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EDUCATION

2002: **Master's Degree of Business Administration (MBA)**, *Executive track*, with GPA = 3.94/4, Arab Academy for Science & Technologies and Maritime Transport (AASTMT; www.AAST.edu), Cairo, Egypt.

1987: **PhD in Electronics & Electrical Engineering**, *New Approaches for Isolated word Recognition*, Queen's University; Kingston-Ontario-Canada.

1985: **M.Sc. of Systems and Computer Engineering**, Carleton University, Ottawa, Ontario, Canada

1980: **M.Sc. of Electronics and Electrical Communications**, *Digital Filters Implementation using Microprocessors*, Faculty of Engineering, Cairo University, Egypt.

1977: **B.Sc. of Electronics and Electrical Communications**, Faculty of Engineering, Cairo University, Egypt, with a graduation grade of "Distinction (97.85%) with honors" and ranked as "Top-of-Class".

ACADEMIC POSITION & ACTIVITIES

Professor of Electronics & Electrical Communications, department of Electronics and Communications, Faculty of Engineering, Cairo University-Egypt

- About **60** papers are published in international proceedings and conferences. (See the list at the end of this CV)

- **45** theses had been finished under my supervision: **15** PhDs and **30** M.Sc.'s.

- **25** theses are being conducted under my supervision: **10** PhDs and **15** M.Sc.'s.

- Many of my ex-post graduate (M.Sc. & PhD) students are currently recruited in the core of top world hi-tech companies and research centers like IBM-WRC, Lucent Technologies, Microsoft ... etc.

- Over **375** graduation projects are realized under my supervision in the dept. of Electronics and Electrical Communications, Faculty of Engineering, Cairo University, in different applications such as the digital processing of Speech, Audio, Image, and Video, as well as Pattern Recognition and/or Classification, OCR, Document Analysis,

Biometry, Software and Hardware design. Many prizes have been awarded to some of those projects.

- Since 1988, I have taught numerous courses for graduate as well as undergraduate student. Software Engineering, Digital Signal Processing, Telecommunications, Speech and Image Processing, Electronics, Electric Circuits, Microprocessors and Micro Controllers, DSP and DSP applications, ..., are among these courses where hundreds of course projects are implemented under my supervision.

- I have led the Summer Training since 1988 in the dept. of Electronics & Electrical Communications. Thousands of students have been trained on both advanced s/w and/or h/w topics through this training. Many of these students come from the outside the dept.

INDUSTRIAL EXPERIENCE

- Cofounder, Vice Chairman, and Managing Director of the Corporate Software House; **RDI**; www.RDI-eg.com since 1993. Based in Giza-Egypt with offices in the Gulf Area (Riyadh-KSA, Abu Dhabi-UAE), this corporation specializes in Human Language Technologies (e.g. OCR, Advanced Digital Speech Applications, Arabic Natural Language Processing ... etc.) and e-Learning.

- Cofounder (on behalf of RDI) of **MGD** www.eMGD.com company based in KSA since 2001. This company is specialized in providing integrated e-Learning solutions.

- RDI representative in the e-Learning Committee of the **Egyptian Chamber of Commerce**.

- Cofounder, board member, member of the executive committee, and member of the quality committee of **eLABs**; www.eLABs.org.eg (on behalf of RDI) which is an association for the companies working in the field of e-Learning and Multimedia content gathering over 30 members.

- Member of the **Egyptian Export Council for Information Technology** (following the ministry of Foreign exports) since 2005 on behalf of the industry of e-Learning and e-Content. This council gathers 15 members representing the IT industry in Egypt.

- Cofounder of Arabic Language Technologies Society (ALTEC) which is an NGO association joining all the academic/industrial stake holders of Arabic HLT in Egypt (under establishment).

- Cofounder of Information Dynamix; (**IDX**) company, Egypt, for advanced Internet & Telephony applications, 2000.

- Cofounder of **Al-Rowad** Software and Training company, 1988.

MEMBERSHIPS

- **IEEE** member.

- Member of the International Speech Communications Association (**ISCA**); www.isca-speech.org.

- Member in the Egyptian Information, Telecommunications, Electronics, and Software Alliance (**EITESAL**); www.EITESAL.com on behalf of RDI.

