

Karla L. Caballero Espinosa

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Research Interests

Bayesian Inference, Topic Modelling, Graphical Models, Hierarchical Models, Clustering and Co-clustering, Collaborative Filtering, Social Networks, Smart Alerts, Text Mining.

Education

University of California, Santa Cruz Ph.D. Electrical Engineering GPA: 3.9/4.0	Sept 2007 - Present Advisor: Ram Akella
Autonomous University of Barcelona, Spain M.S. Informatics GPA: 9.6/10 Thesis: <i>Tissue Classification using Intravascular Ultrasound (IVUS) Images and RF signals</i>	Sept 2005 - June 2007 Advisor: Petia Radeva
Monterrey Inst. of Tech. ITESM Qro., Mexico B.S. Electronic Systems Engineering GPA: 94/100 Graduated with Honors	Aug 1999 - Dec 2004

Knowledge

Bayesian Statistics: Markov Chain Monte Carlo, Gibbs Sampling, Mixture Models, Expectation Maximization, Multivariate Distributions, Hierarchical Models and Latent Variables, Decision Theory, Risk Assessment and Utility functions, Hypothesis Testing, Optimal Design by Simulation, Model Checking, Modeling Sensored and Missing Data, Bayesian Regression Models.

Stochastic Processes Concepts: Markov Chains, Gaussian Processes, Poisson Processes, Continuous-Time Markov Chains, Random Processes and Linear Systems, Dynamic Programming, Information Theory concepts, Constrained Optimization, Bayesian Networks, Graphical Models,

Topic Modeling in Text Mining: Latent Semantics Indexing, Probabilistic Latent Semantics, Latent Dirichlet Allocation, Social Networks, Blog Mining.

Machine Learning: Classification and Prediction Techniques, Linear and Logistic Regression, Decision Trees, Naive Bayes, Linear Discriminant Analysis, Support Vector Machines, Boosting, Clustering and Co-clustering using Information Theory, Smart Alerts.

Image Analysis and Computer Vision: Autoregressive Models, Signal Processing and Acquisition, Binary Images, Filtering, Color Representation, Noise Estimation and Removal from a Single Image. Domain in the analysis of Coronary Tissue Classification from Intravascular Ultrasound (IVUS) Images, and their acquisition and reconstruction from RF signals.

Professional Experience

Research Assistant Technology and Information Management Information Retrieval, Text Mining, Topic Modelling, Graphical Models, Bayesian Networks, Smart Alerts, Co-clustering, Collaborative Filtering, Image Retrieval combined with Text, Matrix Decompositions (PCA, SVD). Information Extraction (Name Entity Recognition). Topic Distillation in TREC blog track.	Sept 2007–Present UCSC
Research Assistant Computer Vision Center Tissue Classification using Intravascular Ultrasound (IVUS) images and RF signals. IVUS Image acquisition and reconstruction. In collaboration with the Hospital German Trias I Pujol, Hemodynamic Division, Barcelona and Boston Scientific Iberica.	Jan 2005 - June 2007 UAB
Intern CIAT General Electric	May 2004 - Dec 2004 Queretaro, Mexico

Web programming of a Decision Tool for mechanical engineers and turbo machine designers. Development of the Digital Library of the center.

Teaching Experience

Stoch. Opt. in Info. Syst. and Tech. UCSC, Winter 08, Winter 09
Optimization Techniques applied in computational advertising: Constrained Optimization and Nonlinear Programming, Portfolios, Support Vector Machines, Expectation Maximization, Collaborative Filtering, Dynamic Programming. Prof: Ram Akella.

Knowledge Services and Data Analysis UCSC, Fall 08
Introduction to Data Mining Techniques in Business Applications: Principal Component Analysis, Logistic and Multiple Linear Regression, Latent Semantics Analysis, Clustering, Linear Discriminant Analysis, Decision Trees. Prof: Ram Akella.

Web Mining and Advanced Machine Learning UCSC, Spring 08
Human behavior modeling, Relevance feedback in IR, Clickstream Mining, Social Networks, Bayesian Networks and Graphical Models, Time Series, Reinforcement Learning. Prof: Ram Akella.

Signals and Systems UCSC, Fall 07
Introduction to Signal Analysis concepts: Fourier Transform, Fourier Series, Sampling Methods, Aliasing, System Characterization. Prof: Benjamin Friedlander.

Computer Logic UAB, Fall 06
Propositional Logic, Predicative Logic. Prof: Petia Radeva.

Software Skills

R, Matlab and different toolboxes, ANSI C, C++, XLMiner, Weka, Lucene, Lemur, OpenCV, PHP, SQL, HTML, XML, in the design of a Digital Library and web applications.

Publications

K. L. Caballero, J. Barajas, O. Pujol, J. Mauri, *Using Reconstructed IVUS Images for Coronary Plaque Classification*. In Proc. of *29th Conference of the IEEE Engineering in Medicine and Biology Society, EMBS 2007*, pp. 2167-2170.

K. L. Caballero, J. Barajas, O. Pujol, J. Mauri, P. Radeva, *Reconstructing IVUS images for an accurate tissue classification*. In Proc of *VISSAP 2007*.

K. L. Caballero, O. Pujol, J. Barajas, J. Mauri, P. Radeva, *Assessing In-vivo IVUS Tissue Classification accuracy between Normalized Image Reconstruction and RF Analysis*. In Proc. of *First International Workshop on Computer Vision for Intravascular and Intracardiac Imaging from MICCAI 2006*, pages 82-89.

K. L. Caballero, J. Barajas, O. Pujol, N. Savatella, P. Radeva, *In-vivo IVUS Tissue Classification: a comparison between RF Signal Analysis and Reconstructed Images*, In Proc. of *CIARP 2006*. LNCS 4225, pp. 137-146. Cancun, Mexico.

K. L. Caballero, J. Barajas, O. Pujol, J. Mauri, P. Radeva, *Using RF Reconstructed IVUS Images in Tissue Classification*, In Proc. of *Computers in Cardiology 2006*, Valencia, Spain (in press).

J. Barajas, K. L. Caballero, J. Garcia, F. Carreras, S. Pujadas, P. Radeva, *Correction of Misalignment Artifacts Among 2-D Cardiac MR Images in 3-D Space*. In Proc. of *First International Workshop on Computer Vision for Intravascular and Intracardiac Imaging from MICCAI 2006*, pages 114-121.

Honors and Awards

Doctoral fellowship, UCSC, 2007–Today.

Doctoral Scholarship, National Council of Science and Technology (CONACYT), Mexico. 2007–Today

Research Formation Scholarship, Regional Government of Catalonia, Spain. 2006–2007

Assistant Research Scholarship, Computer Vision Center Barcelona, Spain. 2005

Graduated with Honors, B.S. Electronic Systems Engineering, Mexico. 2004

Academic Scholarship, ITESM Querétaro, Mexico. 1999–2004

Languages

English, Spanish