

الآية

(وَلَيْنِدَأُ لَتَهْمَنَّ ذَلْفَلْسَمَ اَوْ وَاِئِلَّا رَّضَوْ سَخَرَالشَّمْسُ الْاَقْمَرَّ

لَيَقُولُنَّ لَّهٗ فَاَنزِيْهُ فَكُوْنَ)

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سورة العنكبوت :

(61)

DEDICATION

At the beginning, I thank ALLAH for giving me the strength and health to let this work see the light. With much pleasure I wish to dedicate this research to my grand mother **Altouma Bashir**, my father **Hassan Ahmed Fedail** and my mother **Afaf Fadl Elmoula**.

Also to my brothers **Haitham, Asim, AbdElaziem**, and my sisters **Nesrien** and **Nashwa** whom support me to complete this work.

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ABSTRACT

Solar energy is viewed as clean and renewable source of energy. It is the energy of the future; so the use of Photo Voltaic (PV) systems has increased in many applications. That need to improve the materials and methods used to harness this power source. This thesis includes the design and implementation of a microcontroller-based solar panel tracking system with single degree of freedom. The control circuit for the solar tracker is specifically based on an ATmega16 microcontroller and stepper motor. This is programmed to detect the sunlight through the Light Dependent Resistor (LDR) and then actuate the stepper motor to position the solar panel where it can receive maximum sunlight. The main aim of this thesis is to get maximum power from the sun by solving the problem of system work during bad weather or when the clouds, using a scan technique to detect the position of the sun.

المستخلص

تعتبر الطاقة الشمسية احد المصادر النظيفة والمتجددة للطاقة و تعتبر طاقة المستقبل؛ وهذا ادي الي ازدياد عدد التطبيقات التي تستخدم الواح الخلايا الشمسية. هذا يتطلب تحسين المواد والطرق المستعملة لتسخير مصدر الطاقة هذا.

هذا البحث يحتوي علي تصميم وتنفيذ نظام تتبع لوحة للطاقة الشمسية بالاعتماد علي متحكم دقيق مع درجة واحدة من الحرية. تعتمد دائرة التحكم لتعقب الطاقة الشمسية تحديدا علي متحكم دقيق من نوع AT mega 16 ومحرك خطوة. يتم برمجة المتحكم للكشف عن ضوء الشمس من خلال مقاومة ضوئية متغيرة تتغير مع شدة الضوء ومن ثم اعطاء اشارة لمحرك الخطوة بتحريك الألواح الشمسية حيث يمكن الحصول علي اقصى قدر من اشعة الشمس.

الهدف الرئيسي من هذا البحث هو الحصول علي اكبر قدر من الطاقة الشمسية من خلال حل مشكلة عمل النظام اثناء الاحوال الجوية السيئة او عند الغيوم باستخدام تقنية البحث الذاتي للكشف عن موقع الشمس.

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LIST OF ABBREVIATIONS

PV	Photo Voltaic
MPP	Maximum Power Point
CSP	Concentrating Solar Power
CPV	Concentrated Photo Voltaic
HSAT	Horizontal Single Axis Tracker
VSAT	Vertical Single Axis Tracker
TSAT	Tilted Single Axis Tracker
PASAT	Polar Aligned Single Axis Tracker
TTDAT	Tip-Tilt Dual Axis Tracker
AADAT	Azimuth -Altitude Dual Axis Tracker
LDR	Light Dependent Resistor
DC	Direct Current
LCD	Liquid Crystal Display
BASCOM	BASic COMpiler