البحث الاول

بيانات البحث رقم (1)

نوع البحث : **بحث مشترك**

(مشترك مع أخرين فى نفس التخصص)

1- بيانات البحث رقم (1):

عنوان البحث باللغة الانجليزية	**Combustion fault detection technique of spark ignition engine based on wavelet packet transform and artificial neural network**
عنوان البحث باللغة العربية	**تقنية اكتشاف أخطاء الاحتراق بالشرارة لمحرك الإشعال على أساس تحويل حزمة المويجات والشبكة العصبية الاصطناعية**

3.-ملخص البحث باللغة الانجليزية:

Combustion fault detection technique of spark ignition engine based on wavelet packet transform and artificial neural network

In the present work, the wavelet packet technique based on the vibration signals is proposed under normal and fault conditions of the spark ignition (SI) engine. A novelty fault diagnosis technique is considered through the calculation of the maximum energy to Shannon entropy ratio for twenty-five mother wavelets. An optimization approach is conducted for selecting the wavelets and decomposition level to reduce the noise of the captured signal. Feature extraction based on a discrete wavelet transform and energy spectrum is extracted. Effect of the selection of proper denoising wavelet on the

performance of both supervised and unsupervised artificial neural network (ANN) is evaluated. Experimental results show that Coif2_2, dmey_2, and rbio5.5_2 are valuable wavelets for de-noising signal of the SI engine. It is also found that the maximum energy to Shannon entropy ratio is a fast and powerful method to be used in the selection of wavelet families with the best decomposition level. In addition, it indicated that the wavelet packet transform has great potential in detecting spark plug defects. It can be reported that the de-noising with the wavelet revealed the best results on the performance of the ANN for the classification and clustering of fault or normal states.

4-بيانات نشر البحث رقم (1):

مكان النشر	**Elsevier**
اسم المجلة العلمية	**Alexandria Engineering Journal**
الموقع الالكترونى	**https://doi.org/10.1016/j.aej.2020.06.023** https://www.sciencedirect.com/science/article/pii/S111001682030291X
سنة النشر	**(2020)**