

DATA

MODELING MADE SIMPLE

With ER/Studio® Data Architect



STEVE HOBERMAN

Data Modeling Made Simple With Er Or Studio Data Architect

Robert R. Redfield



Data Modeling Made Simple With Er Or Studio Data Architect:

Data Modeling Made Simple with Embarcadero ER/Studio Data Architect Steve Hoberman, 2015-10 Build a working knowledge of data modeling concepts and best practices along with how to apply these principles with ER Studio This second edition includes numerous updates and new sections including an overview of ER Studio s support for agile development as well as a description of some of ER Studio s newer features for NoSQL such as MongoDB s containment structure You will build many ER Studio data models along the way applying best practices to master these ten objectives Know why a data model is needed and which ER Studio models are the most appropriate for each situation Understand each component on the data model and how to represent and create them in ER Studio Know how to leverage ER Studio s latest features including those assisting agile teams and forward and reverse engineering of NoSQL databases Know how to apply all the foundational features of ER Studio Be able to build relational and dimensional conceptual logical and physical data models in ER Studio Be able to apply techniques such as indexing transforms and forward engineering to turn a logical data model into an efficient physical design Improve data model quality and impact analysis results by leveraging ER Studio s lineage functionality and compare merge utility Be able to apply ER Studio s data dictionary features Learn ways of sharing the data model through reporting and through exporting the model in a variety of formats Leverage ER Studio s naming functionality to improve naming consistency including the new Automatic Naming Translation feature This book contains four sections Section I introduces data modeling and the ER Studio landscape Learn why data modeling is so critical to software development and even more importantly why data modeling is so critical to understanding the business You will learn about the newest features in ER Studio including features on big data and agile and the ER Studio environment By the end of this section you will have created and saved your first data model in ER Studio and be ready to start modeling in Section II Section II explains all of the symbols and text on a data model including entities attributes relationships domains and keys By the time you finish this section you will be able to read a data model of any size or complexity and create a complete data model in ER Studio Section III explores the three different levels of models conceptual logical and physical A conceptual data model CDM represents a business need within a defined scope The logical data model LDM represents a detailed business solution capturing the business requirements without complicating the model with implementation concerns such as software and hardware The physical data model PDM represents a detailed technical solution The PDM is the logical data model compromised often to improve performance or usability The PDM makes up for deficiencies in our technology By the end of this section you will be able to create conceptual logical and physical data models in ER Studio Section IV discusses additional features of ER Studio These features include data dictionary data lineage automating tasks repository and portal exporting and reporting naming standards and compare and merge functionality

Data Modeling Made Simple Steve Hoberman, 2013 This book provides the business or IT professional with a practical working knowledge of data modelling

concepts and best practices along with how to apply these principles with ER Studio DA You will build many ER Studio DA data models along the way applying best practices to master these ten objectives You will know why a data model is needed and which ER Studio DA models are the most appropriate for each situation You will be able to read a data model of any size and complexity with the same confidence as reading a book You will know how to apply all the key features of ER Studio DA You will be able to build relational and dimensional conceptual logical and physical data models in ER Studio DA You will be able to apply techniques such as indexing transforms and forward engineering to turn a logical data model into an efficient physical design You will improve data model quality and impact analysis results by leveraging ER Studio DAs lineage functionality and compare merge utility You will achieve enterprise architecture through ER Studio DAs repository and portal functionality You will be able to apply ER Studio DAs data dictionary features You will learn ways of sharing the data model through reporting and through exporting the model in a variety of formats You will leverage ER Studio DAs naming functionality to improve naming consistency This book contains four sections Section I introduces data modelling and the ER Studio DA landscape Learn why data modelling is so critical to software development and even more importantly why data modelling is so critical to understanding the business You will also learn about the ER Studio DA environment By the end of this section you will have created and saved your first data model in ER Studio DA and be ready to start modelling in Section II Section II explains all of the symbols and text on a data model including entities attributes relationships domains and keys By the time you finish this section you will be able to read a data model of any size or complexity and create a complete data model in ER Studio DA Section III explores the three different levels of models conceptual logical and physical A conceptual data model CDM represents a business need within a defined scope The logical data model LDM represents a detailed business solution capturing the business requirements without complicating the model with implementation concerns such as software and hardware The physical data model PDM represents a detailed technical solution The PDM is the logical data model compromised often to improve performance or usability The PDM makes up for deficiencies in our technology By the end of this section you will be able to create conceptual logical and physical data models in ER Studio DA Section IV discusses additional features of ER Studio DA These features include data dictionary data lineage automating tasks repository and portal exporting and reporting naming standards and compare and merge functionality

