Hossein Ravanbod

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Electronics Research Center
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Skills

- Design, implementation and commissioning of multidisciplinary instrumentation systems (Electrical, Mechanics, Physics, Material Science)
- Signal and image acquisition; preprocessing and processing with application in nondestructive testing

Education

1988 PhD in Electronics - Fundamental Electronics Institute - Paris 11 University - Orsay – France
Thesis: "Image Digitizing and Preprocessing"

1983 MSc in Electronics – Fundamental Electronics Institute - Paris 11 University - Orsay - France

1982 BSc in Electrical Engineering
Fundamental Electronics Institute - Paris 11 University - Orsay - France

Professional experiences

- Associate Professor
- Scientific member in the Electronics research Center of Sharif University of Technology
- Research deputy director of the Electronics Research Center of Sharif University of Technology

Since 1992 to present

Research Activities

- Design, implementation and commissioning of multidisciplinary instrumentation system (Electrical, Mechanics, Physics, Material Science)
- Signal and image acquisition, preprocessing and processing with application in nondestructive testing
- Signal and image acquisition, preprocessing and processing
- Participated in the definition, implementation, and management of "Feasibility study of an intelligent flaw detector for non-destructive testing of oil pipelines" project (National Iranian Petroleum Society) . The goal of this project was studying the feasibility of producing such system in Iran. More than 18 faculty members from various departments: physics, material sciences, mechanical engineering and electrical engineering from Sharif University and Amir-kabir University, and 30 researchers had cooperation with

this project. The scientific and technical results of this project are published in 13 reports in over 1450 paged document.

- Designed and implemented a three dimensional scanning table with integrated environment for signal acquisition, preprocessing, processing and monitoring
- Designed and implemented fabrication of laboratory prototype of "Ultrasonic wall thickness meter
- Designed and implemented a laboratory prototype of "Eddy current flaw detector of metallic surfaces
- Designed and implemented a prototype of "Magnetic flux leakage wall thickness meter"
- Defined the project for fabrication of an industrial prototype of the "intelligent flaw detector using magnetic flux leakage technique" National Iranian Gas Society - National Iranian Petroleum Society
- Founded a laboratory under the name of "Application of signal processing in non-destructive testing" in the ERC in 2006.
- Founded a lab under the name of "Advanced instrumentation" in the ERC in 2002.
- Managed the project: "issuing the legislations of transferring the electronic technologies" in the national electronic council, 1999-2001.
- Advised the national electronic council of the country in 1998-2001.
- Scientific consultant of the managing director of the underground rail-roads of Tehran (Metro) in affairs such as control, signaling, communication, from June 1994 to February 1994.

Courses Taught

Sharif University of Technology – Electrical Engineering Department (Since 1997)

Courses	**Level**
Electrical Measurement	Electrical engineering BSc
Instrumentation	Electrical Engineering BSc
Advanced Instrumentation	Electrical engineering MSc and PhD

1989-1993

FENZY factory (A member of COMASEC multi-national group Paris suburb - France)
Fenzy's activities: Design, fabrication and production of breathing protection equipment

Position: Deputy of Research and Development
Activities in industrial research and development of electronic section:

- Founded the electronic lab (including analog section, microprocessor development systems, microcontrollers, instrumentation devices)
- Proposed some new measurement methods, signal processing algorithms, and designing control systems for quality testing of breathing equipments produced by the industrial group COMASEC)
- Designed a portable data acquisition systems and their transmission through radio channels in order to monitoring of rescue teams working in harsh environments.

1984-1987

French Electrical Research and Studies Direction (Chatou Center - Paris Suburb - France)
Position: Expert in digitization and preprocessing of the images.
Activities: Director, and practitioner of two centers for processing of radiography images for nondestructive testing.

Fields of interest (Skills)

- Design, implementation and commissioning of multidisciplinary instrumentation system (Electrical, Mechanics, Physics, Chemistry, Material Science)
- Signal and image acquisition, preprocessing and processing with application in nondestructive testing
- Image signal and acquisition, preprocessing and processing
- Signal processing with combinations of spectral analysis, data driven method and mathematical morphology,
- Designing calibration methods for systems comprised of more than one technology
- Design, implementation and commissioning of portable data and image acquisition systems hush environments,
- Design and production of non-destructive testing systems (Ultrasonic, Eddy current, and Magnetic Flux Leakage),
- Design and implementation of multi-processors signal processing systems

Publications (Since 2005)