- Member of the **Egyptian Syndicate for Engineers**.

- Board member (on behalf of the Egyptian Syndicate for Engineers) for Mohandis Information Systems company (**MIS** corporation) 1990-1995.

- RDI representative in the Egyptian Society of Language Engineering (ESoLE); www.ESoLE.org.

AWARDS

- First prize in the **2007 World Summit Award** contest <http://www.wsis-award.org> for best e-content (e-Learning track). This int'l prize has been awarded for RDI 's [Hafss](#)[©] technology for the interactive self-learning of spoken language applied on the Tajweed of the holy Qur'an.
- e-Content Award's first prize <http://www.econtentaward.org.eg/winners.html> in the track of e-Learning from the Egyptian IT Industry Development Agency ITIDA, for RDI 's new technology for the self learning of spoken language applied on Tajweed; [Hafss](#)[©]; 2006. (based on more than 10 MSc. and PhD theses)
- The first 2006 prize of Suzan Mubarak 's Children Arts contest www.SMubarakPrize.gov.eg/index.htm in the professional enterprises track of Programming & Internet for its Flash[®]-based software tutorial on Arabic Syntax.
- e-Content certificate of honors <http://www.econtentaward.org.eg/winners.html> in the track of e-Learning from the Egyptian IT Industry Development Agency ITIDA, for RDI 's educational [e-Learning library](#); 2006. (where 4 RDI technologies including Arabic Text-To-Speech have been deployed)
- e-Content Award's second prize <http://www.econtentaward.org.eg/winners.html> in the track of e-Science from the Egyptian IT Industry Development Agency, for RDI 's [Virtual Labs](#) application; Aug. 2005.
- Best-of-GITEX (Gulf IT EXhibition) 1996; for the (by then) novel technology of CELP-based Speech Compression.
- Certificate of honors for being the top of my class in B.Sc. graduation year; 1977.

MAIN R&D INTERESTS

- **Digital Speech processing:** Compression, Recognition, Speech Synthesis, and Computer Aided Pronunciation Learning (CAPL). (Currently supervising 2 PhD 's & 2 M.Sc. 's)
- **Natural Language Processing of Arabic:** Lexical/Syntax/Semantic analysis, automatic diacritization (vowelization), and Stochastic Language Modeling for speech and OCR applications. (Currently supervising 5 PhD's & 5 M.Sc.'s)
- **Image and Video Processing:** Arabic OCR, Compression, Pattern Recognition and Tracking. (Currently supervising 2 PhD's & 4 M.Sc.'s)
- **Smart Edutainment:** Building integrated & effective Education/Entertainment (Edutainment) applications deploying AI-based technologies.
- **Digital Signal Processing (DSP)** in general, and esp. h/w implementations of advanced DSP algorithms.

TECHNICAL INDUSTRIAL ACHIEVEMENTS

With a vision of linking the software industry to the academia in Egypt, I could successfully conduct many successful projects (mostly inside RDI) through both the engineering teams in RDI and my post graduate students. Those projects has resulted in sellable technologies and products, amongst whom I mention:

Computer Aided Pronunciation Learning. This technology has resulted in *Hafss*[©] which is a product for the self learning of Tajweed. It also opened the path to extending the technology to other language than Arabic.

For example; the joint project of "Audiovisual Detection of Errors in Pronunciation Training" with the Middle East and North Africa (MENA) - Swedish Research Links Program in cooperation with the "Royal Institute of Technology at Stockholm (KTH)".

Arabic NLP tools for Lexical Analysis, Automatic Diacritization (Vowelization), PoS Tagging, Semantic Analysis. These technologies have become core engines for companies like RDI-Egypt, Acapela_Group-EU (Belgium), Nattiq Technologies-UAE&USA ... etc.

Arabic Text-to-Speech (TTS): where our automatic diacritization (vowelization) along with our front end speech synthesizer are combined to produce our TTS *ArabTalk*® which is deployed as a distinguishing feature in our e-Learning & multimedia products.