Data Modeling Made Simple with ER/Studio Data Architect Steve Hoberman, 2015 Build a working knowledge of data modeling concepts and best practices along with how to apply these principles with ER Studio This second edition includes numerous updates and new sections including an overview of ER Studio s support for agile development as well as a description of some of ER Studio s newer features for NoSQL such as MongoDB s containment structure You will build many ER Studio data models along the way applying best practices to master these ten objectives Know why a data model is needed and which ER Studio models are the most appropriate for each situation Understand each component on the data model and how to represent and

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Technology Made Simple for the Technical Recruiter, Second Edition Obi Ogbanufe,2019-04-27 If you re a technical recruiter who wants to keep your skills up to date in the competitive field of technical resource placement you need a detailed guidebook to outpace competitors This technical skills primer focuses on technology fundamentals from basic programming terms to big data vocabulary network lingo operating system jargon and other crucial skill sets Topics covered include sample questions to ask candidates types of networks and operating systems software development strategies cloud systems administration and DevOps data science and database job roles and information security job roles Armed with indispensable information the alphabet soup of technology acronyms will no longer be intimidating and you will be able to analyze client and candidate requirements with confidence Written in clear and concise prose Technology Made Simple for the Technical Recruiter is an invaluable resource for any technical recruiter

Data Modeling for MongoDB Steve Hoberman,2014-06-01 Congratulations You completed the MongoDB application within the given tight timeframe and there is a party to celebrate your application s release into production Although people are congratulating you at the celebration you are feeling some uneasiness inside To complete the project on time required making a lot of assumptions about the data such as what terms meant and how calculations are derived In addition the poor documentation about the application will be of limited use to the support team and not investigating all of the inherent rules in the data may eventually lead to poorly performing structures in the not so distant future Now what if you had a time machine and could go back and read this book You would learn that

even NoSQL databases like MongoDB require some level of data modeling Data modeling is the process of learning about the data and regardless of technology this process must be performed for a successful application You would learn the value of conceptual logical and physical data modeling and how each stage increases our knowledge of the data and reduces assumptions and poor design decisions Read this book to learn how to do data modeling for MongoDB applications and accomplish these five objectives Understand how data modeling contributes to the process of learning about the data and is therefore a required technique even when the resulting database is not relational That is NoSQL does not mean NoDataModeling Know how NoSQL databases differ from traditional relational databases and where MongoDB fits Explore each MongoDB object and comprehend how each compares to their data modeling and traditional relational database counterparts and learn the basics of adding querying updating and deleting data in MongoDB Practice a streamlined template driven approach to performing conceptual logical and physical data modeling Recognize that data modeling does not always have to lead to traditional data models Distinguish top down from bottom up development approaches and complete a top down case study which ties all of the modeling techniques together This book is written for anyone who is working with or will be working with MongoDB including business analysts data modelers database administrators developers project managers and data scientists There are three sections In Section I Getting Started we will reveal the power of data modeling and the tight connections to data models that exist when designing any type of database Chapter 1 compare NoSQL with traditional relational databases and where MongoDB fits Chapter 2 explore each MongoDB object and comprehend how each compares to their data modeling and traditional relational database counterparts Chapter 3 and explain the basics of adding querying updating and deleting data in MongoDB Chapter 4 In Section II Levels of Granularity we cover Conceptual Data Modeling Chapter 5 Logical Data Modeling Chapter 6 and Physical Data Modeling Chapter 7 Notice the ing at the end of each of these chapters We focus on the process of building each of these models which is where we gain essential business knowledge In Section III Case Study we will explain both top down and bottom up development approaches and go through a top down case study where we start with business requirements and end with the MongoDB database This case study will tie together all of the techniques in the previous seven chapters Nike Senior Data Architect Ryan Smith wrote the foreword Key points are included at the end of each chapter as a way to reinforce concepts In addition this book is loaded with hands on exercises along with their answers provided in Appendix A Appendix B contains all of the book s references and Appendix C contains a glossary of the terms used throughout the text

