



Newsletter

Swine Influenza Models Based Optimization (SIMBO) A Step Forward in Evolutionary Optimization Techniques

(Prof.(Dr.) S.S.Pattnaik, Professor and Head, ETV Centre)

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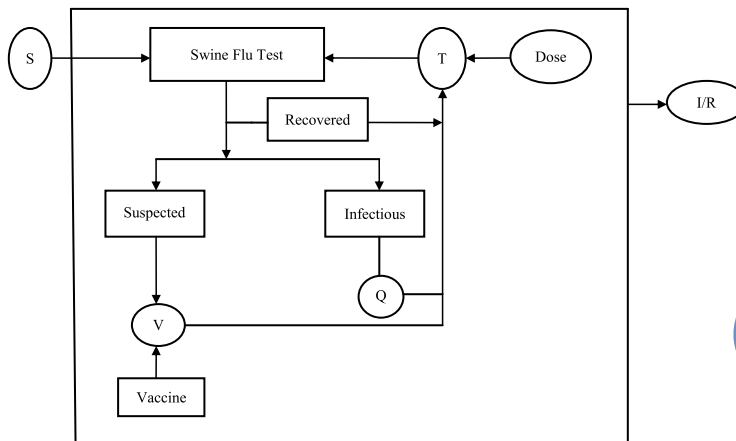
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The development of optimization techniques began during World War-II to optimize the trajectory of missiles. But those initial optimization techniques were rule based and operated with constraints. In the year 1959 with the development of Genetic Algorithm (GA), the research in the optimization world got oriented to a new direction. The optimization world shifted from mathematical constraint based optimization to nature based algorithms. In 1995, Eberhart et al developed particle swarm optimization (PSO) which is inspired by social behavior of bird flocking or fish schooling. Bacterial foraging optimization Algorithm developed by Passino in the year 2002 is a population based optimization algorithm developed from the food searching cycle of E. Coli bacteria. In the year 2008, Simon gave an optimization algorithm named as BBO (Bio-geography based optimization) derived from the mathematical model of species immigration, migration and suitability index. Today there exists many such nature inspired evolutionary optimization techniques. SITO, AAO are some of such widely used optimization algorithm.

The recently developed swine Influenza model based optimization (SIMBO) which has been published in the Applied Soft Computing Journal of Elsevier is mimicked from Susceptible-Infectious-Recovered (SIR) models of swine flu. This is an original evolutionary optimization algorithm developed by Prof. S.S.Pattnaik and his group and is capable of dynamically combine the exploration and exploitation behaviors in the optimization process.

Swine influenza was first proposed to be a disease related to human influenza during the year 1918. Unlike regular seasonal flu, Swine flu spreads from person to person through close contact and touch, or respiratory droplets from person to environmental surfaces through coughs and sneezes. Various mathematical models have been proposed in literatures to limit the spreading of swine flu. The first mathematical model developed by Karnack and MC Kendrick early in the 20th century is called Susceptible-Infectious-Recovered (SIR) model. Later on the researchers modified the basic SIR model by incorporating season ability, vaccination, treatment, quarantine and isolation etc. The development of SIMBO followed treatment, vaccination and quarantine based on probability. In the developed algorithm, Swine flu test based on the dynamic threshold identifies a confirmed case of swine flu. After a confirmed case of swine flu in the population, the susceptible are advised to go for the swine flu vaccination to acquire immunity. The confirmed case of swine flu is quarantined from the population. The suspected cases are treated with antiviral. The amount of drugs to be given is dependent on patients with or without complications as well as current health of individuals. The development of SIMBO is conceived by developing three step models SIMBO-T(treatment) SIMBO-V(vaccination) and SIMBO-Q(Quarantine). The SIMBO model is depicted below.



S-State, T-Treatment, V-Vaccination, Q-Quarantine



S-state, T-Treatment V-Vaccination Q-Quarantine.

The SIMBO was tested with benchmark functions with uni-modal, multimodal, low dimension, high dimension and multivariable characteristics. The performance was evaluated in terms of quality of optima, number times heating stopping criteria, convergence, fitness evaluation, t-test statistical parameters (mean, max, min, median and standard deviation) and Anovatest. The algorithm was compared with SSM-PSO, LDW-PSO, GPSO, PSO, HPSO-TVAC, AS, DE, PSO, TVIW, BSO, BFO, GA, BPSO, SITO, PSO-RANDIW, MPSO-FAC, EPSO, CPSO and many more recently developed evolutionary/heuristic algorithms published by researchers. To evaluate the application potential of the SIMBO, the algorithm was applied to a very complex sensitive and computational resource hungry problem named as motion estimation in video. Video compression is an ongoing emerging area of research in which motion estimation is a computationally expensive and resource hungry operation that consumes a large amount of computational time. The SIMBO proved its efficiency by reducing drastically the computational time while achieving a substantially large peak signal to noise ratio (PSNR).

The evolutionary meta heuristic optimization algorithm named as SIMBO developed by Prof. S.S.Pattnaik and his team at NITTTR, Chandigarh is a leap in the area of optimization research as the algorithm has better accuracy and can solve multidimensional and multivariable complex optimization problem in reduced computational time. The SIMBO algorithms on parallel computers can pave a new dimension for the solution space for meeting the upcoming challenges of non-linearity, dimensionality, randomness and the demands for better efficiency with reduced computational time and resources.