Journals

1. H. Ravanbod, "Application of neuro-fuzzy techniques in oil pipeline", *NDT & E International* (Elsevier - Science Direct), 2005, Vol. 38, No. 6, pp 643-653.
2. H. Ravanbod, F. Behnia, A. Jalali, "Determining the required information in scanning of the oil pipeline corrosions", *Sharif* , Journal of Science & Technology, 2007, No. 38, pp 69-76.
3. H. Ravanbod, A. Jalali, "Configurable ultrasonic flaw classification of oil pipelines, Part I: image acquisition, preprocessing and flaw area and volume estimation", *Nondestructive Testing and Evaluation* (Francis & Taylor), 2008, Vol. 23, No. 1, pp 43-55.
4. H. Ravanbod, A. Jalali, "Configurable ultrasonic flaw classification of oil pipelines, Part II: Feature extraction, Classification and Error verification", *Nondestructive Testing and Evaluation* (Francis & Taylor), 2008, Vol. 23, No. 2, pp 77-88.
5. E. Norouzi and H. Ravanbod, "Optimization of the flux distribution in magnetic flux leakage testing, *Insight,* 2009, Vol. 51, No 10, pp563-567.
6. E. Norouzi and H. Ravanbod, "Optimization of the flux distribution in magnetic flux leakage testing", *Materials Evaluation* (with permission to republish of INSIGHT), 2010, Vol.. 68, No. 3, pp 360-364.
7. H. Ravanbod, E. Norouzi, "A novel method for modeling the magnetizing yoke". *Electromagnetics* (Francis & Taylor), 2010, Vol. 30, Issue 3, 297-308.

Conferences

1. H. Ravanbod, E. Norouzi, , "Developing a neural network model for magnetic yoke structure", CIMSA 2008 - IEEE International Conference on Computational Intelligence for Measurement Systems and Applications, Istanbul - Turkey, 14-16 July 2008, pp. 75-78
2. H. Ravanbod, M. Hajihasani, Y. Farjami, E Norouzi, "Developing an adaptive fractional model of a magnetic structure using evolutionary algorithm", IEEE 6th International Conference on Computational Cybernetics, Slovakia, 27-29 November 2008, pp 168-172.

Applied Research

Industrial feasibility study of the intelligent flaw-detector system" for pipeline nondestructive testing

SHARIF UNIVERSITY OF TECHNOLOGY - NATIONAL IRANIAN PETROLEUM SOCIETY

Regular nondestructive testing of gas and petroleum pipelines guaranties their operationality. The research plan under the title of 'Feasibility study of flaw detector of the petroleum pipelines' was performed by the Electronics Research Center (ERC) on behalf of National Iranian Petroleum Society.
The imaging and flaw detection system using ultrasonic signals comprised of several technologies. The intelligent flaw detector system is cylindrical. This system is inserted in a branch of the pipeline and it is propelled by fluid. The mounted sensors all over the body of the system gather the data about the flaws on the pipe-wall together with its geographical coordination. After sampling and compression, these data are saved. After passing the path, the system is taken out from the other end of the pipeline. The gathered data are extracted from the system memory and undergoing a chain of processing the flaws are detected, characterized and systematically documented.

A brief description of this multi-disciplinary project is as follows:

- Determination of the required data that should be acquired,
- Determination of the best sensors for an optimal data acquisition for imaging of pipeline,
- Study, selection and designing of navigation system and odometer for the purpose of determining the location of the flaws are done,
- Study and basic design of acquisition and preprocessing of required information,
- Compression and documentation of the gathered data,
- Study, and basic design of power supplies for the imaging module,
- Study, and basic design of the mechanical body of the intelligent flaw-detector system,
- Retrieval of the gathered information outside the pipeline.
- Developing the signal processing algorithms and extraction of the flaws characterizations,

In order to verify the reliability of the intelligent flaw-detector system, reliable alternatives are introduced for the vital parts.

The results of this research plan were published in 10 volumes and 3 appendices. In addition to the faculty members of the Electronics Research Center of Sharif University of Technology, the faculty members of the departments of electrical engineering, computer engineering, mechanics, and physics of Sharif University of Technology and also some faculty members of Amir Kabir university of technology, and some private corporations had cooperation in the implementation phase of this project. After successful finishing of this plan, the research activities continued in some directions:

- Preparing the proposal of a plan for production of an industrial prototype of oil and gas pipelines flaw detection system (National Iranian Petroleum Society and National Iranian Gas Society)
- Preparation of a plan for production of an industrial prototype of oil and gas pipelines geometrical anomaly detection (National Iranian Petroleum Society and National Iranian Gas Society)
- Following the basic and applied research in the field of imaging, preprocessing and image processing to extract the defect in the material and publication of articles in prestigious journals and international conferences

Principal scientific members of the project

• Project design and management

Designer	Ravanbod H.
Managing directory of the project	Tebiani M., Ravanbod H., Behnia F.
Project Consultant	Sheibani Sh.

• Sharif University of Technology

Electrical Engineering Department	Barkeshli K, Behnia F., Masoumnia M.A, Nayebi K., Sheybani Sh., Tebiani M.
Mechanical Engineering Department	Dorali M.
Material Science and Engineering Department	Ghorbani M.
Physics Department	Amjadi A.
Electronics Research Center	Ghampour I., Movahedi M. R., Pezeshk AM Pireyar M., Ravanbod H.

• Amir Kabir University of Technology

Mechanical Engineering Department	Rahimzadeh H
Electrical Engineering Department	Amindavar H. R.

• Ecole Polytechnique Fédérale de Lausanne (Switzer land)

Laboratory of Movement Analysis and Measurement	Aminian K.

Languages

French: Fluent
English : Proficient

References

Available upon request.