[DAMA-DMBOK: Guía Del Conocimiento Para La Gestión De Datos \(Spanish Edition\)](#) DAMA International, La Guía del Conocimiento para la Gestión de Datos DAMA DMBOK2 presenta una visión exhaustiva de los desafíos complejidades y valor de la gestión eficaz de los datos Las organizaciones de hoy en día reconocen que la gestión de los datos es fundamental para su éxito Reconocen que los datos tienen valor y quieren aprovechar ese valor A medida que nuestra capacidad y deseo de crear y explotar datos ha aumentado

tambi n lo ha hecho la necesidad de pr cticas de gesti n de datos confiables La segunda edici n de la Gu a del Conocimiento para la Gesti n de Datos de DAMA International actualiza y aumenta el exitoso DMBOK1 DMBOK2 un libro de referencia accesible y autorizado escrito por los principales pensadores en el campo y ampliamente revisado por los miembros de DAMA re ne materiales que describen exhaustivamente los desaf os de la gesti n de datos y c mo cumplirlos mediante Definir un conjunto de principios rectores para la gesti n de datos y describir c mo se pueden aplicar estos principios dentro de las reas funcionales de gesti n de datos Proporcionar un marco de referencia funcional para la implementaci n de pr cticas de gesti n de datos empresariales incluyendo pr cticas m todos y t cnicas ampliamente adoptadas funciones roles entregables y m tricas Establecer un vocabulario com n para los conceptos de gesti n de datos y servir de base para las mejores pr cticas para los profesionales de la gesti n de datos DAMA DMBOK2 proporciona a los profesionales de la gesti n de datos y de TI a ejecutivos trabajadores del conocimiento educadores e investigadores un marco para gestionar sus datos y madurar su infraestructura de informaci n basado en estos principios Los datos son un activo con propiedades nicas El valor de los datos puede y debe expresarse en t rminos econ micos Gestionar los datos significa gestionar la calidad de los datos Se necesitan metadatos para gestionar los datos Se necesita planificaci n para gestionar los datos La gesti n de datos es multifuncional y requiere una amplia gama de habilidades y experiencia La gesti n de datos requiere una perspectiva empresarial La gesti n de datos debe tener en cuenta una serie de perspectivas La gesti n de datos es la gesti n del ciclo de vida de los datos Los diferentes tipos de datos tienen diferentes requerimientos de ciclo de vida La gesti n de datos incluye la gesti n de los riesgos asociados a los datos Los requerimientos de gesti n de datos deben impulsar las decisiones sobre tecnolog a de la informaci n Una gesti n eficaz de los datos requiere un compromiso de liderazgo Los cap tulos incluyen Gesti n de Datos Manejo tico de los Datos Gobierno de Datos Arquitectura de Datos Modelado y Dise o de Datos Almacenamiento de Datos y Operaciones Seguridad de Datos Integraci n de Datos e Interoperabilidad Gesti n de Documentos y Contenidos Datos Maestros y de Referencia Data Warehousing e Inteligencia de Negocios Gesti n de Metadatos Calidad de Datos Big Data y Ciencia de Datos Evaluaci n de la Madurez de la Gesti n de Datos Organizaci n de la Gesti n de Datos y Expectativas de Roles Gesti n de Datos y Gesti n del Cambio Organizacional La estandarizaci n de las disciplinas de gesti n de datos ayudar a los profesionales de la gesti n de datos a desempe arse de forma m s eficaz y consistente Tambi n permitir a los l deres de la organizaci n reconocer el valor y las contribuciones de las actividades de gesti n de datos

