Practical Predictive Analytics and Decisioning Systems for Medicine: Informatics Accuracy and Cost-Effectiveness for Healthcare Administration and Delivery Including Medical Research

By Linda Miner, Pat Bolding, Joseph Hilbe, Mitchell Goldstein, Thomas Hill, Robert Nisbet, Nephi Walton, Gary Miner

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With the advent of electronic medical records years ago and the increasing capabilities of computers, our healthcare systems are sitting on growing mountains of data. Not only does the data grow from patient volume but the type of data we store is also growing exponentially. *Practical Predictive Analytics and Decisioning Systems for Medicine* provides research tools to analyze these large amounts of data and addresses some of the most pressing issues and challenges where data integrity is compromised: patient safety, patient communication, and patient information. Through the use of predictive analytic models and applications, this book is an invaluable resource to predict more accurate outcomes to help improve quality care in the healthcare and medical industries in the most cost–efficient manner. *Practical Predictive Analytics and Decisioning Systems for Medicine* provides the basics of predictive analytics for those new to the area and focuses on general philosophy and activities in the healthcare and medical system. It explains why predictive models are important, and how they can be applied to the predictive analysis process in order to solve real industry problems. Researchers need this valuable resource to improve data analysis skills and make more accurate and cost-effective decisions.

- Includes models and applications of predictive analytics why they are important and how they can be used in healthcare and medical research
- Provides real world step-by-step tutorials to help beginners understand how the predictive analytic processes works and to successfully do the computations
- Demonstrates methods to help sort through data to make better observations and allow you to make better predictions

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Editorial Review

Review

"...strongly recommended to researchers or healthcare administrators to improve their data analysis skills and help them make more accurate and cost-effective decisions. Score: 84 - 3 Stars" --**Doody's**

"In-depth and eye-opening, this seminal tome serves both the healthcare professional and the analyst: If you are a healthcare provider, researcher, or administrator, this handbook will motivate and guide your data-crunching; if you are an analytics expert, this industry overview will illuminate the pertinent background you need from the complex and dynamic healthcare industry. To get a grip on the predictive healthcare revolution, one must begin with this book's comprehensive 26 chapters and 33 hands-on tutorials." **--Eric Siegel, Ph.D., founder of Predictive Analytics World and author of** *Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die*

About the Author
Linda A. Winters-Miner, PhD, earned her bachelor's and master's degrees at University of Kansas, her doctorate at the University of Minnesota, and completed post-doctoral studies in psychiatric epidemiology at the University of Iowa. While she, with her husband Gary Miner, raised their children, Becky and Matt, she spent most of her career as an educator, in teacher education and statistics and research design. She spent nearly two years as a site coordinator for a major (Coxnex) drug trial. For 23 years, Miner directed academic programs for Southern Nazarene University- Tulsa. Her program direction included three undergraduate programs in business and psychology and three graduate programs in management, business administration, and health care administration. She has authored or co-authored numerous articles and books including with Gary and others, the first book concerning the genetics of Alzheimer's, Alzheimer's disease: Molecular genetics, clinical perspectives and promising new research. Winters - Miner authored some of the tutorials in the first two predictive analytic books published in 2009 and 2012 by Elsevier. At present, she teaches both undergraduate statistics and research at SNU-Tulsa, teaches statistics and predictive analytics for the IHI Family Practice Medical Residency program in Tulsa, and also teaches predictive analytics online, including 'healthcare predictive analytics', for both the University of California-Irvine and University of California - San Diego.

Pat Bolding, MD, FAAFP is a practicing board certified family physician. He has used an EMR (Electronic Medical Record) since his residency training in the mid 1980's which at the time was the "pioneering" Technicon Medical Information System. Later, as the CEO of a large family practice group (which also hosted a 30 resident training program), he led the selection and implementation of several EMR systems, beginning with the text-based Medic Autochart then Misys EMR and finally the A4-Healthmatics system. In 2007, he joined a multi-specialty group practice/integrated delivery system where he serves on the EMR committee which oversaw the implementation of the NextGen ambulatory EMR. More recently he was a member of the search committee that chose the Epic system to replace NextGen. He is a frequent speaker on health/medical topics and has a special interest in evidence-based medicine. He is an adjunct faculty member of Southern Nazarene University, teaching in the Health Care MBA program.