Language Resources (LR's): where RDI has developed excellent experience in managing their production at a large scale. Building LR's includes processes of collection, annotation, analysis, and verification operated on raw written, spoken, and multimodal data streams. Not only RDI technologies have made benefit of these abilities but also large names like IBM-Egypt, BBN-USA, ELDA-EU, ..., have trusted RDI as a leading producer of Arabic LR's they need.

e-Learning solutions that are well equipped with scientific animations, interactive simulations, Arabic search and TTS features, self-evaluation exercises & exams, in addition to all aspects of electronic static material (text, images, ...).

RDI has realized many large-scale projects for educational stages from the primary to the secondary ones which made a rich customers list like Microsoft-KSA, Smart School-Kuwait, Bayan Schools-KSA, ...

Speech compression: using CELP *vocoding* algorithm which was novel at 1994. Deploying this compression in large-speech-content multimedia products was the key to position RDI in the 1990's as one of the leading multimedia vendors in Egypt and the Arab region.

Authoring system *ArabWare*® that serves like a container of all our tools and technologies, and also as a RAD tool for our multimedia and e-Learning products for the web and desk top.

R&D GRANTS

This bright history made RDI a favorite candidate for international and national R&D grants whether individually or through consortia exemplified as follows:

- The 30-month **MEDAR** (Mediterranean Arabic Language and Speech Technologies). This project runs under the EU 's FP7 R&D grants program. This project is shared by 15 partners from 11 ME and European countries. (Feb. 2008 to Aug. 2010)
- **NEMLAR** (Network for Euro-Mediterranean LAnguage Resource and human language technology development and support) www.NEMLAR.org, which is a 30 month EU (under the INCO-MED programme) project shared by 15 partners from 11 ME and European countries. (Feb. 2003 to Aug. 2005)
- A 1,000,000 EGP over 18-month grant from the Information Technology Academia Collaboration (ITAC) programme initiated by the Information Technology Industry Development Agency (ITIDA); www.ITIDA.gov.eg for RDI exclusively to produce its Virtual Tutor which is an advanced e-learning system supported with TTS, ASR, talking face, ..., and other highly interactive advanced HLT capabilities that boosts self learning. I am personally the Principal Investigator of this project. (Mar. 2008 to Sept. 2009)
- The **Data Mining and Computer Modeling Center of Excellence** (DMCM-CoE), which is initiated by the Egyptian MCIT and funded by the UNDP, is an example of the former consortia. (Sept. 2005 to date)
- Moreover, it made us eligible to receive investments from both business people in the Gulf and funding bodies like the Technologies Development Fund (TDF) powered by the Egyptian MCIT and managed by Hermes financial group.

PATENTS

- **Attia, M., Rashwan, M.,** *A New Compact Approach to Large-Scale Arabic Lexical Semantic Analysis*, Int'l. Patent Application number: PCT/EG2007/000022 under Patent Cooperation Treaty (PCT), Int'l. filing date; July 12th, 2007.
- **Rashwan, M., Attia, M.,** "Arabic OCR System"; *A Large-Scale Arabic Omni Font-Written OCR Based on an Analogy with HMM-Based ASR*, Int'l. Patent Application number: PCT/EG2007/000018 under Patent Cooperation Treaty (PCT), Int'l. filing date; May 15th, 2007.
- **Rashwan, M., et al.,** "Hafss"; *Novel Speech Technology for the Self-Learning of Spoken Language Applied on Tajweed*, Int'l. Patent Application number: PCT/EG2007/000013 under Patent Cooperation Treaty (PCT), Int'l. filing date; Apr. 26th, 2007.