DAMA-DMBOK. Свод знаний по управлению данными
 Коллектив авторов, 2020-11-16 DAMA DMBOK *Data Modeling Essentials* Mr. Rohit Manglik, 2024-07-20 EduGorilla
 Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources Specializing in competitive exams and academic support EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels **Data Modeling Essentials**
 Graeme Simsion, Graham Witt, 2004-12-03 Data Modeling Essentials Third Edition covers the basics of data modeling while

focusing on developing a facility in techniques rather than a simple familiarization with the rules In order to enable students to apply the basics of data modeling to real models the book addresses the realities of developing systems in real world situations by assessing the merits of a variety of possible solutions as well as using language and diagramming methods that represent industry practice This revised edition has been given significantly expanded coverage and reorganized for greater reader comprehension even as it retains its distinctive hallmarks of readability and usefulness Beginning with the basics the book provides a thorough grounding in theory before guiding the reader through the various stages of applied data modeling and database design Later chapters address advanced subjects including business rules data warehousing enterprise wide modeling and data management It includes an entirely new section discussing the development of logical and physical modeling along with new material describing a powerful technique for model verification It also provides an excellent resource for additional lectures and exercises This text is the ideal reference for data modelers data architects database designers DBAs and systems analysts as well as undergraduate and graduate level students looking for a real world perspective Thorough coverage of the fundamentals and relevant theory Recognition and support for the creative side of the process Expanded coverage of applied data modeling includes new chapters on logical and physical database design New material describing a powerful technique for model verification Unique coverage of the practical and human aspects of modeling such as working with business specialists managing change and resolving conflict

Practical Solar Tracking Automatic Solar Tracking Sun Tracking Автоматическое удерживание Солнечная слежения ВС Gerro Prinsloo, Robert Dobson, 2015-11-01 This book details Practical Solar Energy Harvesting Automatic Solar Tracking Sun Tracking Systems Solar Trackers and Sun Tracker Systems using motorized automatic positioning concepts and control principles An intelligent automatic solar tracker is a device that orients a payload toward the sun Such programmable computer based solar tracking device includes principles of solar tracking solar tracking systems as well as microcontroller microprocessor and or PC based solar tracking control to orientate solar reflectors solar lenses photovoltaic panels or other optical configurations towards the sun Motorized space frames and kinematic systems ensure motion dynamics and employ drive technology and gearing principles to steer optical configurations such as mangin parabolic conic or cassegrain solar energy collectors to face the sun and follow the sun movement contour continuously In general the book may benefit solar research and solar energy applications in countries such as Africa Mediterranean Italy Spain Greece USA Mexico South America Brazilia Argentina Chili India Malaysia Middle East UAE Russia Japan and China This book on practical automatic Solar Tracking Sun Tracking is in PDF format and can easily be converted to the EPUB MOBI AZW ePub FB2 LIT LRF MOBI PDB PDF TCR formats for smartphones and Kindle by using the ebook online convert com facility The content of the book is also applicable to communication antenna satellite tracking and moon tracking algorithm source code for which links to free download links are provided In harnessing power from the sun through a solar tracker or practical solar tracking system

renewable energy control automation systems require automatic solar tracking software and solar position algorithms to accomplish dynamic motion control with control automation architecture circuit boards and hardware On axis sun tracking system such as the altitude azimuth dual axis or multi axis solar tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun's passage through the sky is traced with high precision in automated solar tracker applications right through summer solstice solar equinox and winter solstice A high precision sun position calculator or sun position algorithm is this an important step in the design and construction of an automatic solar tracking system From sun tracing software perspective the sonnet Tracing The Sun has a literal meaning Within the context of sun track and trace this book explains that the sun's daily path across the sky is directed by relatively simple principles and if grasped understood then it is relatively easy to trace the sun with sun following software Sun position computer software for tracing the sun are available as open source code sources that is listed in this book Ironically there was even a system called sun chaser said to have been a solar positioner system known for chasing the sun throughout the day Using solar equations in an electronic circuit for automatic solar tracking is quite simple even if you are a novice but mathematical solar equations are over complicated by academic experts and professors in text books journal articles and internet websites In terms of solar hobbies scholars students and Hobbyists looking at solar tracking electronics or PC programs for solar tracking are usually overcome by the sheer volume of scientific material and internet resources which leaves many developers in frustration when search for simple experimental solar tracking source code for their on axis sun tracking systems This booklet will simplify the search for the mystical sun tracking formulas for your sun tracker innovation and help you develop your own autonomous solar tracking controller By directing the solar collector directly into the sun a solar harvesting means or device can harness sunlight or thermal heat This is achieved with the help of sun angle formulas solar angle formulas or solar tracking procedures for the calculation of sun's position in the sky Automatic sun tracking system software includes algorithms for solar altitude azimuth angle calculations required in following the sun across the sky In using the longitude latitude GPS coordinates of the solar tracker location these sun tracking software tools supports precision solar tracking by determining the solar altitude azimuth coordinates for the sun trajectory in altitude azimuth tracking at the tracker location using certain sun angle formulas in sun vector calculations Instead of follow the sun software a sun tracking sensor such as a sun sensor or webcam or video camera with vision based sun following image processing software can also be used to determine the position of the sun optically Such optical feedback devices are often used in solar panel tracking systems and dish tracking systems Dynamic sun tracing is also used in solar surveying DNI analyser and sun surveying systems that build solar infographics maps with solar radiance irradiance and DNI models for GIS geographical information system In this way geospatial methods on solar environment interaction makes use use of geospatial technologies GIS Remote Sensing and Cartography Climatic data and weather station or weather center data as well as queries from sky servers and solar resource

