzu-Ying is ranked 1st in women's singles globally, which has set off a wave of badminton in Taiwan. Furthermore, table tennis is also very popular in Asia. However, sports development strategies must involve technology, physical, tactic and practical movement. These research points are often coached by a trainer or self-assessment without acceptance and rejection criteria. Thus, our cooperation research group formulated a series of research maps, including developing intelligent rackets and paddles. **The main research goals involve charge-induced materials, sensor design, precise sensing system, the athlete's movement, and the establishment of a database.**[1-4] The innovative racket/paddle can help the athlete achieve higher training quality from the combined cross-disciplinary. In the meantime, this novel sporting system will apply more precise criteria in the training condition for the user, including the batting point, strength and speed. The following research results are shown in **Figure 1**. Our research team successfully developed a self-powered mechanical force sensor and installed it on the racket's surface in miniaturization. **With its self-powered advantage, it can maximize the saving of battery installation space. In the meantime, we combine the human-machine interface design to achieve the purpose of remote monitoring of training conditions.** According to this research, we hope to provide players with an intelligent training method in the future.

Key words：Sports Science, smart racket/paddle, Sensing System, self-powered, acceptance and rejection criteria
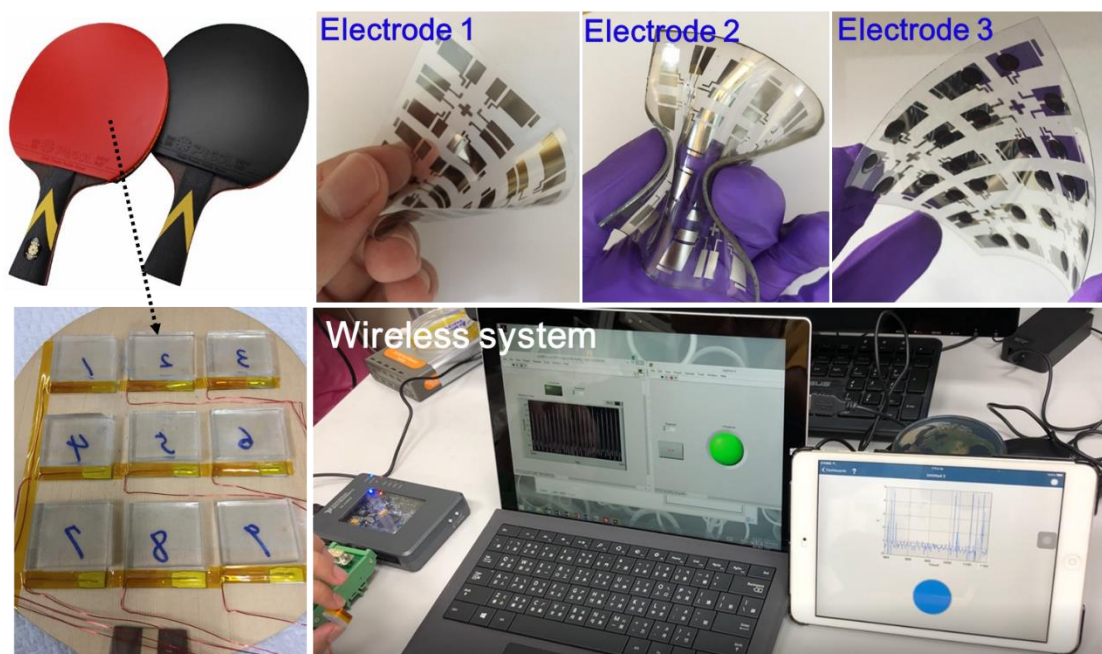
Figure 1: Different self-powered sensor designed and wireless sensor systems.

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