PUBLICATIONS

A- Digital Speech Processing

- 1- Ragheb, A., Rashwan, M., Fayez, Y., *Qur'anic Speech Recognition System; Hafss© Evaluation Study*, The 7th Conference on Language Engineering, Dec. 5th-6th, 2007, Cairo, Egypt, Organized by The Egyptian Society of Language Engineering (ESLE); www.esole.org.
- 2- Samir, A., Abdou, S., M., Khalil, A., H., Rashwan, M., *Enhancing Usability of CAPL System for Qur'an Recitation Learning*, INTERSPEECH-2007, Antwerp-Belgium, Aug. 2007.
- 3- Abdou, S., M., Hamid, S., Rashwan, M., Samir, A., Abdel-Hamid, O., Shahin, M., Nazih, W., *Computer Aided Pronunciation Learning System Using Speech Recognition Techniques*, INTERSPEECH-2006, paper 1888.
- 4- Hamid, S., Abdel-Hamid, O., Rashwan, M., *Performance Tuning and System Evaluation for Computer Aided Pronunciation Learning*, Proceedings of the Arabic Language Technologies and Resources Int'l Conference; NEMLAR, Cairo-Egypt <http://www.elda.org/nemlar-conf>, Sept. 2004.
- 5- Hamid, S., Rashwan, M., *Automatic Generation of Hypotheses for Automatic Diagnosis of Pronunciation Errors*, Proceedings of the Arabic Language Technologies and Resources Int'l Conference; NEMLAR, Cairo-Egypt <http://www.elda.org/nemlar-conf>, Sept. 2004.
- 6- Rashwan, M., A., Omar, M., K., *Phonetic Speech Segmentation for Verification Using Hidden Markov Model*, International Conference on Signals Processing Application & Technology (ICSPAT2000), Oct. 2000, Dallas, TX., USA. www.dspworld.com/icspat/speech.htm
- 7- Omar, M., K., Rashwan, M., A., *Phonetic Arabic Speech Segmentation for Verification Using HMM*, 14th Annual International Symposium on High Performance Computing Systems and Applications, June 14-16, 2000, Victoria, Canada. www.ece.uvic.ca/~hpcs2000/sessions.htm1
- 8- Rashwan, M., A., Omar, M., K., *Phonetic Arabic Speech Segmentation for Verification Using HMM*, 1st IEEE Electro/Information Technology Conference (E/IT), June 8-11, 2000, Chicago, USA. www.ewh.ieee.org/reg/4/eit2000.htm
- 9- Mahmoud, A., M., Mashali, S., A., Rashwan, M., A., Nassar, A., M., *Flexible Design of a Digital Signal Processing System for Speech Applications*, ICECS 94; International Conference on Electronics, Circuits, and Systems, pp. 262 - 266, Cairo, Egypt, Dec. 19 - 22, 1994.

- 10- Afify, M., A., Rashwan, M., A., Fikri, A., M., *The Effect of Varying the Output Probability Distribution on Speaker Independent Hidden Markov Model Recognition of Isolated Arabic Digits*, Journal of the Egyptian Computer Society, 1993.
- 11- Afify, M., A., Rashwan, M., A., Fikri, A., M., *A Speaker Independent Speech Recognition System for Arabic Digits*, Journal of Engineering and Applied Science, Faculty of Engineering, Cairo University, vol.40, No.3, pp 605-618, June 1993.
- 12- Rashwan, M., A., Fahmy, M., M., *New Technique for Speaker Independent Isolated Word Recognition*, IEEE, ICASSP 1988, pp 1395 – 1398.
- 13- Rashwan, M., A., Fahmy, M., M., *New Technique for Speaker Independent Isolated Word Recognition*, IEE proceedings, vol. 135, pt. f. No. 3, June 1988.

B- Speech Synthesis & Text-To-Speech

- 14- Abdel-Hamid, O., Abdou, S., Rashwan, M., *Improving Arabic HMM-Based Speech Synthesis Quality*, INTERSPEECH-2006, paper 1693, 2006.
- 15- Hifny, Y., Qurany, S., Hamid, S., Rashwan, M., Attia, M., Ragheb, A., Khallaaf, G., *ArabTalk[®]; An Implementation for Arabic Text To Speech System*, News Letter of Evaluation of Language Resources and Distribution Agency (ELDA) www.ELDA.org, France, May 2004 issue.
- 16- Hifny, Y., Rashwan, M., *Duration Modeling for Arabic Text to Speech Synthesis*, Proceedings of ICSLP2002, Denver, Colorado, USA, pp. 1773-1776, Sept. 2002.
- 17- Hamza, W., Rashwan, M., Afify, M., *Joint Prosody Prediction and Unit Selection for Concatenative Speech Synthesis Using Large Database*, ICASSP, Acoustics, Speech, and Signal Processing, 2001 Vol. 2.
- 18- Hamza, W., M., Rashwan, M., A., Afifi, M., *A Quantitative Method for Modeling Context in Concatenative Synthesis Using Large Speech Database*, IEEE Signal Processing Society, International Conference on Acoustics, Speech and Signal Processing 2001, May 7-11, 2001, Salt Lake City, Utah, USA. www.ICASSP2001.org/authorinfo/volume2.htm
- 19- Hamza, W., M., Rashwan, M., A., *Concatenative Arabic Speech Synthesis Using Large Speech Database*, Scientific Journal, Ain Shams University, Faculty of Engineering, Vol. 35, No. 1, Mar. 31st, 2001.
- 20- Hamza, W., M., Rashwan, M., A., Afifi, M., *A Quantitative Method for Modeling Context in Concatenative Synthesis Using Large Speech Database*, 6th International Conference on Spoken Language Processing, ICSLP 2000, Oct. 16-20, 2000, Beijing, China.
- 21- Hefnawy, A., Mashali, S., A., Rashwan, M., A., Fikri, A., M., *Improving Compression Ratio of Formant Speech Synthesizer*, Journal Of Engineering and Applied Science, Faculty of Engineering, Cairo University, Vol. 43, Feb. 1996.