database systems i.e. on DB2 Sybase Oracle SQL MySQL may also be associated with solar GIS maps In such solar resource modelling systems a pyranometer or solarimeter is normally used in addition to measure direct and indirect scattered dispersed reflective radiation for a particular geographical location Sunlight analysis is important in flash photography where photographic lighting are important for photographers GIS systems are used by architects who add sun shadow applets to study architectural shading or sun shadow analysis solar flux calculations optical modelling or to perform weather modelling Such systems often employ a computer operated telescope type mechanism with ray tracing program software as a solar navigator or sun tracer that determines the solar position and intensity The purpose of this booklet is to assist developers to track and trace suitable source code and solar tracking algorithms for their application whether a hobbyist scientist technician or engineer Many open source sun following and tracking algorithms and source code for solar tracking programs and modules are freely available to download on the internet today Certain proprietary solar tracker kits and solar tracking controllers include a software development kit SDK for its application programming interface API attributes Pebble Widget libraries widget toolkits GUI toolkit and UX libraries with graphical control elements are also available to construct the graphical user interface GUI for your solar tracking or solar power monitoring program The solar library used by solar position calculators solar simulation software and solar contour calculators include machine program code for the solar hardware controller which are software programmed into Micro controllers Programmable Logic Controllers PLC programmable gate arrays Arduino processor or PIC processor PC based solar tracking is also high in demand using C Visual Basic VB as well as MS Windows Linux and Apple Mac based operating systems for sun path tables on Matlab Excel Some books and internet webpages use other terms such as sun angle calculator sun position calculator or solar angle calculator As said such software code calculate the solar azimuth angle solar altitude angle solar elevation angle or the solar Zenith angle Zenith solar angle is simply referenced from vertical plane the mirror of the elevation angle measured from the horizontal or ground plane level Similar software code is also used in solar calculator apps or the solar power calculator apps for IOS and Android smartphone devices Most of these smartphone solar mobile apps show the sun path and sun angles for any location and date over a 24 hour period Some smartphones include augmented reality features in which you can physically see and look at the solar path through your cell phone camera or mobile phone camera at your phone's specific GPS location In the computer programming and digital signal processing DSP environment free open source program code are available for VB Net Delphi Python C C C PHP Swift ADM F Flash Basic QBasic GBasic KBasic SIMPL language Squirrel Solaris Assembly language on operating systems such as MS Windows Apple Mac DOS or Linux OS Software algorithms predicting position of the sun in the sky are commonly available as graphical programming platforms such as Matlab Mathworks Simulink models Java applets TRNSYS simulations Scada system apps Labview module Beckhoff TwinCAT Visual Studio Siemens SPA mobile and iphone apps Android or iOS tablet apps and so forth At the same time PLC software code for