Joseph M. Hilbe is an emeritus professor at the University of Hawaii, an adjunct professor of statistics at Arizona State University, and a Solar System Ambassador with NASA/Jet Propulsion Laboratory, Caltech. An elected Fellow of the American Statistical Association and elected member of the International Statistical Institute, Dr. Hilbe is currently President of the International Astrostatistics Association, is a full member of the American Astronomical Society, and Chairs the Statistics in Sports section of the American Statistical Association (ASA). He has authored fifteen books in statistical modeling, and over 200 book chapters, encyclopedia entries, journal articles, and published statistical software, and is currently on the editorial board of seven academic journals. During the 1990's Dr Hilbe was on the founding executive committee of the ASA Section on Health Policy Statistics, and served in various capacities in the health research industry, including: CEO of National Health Economics and Research Corp.; Director of Research at Transitional Hospitals Corp, a national chain of long term hospitals; Senior Statistician of NRMI-2, Genentech's National Registry for Myocardial Infarctions; lead biostatistical consultant, Hoffman-La Roche's National Canadian Registry for Cardiovascular Disease; and was Senior Statistical Consultant for HCFA's Medicare Infrastructure Project.

Dr. Goldstein attended the University of Miami's Honor Program in Medical Education under an Isaac B. Singer full tuition scholarship, completed his pediatric residency training at the University of California, Los Angeles, and finished his Neonatal Perinatal Medicine training at the University of California, Irvine in 1994. Dr. Goldstein is board certified in both Pediatrics and Neonatal Perinatal Medicine. He is an Associate Professor of Pediatrics at Loma Linda University Children's Hospital and emeritus medical director of the Neonatal Intensive Care Unit at Citrus Valley in West Covina, CA. He has been in clinical practice for 20 years. At the various places he has worked, Dr. Goldstein has become fluent in a multitude of EMR's including EPIC, Cerner, and Meditech. As a member of the Department Deputies Users Group at Loma Linda University Hospital, Dr. Goldstein participates in an ongoing EMR improvement process.

Dr. Goldstein is a past president of the Perinatal Advisory Council, Legislation, Advocacy and Consultation (PACLAC) as well as a past president of the National Perinatal Association (NPA). Dr. Goldstein is the twice recipient of the annual Jack Haven Emerson Award presented to the physician with the most promising study involving innovative pulmonary research and the 2013 recipient of the National Perinatal Association Stanley Graven lifetime achievement award presented for his ongoing commitment to the advancement of neonatal and perinatal health issues. He is the editor of PACLAC's Neonatal Guidelines of Care as well as the Principal author of both the National Perinatal Association's 2011 Best Practice Checklist - Oxygen Management for Preterm Infants and Respiratory Syncytial Virus (RSV) Prophylaxis 2012 Guidelines. Dr. Goldstein serves on the editorial board of the Journal of Perinatology as well as Neonatology Today, has represented the NPA to the American Academy of Pediatrics (AAP) perinatal section, and is a moderator of NICU-NET, a neonatal listserv. He is an executive board member and is on the nominations committee for the Section on Advances in Therapeutics & Technology (SOATT) of the AAP. Dr. Goldstein chaired the NPA National Conferences in 2004, 2008 and 2011 and continues to be active in conference planning as the CME Continuing Medical Education (CME) chair for PACLAC.

His research interests include the development of non-invasive monitoring techniques, evaluation of signal propagation during high frequency ventilation, and data mining techniques for improving quality of care. Dr. Goldstein has also been a vocal advocate for RSV prophylaxis and "right" sizing technology for the needs of neonates. Dr. Goldstein's recent publications have included "Critical Complex Congenital Heart Disease (CCHD)" which was dual published in Neonatology Today and Congenital Cardiology Today, the "Late Preterm Guidelines of Care" published in the Journal of Perinatology, and "How Do We COPE with CPOE" published in Neonatology Today.

Thomas Hill received his Vordiplom in psychology from Kiel University in Germany and earned an M.S. in industrial psychology and a Ph.D. in psychology and quantitative methods from the University of Kansas. He was associate professor (and then research professor) at the University of Tulsa from 1984 to 2009, where he taught data analysis and data mining courses. He also has been vice president for Research and Development and then Analytic Solutions at StatSoft Inc., where he has been involved for over 20 years in the development of data analysis, data and text mining algorithms, and the delivery of analytic solutions. Dr. Hill joined Dell through Dell's acquisition of StatSoft in April 2014, and he is currently the Executive Director for Analytics at Dell's Information Management Group.