C- IMAGE/VIDEO, and PATTERN RECOGNITION/TRACKING

- 22- Farouk, H., Mashali, S., A., Rashwan, M., A., Nassar, A., M., *Video Compression Improvement Based on Camera Motion*, The 1st International Symposium on Signal Processing & Information Technology, IEEE, ISSPIT Dec. 28th-30th, 2001, Cairo, Egypt.
- 23- El Nemr, H., A., Rashwan, M., A., Hussein, A., El Sherif, M., S., *Automatic Classification of Bank Checks*, The 1st International Symposium on Signal Processing & Information Technology, IEEE, ISSPIT Dec. 28th-30th, 2001, Cairo, Egypt.
- 24- Hassan, H., S., Abdel Azeem, S., Auda, G., Rashwan, M., A., *Detection of Diabetic Retinopathy Using Modular Neural Network Through Data Reduction*, International Conference on Industrial Electronics, Technology & Automation (IETA2001), Dec. 19th-21st, 2001, Cairo, Egypt.

- 25- Hefnawy, A., Mashali, S., A., Rashwan, M., A., Fikri, A., M., *Joint Time-Frequency Analysis for Automatic Recognition of Dynamic Targets*, International Conference on Industrial Electronics, Technology & Automation IETA2001, Dec. 19th-21st 2001, Cairo, Egypt.
- 26- Hefnawy, A., Mashali, S., A., Rashwan, M., A., Fikri, A., M., *An Integrated Automatic Recognition System for Different Target Motion Analysis*, The International Conference on Imaging Science, Systems, and Technology, CISST, June 25th-28th, 2001, Las Vegas, Nevada, USA.
- 27- El-Saban, M., Abdel Azeem, S., Rashwan, M., A., *A New Video Coding Scheme Based on the H.263 Standard and Entropy Constrained Vector Quantization*, The 10th International Conference on Computing and Information, ICCI '2000, Kuwait, Nov. 18th-21st, 2000.
- 28- El-Sherif, M., S., Rashwan, M., A., El Sayad, A., *Matching Criteria in Fractal Image Compression*, Midwest Symposium on Circuits and Systems, 2000, Proceedings of the 43rd IEEE, East Lansing, Michigan, USA, Aug. 8th-11th, 2000.
- 29- El-Saban, M., Abdel Azeem, S., Rashwan, M., A., *A New Video Coding Scheme Based on the H.263 Standard and Entropy Constrained Vector Quantization*, Journal of Engineering and Applied Science, Faculty of Eng., Cairo University, Vol. 47, No. 4, Aug. 2000, pp. 709-724.
- 30- Ali, H., F., Mashali, S., A., Rashwan, M., A., Nassar, A., M., *New Fast Adaptive Matching Criterion for Block-Based Motion Compensation*, International Symposium on Optical Science and Technology, San Diego, California, USA, 30th of July, to the 4th of Aug. 2000.
- 31- Hefnawy, A., Mashali, S., A., Rashwan, M., A., Fikri, A., M., *Joint Time-Frequency Analysis for Automatic Recognition of Dynamic Targets*, The 2000 International Conference on Imaging Science, Systems, and Technology (CISST'2000), June 26-29, 2000, Monte Carlo Resort, Las Vegas, Nevada, USA.
- 32- Farouk, H., Mashali, S., Rashwan, M., Nassar, A., *New fast adaptive matching criterion for block-based motion compensation*, Proc. SPIE 2000, Vol. 4115, p. 719-726, Applications of Digital Image Processing XXIII.
- 33- Hefnawy, A., Mashali, S., A., Rashwan, M., A., Fikri, A., M., *Fast and Efficient Indexing Approach for Object Recognition*, Proceedings of SPIE, Vol. 3837, Sept. 20-21, 1999.
- 34- Farouk, H., Rashwan, M., A., Mashali, S., A., Nassar, A., M., *A New Adaptive Technique for Color Image Compression*, International Symposium on Optical Science, Engineering, and Instrumentation, Denver, Colorado, USA, pp. 645 - 652, Aug. 4th-9th, 1996.
- 35- Farouk, H., Rashwan, M., Mashali, S., A., Nassar, A., *New Adaptive Technique for Color Image Compression*, Proceedings of SPIE, 1996 - www.spie.org
- 36- Rashwan, M., A., *Comparative Study of Pyramid Data Structure for Progressive Image Transmission*, International AMSE Conference on Systems Analysis, Control and Design, Sys.93, London (U.K), Sept. 1st-3rd, AMSE proceedings, vol.1, pp. 85-96.
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- 38- Rashwan, M., A., "Modified Difference Pyramid Structure for Progressive Image Transmission", Proceedings of the 32nd SICE Annual Conference International Session, Japan, Aug. 4-6, 1993.
- 39- Rashwan, M., A., et al., *Reduced-Difference Pyramid Structure for Progressive Image Transmission*, The Egyptian Computer Journal ISSR, Cairo University, vol. 20, No. 1, June 1992.