a range of sun tracking automation technology can follow the profile of sun in sky for Siemens HP Panasonic ABB Allan Bradley OMRON SEW Festo Beckhoff Rockwell Schneider Endress Hauser Fudji electric Honeywell Fuchs Yokonawa or Muthibishi platforms Sun path projection software are also available for a range of modular IPC embedded PC motherboards Industrial PC PLC Programmable Logic Controller and PAC Programmable Automation Controller such as the Siemens S7 1200 or Siemens Logo Beckhoff IPC or CX series OMRON PLC Ercam PLC AC500plc ABB National Instruments NI PXI or NI cRIO PIC processor Intel 8051 8085 IBM Cell Power Brain or Truenorth series FPGA Xilinx Altera Nios Intel Xeon Atmel megaAVR MPU Maple Teensy MSP X MOS Xbee ARM Raspberry Pi Eagle Arduino or Arduino AtMega microcontroller with servo motor stepper motor direct current DC pulse width modulation PWM current driver or alternating current AC SPS or IPC variable frequency drives VFD motor drives also termed adjustable frequency drive variable speed drive AC drive micro drive or inverter drive for electrical mechatronic pneumatic or hydraulic solar tracking actuators The above motion control and robot control systems include analogue or digital interfacing ports on the processors to allow for tracker angle orientation feedback control through one or a combination of angle sensor or angle encoder shaft encoder precision encoder optical encoder magnetic encoder direction encoder rotational encoder chip encoder tilt sensor inclination sensor or pitch sensor Note that the tracker s elevation or zenith axis angle may measured using an altitude angle declination angle inclination angle pitch angle or vertical angle zenith angle sensor or inclinometer Similarly the tracker s azimuth axis angle be measured with a azimuth angle horizontal angle or roll angle sensor Chip integrated accelerometer magnetometer gyroscope type angle sensors can also be used to calculate displacement Other options include the use of thermal imaging systems such as a Fluke thermal imager or robotic or vision based solar tracker systems that employ face tracking head tracking hand tracking eye tracking and car tracking principles in solar tracking With unattended decentralised rural island isolated or autonomous off grid power installations remote control monitoring data acquisition digital datalogging and online measurement and verification equipment becomes crucial It assists the operator with supervisory control to monitor the efficiency of remote renewable energy resources and systems and provide valuable web based feedback in terms of CO2 and clean development mechanism CDM reporting A power quality analyser for diagnostics through internet WiFi and cellular mobile links is most valuable in frontline troubleshooting and predictive maintenance where quick diagnostic analysis is required to detect and prevent power quality issues Solar tracker applications cover a wide spectrum of solar applications and solar assisted application including concentrated solar power generation solar desalination solar water purification solar steam generation solar electricity generation solar industrial process heat solar thermal heat storage solar food dryers solar water pumping hydrogen production from methane or producing hydrogen and oxygen from water HHO through electrolysis Many patented or non patented solar apparatus include tracking in solar apparatus for solar electric generator solar desalinators solar steam engine solar ice maker solar water purifier solar cooling solar refrigeration USB solar charger solar

phone charging portable solar charging tracker solar coffee brewing solar cooking or solar drying means Your project may be the next breakthrough or patent but your invention is held back by frustration in search for the sun tracker you require for your solar powered appliance solar generator solar tracker robot solar freezer solar cooker solar drier solar pump solar freezer or solar dryer project Whether your solar electronic circuit diagram include a simplified solar controller design in a solar electricity project solar power kit solar hobby kit solar steam generator solar hot water system solar ice maker solar desalinator hobbyist solar panels hobby robot or if you are developing professional or hobby electronics for a solar utility or micro scale solar powerplant for your own solar farm or solar farming this publication may help accelerate the development of your solar tracking innovation Lately solar polygeneration solar trigeneration solar triple generation and solar quad generation adding delivery of steam liquid gaseous fuel or capture food grade CO₂ systems have need for automatic solar tracking These systems are known for significant efficiency increases in energy yield as a result of the integration and re use of waste or residual heat and are suitable for compact packaged micro solar powerplants that could be manufactured and transported in kit form and operate on a plug and play basis Typical hybrid solar power systems include compact or packaged solar micro combined heat and power CHP or mCHP or solar micro combined cooling heating and power CCHP CHPC mCCHP or mCHPC systems used in distributed power generation These systems are often combined in concentrated solar CSP and CPV smart microgrid configurations for off grid rural island or isolated microgrid minigrid and distributed power renewable energy systems Solar tracking algorithms are also used in modelling of trigeneration systems using Matlab Simulink Modelica or TRNSYS platform as well as in automation and control of renewable energy systems through intelligent parsing multi objective adaptive learning control and control optimization strategies Solar tracking algorithms also find application in developing solar models for country or location specific solar studies for example in terms of measuring or analysis of the fluctuations of the solar radiation i.e direct and diffuse radiation in a particular area Solar DNI solar irradiance and atmospheric information and models can thus be integrated into a solar map solar atlas or geographical information systems GIS Such models allows for defining local parameters for specific regions that may be valuable in terms of the evaluation of different solar in photovoltaic of CSP systems on simulation and synthesis platforms such as Matlab and Simulink or in linear or multi objective optimization algorithm platforms such as COMPOSE EnergyPLAN or DER CAM A dual axis solar tracker and single axis solar tracker may use a sun tracker program or sun tracker algorithm to position a solar dish solar panel array heliostat array PV panel solar antenna or infrared solar nan antenna A self tracking solar concentrator performs automatic solar tracking by computing the solar vector Solar position algorithms TwinCAT SPA or PSA Algorithms use an astronomical algorithm to calculate the position of the sun It uses astronomical software algorithms and equations for solar tracking in the calculation of sun's position in the sky for each location on the earth at any time of day Like an optical solar telescope the solar position algorithm pin points the solar reflector at the sun and locks onto the sun's position to track

