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**College of Engineering**  
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# **Performance Evaluation of Modified LEACH Protocol in WSN**

A research submitted in partial fulfillment for the requirements  
of the degree of B.Sc.(Honors) in Computer and Network  
Engineering

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## الاستهلال

قال تعالى:

(قُلْ لَوْ كَانَ الْبَحْرُ مِدَاداً لِكَلِمَاتِ رَبِّي لَنَفِدَ الْبَحْرُ قَبْلَ أَنْ تَنْفَدَ  
كَلِمَاتُ رَبِّي وَلَوْ جِئْنَا بِمِثْلِهِ مَدَدًا)

صدق الله العظيم

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*To our beloved Parents...*

## **Acknowledgement**

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## **Abstract**

Wireless technology has expanded the limits of our world, It used to offer a powerful combination of distributed sensing, computing, communication and also to enable better data collection in scientific studies, it used in countless application, the major challenges in design of wireless sensor networks (WSNs) is to minimize power dissipation so routing protocols are used to reduce power consumption, clustering plays an important role for energy saving and also helps in achieving efficient and scalable control, in an efficient clustering approach, radio communication distance should be minimized. In applications based on large scale WSNs that requires scalability to hundreds or thousands of nodes, usage of hierarchical clustering will be extremely useful.

Low- Energy Adaptive Clustering Hierarchical (LEACH) is parent of hierarchical clustering routing protocol is considered and improved.

We propose a clustering routing protocol named Enhanced MOD LEACH is evaluated which extend MOD LEACH protocol by balancing the energy consumption in the network, simulation studies were done to evaluate the performance of the proposed model.

## المستخلص

توسع العالم بفضل التكنولوجيا اللاسلكية ، و التي تستخدم لتقديم مزيج قوي من الاستشعار عن طريق التوزيع، والحوسبة، والاتصالات، وامكانية تحسين جمع البيانات في الدراسات العلمية , وهي مستخدمة في عدد من التطبيقات اللامحدودة ،التحديات الرئيسية في تصميم شبكات الاستشعار اللاسلكية هو: تقليل تبديد الطاقة بحيث تستخدم بروتوكولات التوجيه للحد من استهلاك الطاقة ،التجمع يلعب دوراً هاماً في توفير الطاقة ويساعد أيضا في تحقيق مراقبة فعالة وقابلة للتطور ، طريقة النهج العنقودي ذات كفاءة، وينبغي التقليل من مسافة الاتصالات اللاسلكية في التطبيقات القائمة على شبكات الاستشعار اللاسلكية واسعة النطاق التي تسيح مئات أو آلاف من العقد، و استخدام المجموعات الهرمية تكون مفيدة للغاية.

بروتوكول التوجيه ليتش هو يعتبر الأساسي من المجموعات الهرمية ويقترح تعديل بروتوكول توجيه المجموعات المسمى تحسين بروتوكول المحسن ليتش، الذي يعتبر امتداداً للبروتوكول المحسن ليتش عن طريق الموازنة بين استهلاك الطاقة في الشبكة وقد أجريت دراسات المحاكاة لتقييم أداء النموذج المقترح.

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## **LIST OF Abbreviations**

### **A**

ADC: Analog to Digital Converter

### **B**

BS: Base station

### **C**

CH: Cluster Head

CDMA: Code Division Multiple Access

CPU: Central Processing Unit

### **E**

EN-MOD LEACH: Enhanced Modified Low Energy Adaptive  
Clustering Hierarchical

### **G**

GPS: Global Position System

### **L**

LEACH : Low- Energy Adaptive Clustering Hierarchical

LEACH-C: Centralized Low- Energy Adaptive Clustering Hierarchical

LEACH-F: Fixed Low- Energy Adaptive Clustering Hierarchical

### **M**

Mod LEACH: Modified LEACH

**S**

SPIN: Sensor Protocol for Information via Negotiation

**T**

TDMA: Time Division Multiple Access

**V**

V-LEACH: Vice Low- Energy Adaptive Clustering Hierarchical

**W**

WSN: Wireless Sensor Network