Dr. Hill has received numerous academic grants and awards from the National Science Foundation, the National Institute of Health, the Center for Innovation Management, the Electric Power Research Institute, and other institutions. He has completed diverse consulting projects with companies from practically all industries and has worked with the leading financial services, insurance, manufacturing, pharmaceutical, retailing, and other companies in the United States and internationally on identifying and refining effective data mining and predictive modeling solutions for diverse applications. Dr. Hill has published widely on innovative applications for data mining and predictive analytics. He is the author (with Paul Lewicki, 2005) of Statistics: Methods and Applications, the Electronic Statistics Textbook (a popular on-line resource on statistics and data mining), a co-author of Practical Text Mining and Statistical Analysis for Non-Structured Text Data Applications (2012); he is also a contributing author to the popular Handbook of Statistical Analysis and Data Mining Applications (2009).

Dr. Robert Nisbet was trained initially in Ecology and Ecosystems Analysis. He has over 30 years' experience in complex systems analysis and modeling, most recently as a Researcher (University of California, Santa Barbara). In business, he pioneered the design and development of configurable data mining applications for retail sales forecasting, and Churn, Propensity-to-buy, and Customer Acquisition in Telecommunications Insurance, Banking, and Credit industries. Currently, he serves as an Instructor in the University of California, Irvine Predictive Analytics Certificate Program, teaching online courses in Effective Data preparation (UCI), and Introduction to Predictive Analytics (UCSB).

Nephi Walton earned his MD from the University of Utah School of Medicine and a Masters degree in Biomedical Informatics from the University of Utah Department of Biomedical Informatics where he was a National Library of Medicine fellow. His Masters work was focused on data mining and predictive analytics of viral epidemics and their impact on hospitals. He was the winner of the 2009 AMIA Data Mining Competition and has published papers and co-authored books on data mining and predictive analytics. Also during his time at the University of Utah he spent several years studying genetic epidemiology of autoimmune disease and the application of analytical methods to determining genetic risk for disease, a work that continues today. His work has included several interactive medical education products. He founded a company called Brainspin that continues this work and has won international awards for innovative design in this area. He is currently a combined Pediatrics/Genetics fellow at Washington University where he is pursuing several research interests including the application of predictive analytics models to genomic data and integration of genomic data into the medical record. He continues to work with the University of Utah and Intermountain Healthcare to further his work in viral prediction models and hospital census prediction and resource allocation models.

Dr. Gary Miner received a B.S. from Hamline University, St. Paul, MN, with biology, chemistry, and education majors; an M.S. in zoology and population genetics from the University of Wyoming; and a Ph.D. in biochemical genetics from the University of Kansas as the recipient of a NASA pre-doctoral fellowship. He pursued additional National Institutes of Health postdoctoral studies at the U of Minnesota and U of Iowa

eventually becoming immersed in the study of affective disorders and Alzheimer's disease.

In 1985, he and his wife, Dr. Linda Winters-Miner, founded the Familial Alzheimer's Disease Research Foundation, which became a leading force in organizing both local and international scientific meetings, bringing together all the leaders in the field of genetics of Alzheimer's from several countries, resulting in the first major book on the genetics of Alzheimer's disease. In the mid-1990s, Dr. Miner turned his data analysis interests to the business world, joining the team at StatSoft and deciding to specialize in data mining. He started developing what eventually became the Handbook of Statistical Analysis and Data Mining Applications (co-authored with Drs. Robert A. Nisbet and John Elder), which received the 2009 American Publishers Award for Professional and Scholarly Excellence (PROSE). Their follow-up collaboration, Practical Text Mining and Statistical Analysis for Non-structured Text Data Applications, also received a PROSE award in February of 2013. Overall, Dr. Miner's career has focused on medicine and health issues, so serving as the 'project director' for this current book on 'Predictive Analytics of Medicine - Healthcare Issues' fit his knowledge and skills perfectly.

Gary also serves as VP & Scientific Director of Healthcare Predictive Analytics Corp; as Merit Reviewer for PCORI (Patient Centered Outcomes Research Institute) that awards grants for predictive analytics research into the comparative effectiveness and heterogeneous treatment effects of medical interventions including drugs among different genetic groups of patients; additionally he teaches on-line classes in 'Introduction to Predictive Analytics', 'Text Analytics', and 'Risk Analytics' for the University of California-Irvine, and other classes in medical predictive analytics for the University of California-San Diego; he spends most of his time in his primary role as Senior Analyst-Healthcare Applications Specialist for Dell | Information Management Group, Dell Software (through Dell's acquisition of StatSoft in April 2014).

Users Review

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