DEVELOPMENT AND VALIDATION OF A TRACK BICYCLE INSTRUMENT FOR TORQUE MEASUREMENT USING THE ZIGBEE WIRELESS SENSOR NETWORK

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Abstract- This study evaluates the consistency between the bicycle torque of the proposed system, and a Schoberer Rad Messtechnik (SRM) system. The torque was measured while a trainer was cycling indoors, and the measured values were compared with those of the SRM system. A Bland-Altman statistical analysis indicated that the measured values agreed with the SRM within 95%. The mean absolute percentage error and root mean square error between the measurements of the proposed system and the SRM system were 8.25%, and 1.86, respectively. The results show that the bicycle torque can be measured accurately and transmitted using ZigBee wireless protocol.

Index terms*:* measurement accuracy, sensor, statistical analysis, strain gauge, torque, track cycling, wireless sensor network, ZigBee.