the sun across the sky as the sun progresses throughout the day Optical sensors such as photodiodes light dependant resistors LDR or photoresistors are used as optical accuracy feedback devices Lately we also included a section in the book with links to microprocessor code on how the PixArt Wii infrared camera in the Wii remote or Wiimote may be used in infrared solar tracking applications In order to harvest free energy from the sun some automatic solar positioning systems use an optical means to direct the solar tracking device These solar tracking strategies use optical tracking techniques such as a sun sensor means to direct sun rays onto a silicon or CMOS substrate to determine the X and Y coordinates of the sun s position In a solar mems sun sensor device incident sunlight enters the sun sensor through a small pin hole in a mask plate where light is exposed to a silicon substrate In a web camera or camera image processing sun tracking and sun following means object tracking software performs multi object tracking or moving object tracking methods In an solar object tracking technique image processing software performs mathematical processing to box the outline of the apparent solar disc or sun blob within the captured image frame while sun localization is performed with an edge detection algorithm to determine the solar vector coordinates An automated positioning system help maximize the yields of solar power plants through solar tracking control to harness sun s energy In such renewable energy systems the solar panel positioning system uses a sun tracking techniques and a solar angle calculator in positioning PV panels in photovoltaic systems and concentrated photovoltaic CPV systems Automatic on axis solar tracking in a PV solar tracking system can be dual axis sun tracking or single axis sun solar tracking It is known that a motorized positioning system in a photovoltaic panel tracker increase energy yield and ensures increased power output even in a single axis solar tracking configuration Other applications such as robotic solar tracker or robotic solar tracking system uses robotica with artificial intelligence in the control optimization of energy yield in solar harvesting through a robotic tracking system Automatic positioning systems in solar tracking designs are also used in other free energy generators such as concentrated solar thermal power CSP and dish Stirling systems The sun tracking device in a solar collector in a solar concentrator or solar collector Such a performs on axis solar tracking a dual axis solar tracker assists to harness energy from the sun through an optical solar collector which can be a parabolic mirror parabolic reflector Fresnel lens or mirror array matrix A parabolic dish or reflector is dynamically steered using a transmission system or solar tracking slew drive mean In steering the dish to face the sun the power dish actuator and actuation means in a parabolic dish system optically focusses the sun s energy on the focal point of a parabolic dish or solar concentrating means A Stirling engine solar heat pipe thermosyphin solar phase change material PCM receiver or a fibre optic sunlight receiver means is located at the focal point of the solar concentrator The dish Stirling engine configuration is referred to as a dish Stirling system or Stirling power generation system Hybrid solar power systems used in combination with biogas biofuel petrol ethanol diesel natural gas or PNG use a combination of power sources to harness and store solar energy in a storage medium Any multitude of energy sources can be combined through the use of controllers and the energy

stored in batteries phase change material thermal heat storage and in cogeneration form converted to the required power using thermodynamic cycles organic Rankin Brayton cycle micro turbine Stirling with an inverter and charge controller Solar Tracking Tracking Systems Solar Tracker Systems Tracker PC

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