SQUAT DEPTH SENSOR

Muhammad Hafizul Shafiq Zainun[1], Nur Aina Afiqah Zainul Asri[2], Ahmad Afnan Mat Zlan[3],
Azeman Abd. Majid[4]

[1,2,3]*Faculty of Sports Science and Recreation Cawangan UiTM Pahang*
[4]*Faculty of Business Management UiTM Cawangan Pahang*
hafizulshafiq96@gmail.com

ABSTRACT:

Squat Depth Sensor (SD-S) is a tool/instrument that will help to detect the optimum depth of squat. It is designed to provide a new invention related to the assessing squat test that will aid lecturers/sports enthusiasts in term of detecting the efficiency of squat depth and to minimize cheating on squat test. It focuses on squat performance in terms of reaching the perfect squat depth based on individual optimum depth. It constitutes the qualities context that addresses challenges that always occur during squat test such as cheating because there is a lack of measurement tools to detect the optimum squat depth. SD-S is developed based on the idea of something remarkable to be presented for Faculty of Sports Science as writers acknowledge the needs of performing proper biomechanics as well as to get the perfect and precise results. It is a simple tool and handy. It comprises of an adjustable chair with built-in ultrasonic sensor. Desired depth is measured and the chair is adjusted to the desired depth measurement. By standing in front of the chair the subject will perform squat. The buzzer will buzz once the subject has reached the depth that has been programmed and it will trigger the LED light to light up. This will indicate the optimum depth has been achieved and the squat is perfect. So this invention will aid the process of squat test by alerting the examiner through the buzz and light in which it will only start to alert if optimum depth is achieved. Thus, there will be no cheating allowed as it will merely give precise and perfect result.

Keywords: Squat; Ultrasonic sensor; Optimum squat depth; Cheating; Invention

INTRODUCTION

There are many people or organizations that take health in serious account. Nowadays, fitness test is one of the famous approaches to determine fitness level of an individual. But there is still lack of tools/instruments to aid the process of fitness test. Squat test is one of it. Squat Depth Sensor is the new idea to aid squat test. With the advancement of technology, it can be applied as a tool to improve the precision and perfection in order to determine the optimum squat depth that needs to be achieved. With the ultrasonic sensor to detect distance that has been programmed, it is easier for the examiner to detect the precision and cheating during squat test.

MATERIALS AND METHODS

The materials that have been used to develop Squat Depth Sensor consists of adjustable chair with built-in ultrasonic sensor. The sensor itself is the self-resembled product with the hardware required such as Arduino UNO, Ultrasonic Sensor, Capacitor, Active Buzzer, LED Light, Breadboards and also Male to Male Jumper Wires.

The HC-SR04 sensor will be attached to the Breadboard and Arduino Board. The buzzer, resistor and LED are attached to the Breadboard and Arduino Board. Then the product will undergo programming session using the specific Distance Alarm System Arduino to set the desired program. Then, the programmed sensor will be placed in the adjustable chair.

RESULT AND DISCUSSION

This product will detect object that comes close to it. It is more accurate as the desired distance has been programmed. The buzzer will buzz and LED Light will light up when the individual has reached the optimum depth that has been set up. So it is more accurate than using the traditional ways to measure the depth of squat. This product will also make the examiner becomes more alert to the test as there is buzzer that will be triggered by the ultrasonic sensor. Thus, it produces more concrete and precise result.

CONCLUSION

Technology has been part of human's life. In order to achieve the objective of fitness test, the test itself should be reliable and it should not produce any doubt in the process of making the test. Therefore, it is important to conduct the test without cheating and bias. This product will ease us and provide us with better, accurate and precise result to determine the efficiency of squat test. Future inventor can include the other squat test indicator such as human biomechanics in line with the ultrasonic sensor to produce more accurate and reliable result.

REFERENCES

Vidit Shah; Utkarsh Tiwari june (2016, June 25). Ultrasonic Sensor Alarm © GPL3+. ARDUINO PROJECT HUB. Retrieved from https://create.arduino.cc/projecthub/onyx/ultrasonic-sensor-alarm-1ec0f3

Park, J., Je, Y., Lee, H., & Moon, W. (2010). Design of an ultrasonic sensor for measuring distance and detecting obstacles. *Ultrasonics*, *50*(3), 340–346. https://doi.org/10.1016/j.ultras.2009.10.013

Ockendon, M., & Gilbert, R. (2012). Validation of a Novel Smartphone Accelerometer-Based Knee Goniometer. *Journal of Knee Surgery*, *25*(4), 341–346. https://doi.org/10.1055/s-0031-1299669

John, D., & Liebenson, C. (2013). How should I squat? *Journal of Bodywork and Movement Therapies*, *17*(1), 137–139. https://doi.org/10.1016/j.jbmt.2012.11.008

Munich, H., Cipriani, D., Hall, C., Nelson, D., & Falkel, J. (1997). The test-retest reliability of an inclined squat strength test protocol. *The Journal of Orthopaedic and Sports Physical Therapy*, *26*(4), 209–213. https://doi.org/10.2519/jospt.1997.26.4.209