قال تعالى:

﴿ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ ﴾

البقرة ﴿٣٢﴾

صدق الله العظيم

Dedication:.

From the depths of our hearts we dedicate this thesis to:

Our parents who are paved and still paving the way for us and treating us as winners. Thanks for being so supportive.

All friends who we are so lucky to have, thanks for being the shoulders that we always depend on.

All teachers who are shaping humanity's future, we are so grateful to have had such awesome humans like you. Thank you for all wisdom you shared.

All colleagues who are collaborated in this trip and make it wonderful moments.

To the place that accommodate us, the place where we lose our fears, to Sudan University of Science and Technology, keep shining up, keep progressing up.

To the court that always sentences to help its students not to punish them, To the School of Electronics Engineering.

To all those workers, simple people but doing cruel jobs, we shan't say thank to them because thank isn't enough for them.

ACKNOWLEDGEMENT

In preparing this thesis, we are so grateful to our supervisor **Dr. Fath Elrahman Ismail** who worked with us from the initial steps until the completion of the research and for his staying side by side close to us, supporting us and becoming the most powerful source of encouragement. Without his continued support, guidance, advices and motivation this research wouldn't not have been the same as presented here. We thank all our colleagues for assisting us in this project by helping us with their contributions and giving suggestions and comments on the contents.

ABSTRACT

Nowadays most of TV operators use satellites to provide a broadcast coverage to wide area. User within the covered area must have a satellite dish that is directly pointed to the satellite with clear line of sight conditions. The number of broadcast TV satellites is increased potentially in the past few years and users prefer to watch channels belong to different satellites. Receiving signals from multiple satellites using a single satellite dish antenna require moving it manually to receive the intended satellite signal which is too difficult because it take long time and much effort. The main objective of this project is to make it easier for moving from one satellite to another providing smart solution for controlling the alignment of the satellite dish from one satellite to another. To achieve such goal an android application running on an android device is responsible for computing the required antenna look angles and then it wirelessly communicates with an ARDUINO using Bluetooth to move stepper motors to these computed angles, as a result the user will receive strong signal. Simulation results demonstrated an ARDUINO is able to drive stepper motors to the intended positions. System was implemented using two stepper motors, ARDUINO, Bluetooth module and CD. The behavior of the system is evaluated by means of angles of rotation by using a Serial monitor.

المستخلص

معظم القنوات التلفزيونية تستخدم الاقمار الإصطناعيه لتوفير التغطيه لمنطقة واسعه .يجب على المستخدمين فى هذه المنطقة المغطاة ان يمتلكوا اطباق لإستقبال الإشاره مباشرةً من القمر الاصطناعي و يجب ان توجه هذه الاطباق مباشرة للقمر الاصطناعي بدون وجود اي عائق بين القمر الاصطناعي و الطبق.أعداد الاقمار الاصطناعية أخذت تزداد بصورة كبيرة في السنوات الاخيرة و أصبح المستخدمين يفضلون مشاهدة قنوات تنتمي لاقمار مختلفة. استقبال قنوات تنتمي لأقمار مختلفة باستخدام طبق واحد يحتاج تحريك يدوي للطبق و هي عملية صعبة جدا و تحتاج للكثير من الوقت و الجهد. الهدف الاساسي للمشروع هو تصميم نظام يُسهل من عملية التحويل من قمر اصطناعي الي قمر اصطناعي و لتحقيق هذا الهدف تم استخدام نظام تشغيل الهواتف الذكية (اندرويد) لبناء تطبيق لحساب الزوايا التي يجب ان يوجه الطبق بها و بعد ذلك يتواصل التطبيق مع متحكم لتحريك الموتورات لهذه الزويا و بالمحصلة سيستقبل المستخدم افضل اشارة,وفى تصميم هذا النظام تم استخدام موتورين واردوينو وبلوتوث للارسال واسطوانه تمثل الطبق . والنتيجه التى تحصل باستخدام نظم المحاكاة ان المتحكم(الاردوينو) يسمح للموتور بالتحرك فى الاتجاه المطلوب نحو الموقع المطلوب. تم تقيم ادائية هذا النظام باستخدام بيئة تطوير الاردوينو لعرض الزوايا التي دار بها كلا من الموتورين في النظام .

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LIST OF ABBREVIATIONS

AC - Alternating current

CD - Compact Disk

DC - Direct current

CEL - Current Elevation Angle

DEL - Desired Elevation Angle

EEPROM - Electrically Erasable Programmable Read Only Memory

GEO - Geostationary Earth Orbit

GPS - Global Positioning System

HPBW - Half Power Beam Width

IR - Infra-Red

LEO - Low Earth Orbit

MEO - Medium Earth Orbit

LIST OF SYMBOLS

λ_E - Earth Station Latitude

Φ_E - Earth Station Longitude

Φ_{SS} - Sub-Satellite Point's Longitude

ES - Position of Earth Station

SS - Sub-Satellite Point

S - Satellite

d - Range from ES to S

σ - Angle between ES and SS

EL - Elevation Angle

AZ - Azimuth Angle

a - Step angle

D - dish diameter

λ - Free Space wave length

h - Distance from satellite to the surface of the earth

R - Radius of the earth