D- OCR

- 40- Attia, M., Rashwan, M., El-Mahallawy, M., *Autonomously Normalized Horizontal Differentials as Features for HMM-Based Omni Font-Written OCR Systems for Cursively Scripted Languages*, The 13th International Conference on Computer Analysis of Images and Patterns (CAIP 2009), hosted by the Münster University; <http://cvpr.uni-muenster.de/CAIP2009/index.html>, Münster-Germany, Sept. 2009.
- 41- Rashwan, M., Fakhr, M., Attia, M., El-Mahallawy, M., *Arabic OCR System Analogous to HMM-Based ASR Systems; Implementation and Evaluation*, Journal of Engineering and Applied Science, Cairo University, www.Journal.eng.CU.edu.eg, Dec. 2007.
- 42- El Anwar, R., I., M., Rashwan, M., A., A., Mashali, S., *A Multiple Classifiers System for Solving the Character Recognition Problem in Arabic Alphabet*, The 6th Conference on Language Engineering, Dec. 6th-7th, 2006, Cairo, Egypt, Organized by The Egyptian Society of Language Engineering (ESLE); www.esole.org.
- 43- Abass, Y., M., Fakhre, M., W., Rashwan, M., *Arabic/English Identification in Document Images.*, The 6th Conference on Language Engineering, December 6-7, 2006, Cairo, Egypt, Organized by The Egyptian Society of Language Engineering (ESLE).
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- 45- Gouda, A., M., Rashwan, M., A., *Segmentation of connected Arabic Characters Using Hidden Markov Models*, IEEE International Conference on Computational Intelligence for Measurement Systems and Applications, CIMS2004, 14-16 July 2004, MD, USA, pp. 115-119.
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- 49- Raafat, H., Rashwan, M., *A Tree Structured Neural Network for Document Analysis and Recognition*, Proceedings of the 2nd International Conference on Document Analysis and Recognition, Oct. 20th- 22nd, 1993, pp 939-941, Tsukuba Science City, Japan.
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E- Natural Language Processing

- 51- Attia, M., Rashwan, M., Al-Badrashiny, M., *Fassieh; a Semi-Automatic Visual Interactive Tool for the Morphological, PoS-Tags, Phonetic, and Semantic Annotation of the Arabic Text*, IEEE Transactions on Audio, Speech, and Language Processing (TASLP): Special Issue on Processing Morphologically Rich Languages <http://www.SignalProcessingSociety.org/Periodicals/Journals>, Mar. 2009.
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