(For detail of the SIMBO please refer to S.S.Pattnaik et.al Elsevier Applied Soft Computing 13(2013), 628-653).

MAJOR ACHIEVEMENTS (Oct-Dec, 2012)

INDUCTION TRAINING PROGRAMMES THROUGH ICT

During the last three months, thirty centres have been covered in northern region to train technical teachers through Induction Training Programme through ICT. About 1775 technical teachers have participated in various programmes till date. Eminent persons from industry and educational institutions interacted with the participants of the various programmes. Some of the eminent personalities who interacted with the participants of the programme included: Dr. IK Bhat, Director, MNIT, Jaipur; Dr. DS Khatri, Managing Director, JK Auto Private Ltd.; Dr. Pramod K. Misra, Chief Manager, HRD, Simplex Infrastructure Pvt. Ltd.; Dr. Raghuvveer Singh, Director, JK Business School; Dr. MM Malhotra, Former Principal, TTTI; Dr. RK Sharma, Registrar IIT, Delhi; Mr. Arvind Chouhan, Planning Head, Bharti Air tel, Chandigarh; Mr. Arvind Dixit, CEO, Advance Technology Centre, Chandigarh; Dr. SK Bhattacharya, Former Prof., NITTTR; Dr. RR Gaur, Former Prof. IIT Delhi; Dr. AB Gupta, Prof. MNIT, Jaipur; Mr. Deepak Bubber, Bubber Industries, Panchkula; Mr. Pradeep Agnihotri, Punjab Tool Room, Mohali; Er. GS Roshia, Former Chief Engineer, CHD, Chandigarh; Dr.(Mrs.) Vidhu Mohan, Former Prof. Panjab University; Dr. LN Sharma, AP, PEC University of Technology; Dr. Parikshit Bansal, AP, NIPER; Prof. GD Agarwal, MNIT, Jaipur; Prof. A Bhadrwaj, MNIT, Jaipur and Dr. LN Mittal, Former Prof. NITTTR. The programme is receiving over whelming response from the technical institutes and it provides an opportunity to the faculty of technical institutions to attend the programme in their respective colleges or in the state and also enables the institute to cater to the training needs of large number of teachers.



Participants of Induction Training Programme



Dr MP Poonia, Dr BK Behra, Dr AK Nasa, Dy. Educational Adviser, MHRD, Govt. of India; Dr SK Singh



Session in Progress: Dr DS Khatri, Managing Director, JK Auto Ltd.



Dr MP Poonia, Director addressing the participants



Dr SK Jena Regional Officer, North Western Regional Office, AICTE and Dr MP Poonia, Director



Dr AK Nasa delivering Inaugural Address in Induction Training Programme through ICT



NATIONAL CONFERENCE ON "LATEST DEVELOPMENT IN POLLUTION CONTROL AND PREVENTION TECHNIQUES" 21-22 NOV, 2012

A National Conference on "Latest Development in Pollution Control and Prevention Techniques" was organized on November 21-22, 2012 by Civil Engineering Department of this institute. The major objectives of the Conference was to provide a forum to exchange knowledge and experiences to various agencies and professionals concerned with environmental protection and also to give an understanding of need and implementation of clean production, Government role in clean production and its link with sustainable development of environment.



Training programmes conducted during Oct-Dec, 2012

papers has been printed and 22 papers were presented under different themes.

Cleaner Production Mechanism which was already popular in the western countries in late nineties is slowly gaining momentum in India and the conference has thrown light on the various innovative technologies and procedures to be adopted to prevent the occurrence of pollution at the source itself, rather than treating the pollutants after their occurrence.

Training programmes conducted during Oct-Dec, 2012

Particulars	Number of Programmes	Number of Participants
Polytechnics	58	1494
Engineering	14	691

FORTHCOMING EVENTS (Jan-Mar, 2013)

POLYTECHNICS

- Achieving Managerial Excellence, 14-18 Jan
- Modeling and Simulation Using MATLAB, 14-18 Jan
- Effective Teaching and Classroom Communication, 14-25 Jan
- Nuclear Energy and Power Options, 21-25 Jan
- Structural Design Using ETABS, 21-25 Jan
- Laboratory Application in Quality Control of Concrete, 21-25 Jan
- Network Administration, 21-25 Jan, UP
- Independent Study Techniques, 21-25 Jan
- Microcontroller Applications, 28 Jan - 01 Feb
- GIS Applications in Engineering and Sciences, 04-08 Feb
- Computer Networking with CISCO Technology, 04-08 Feb
- Norms, Standards and Accreditation of Technical Institutions, 05-08 Feb, GP Bikaner
- Laser Science and Technology, 11-15 Feb
- Soil Investigation Techniques, 11-15 Feb
- Student Evaluation and Setting Question Papers, 11-15 Feb, TTC, Jodhpur
- Faculty Development: Planning and Management, 11-15 Feb
- Auto CAD 3D, 11-15 Feb
- Grid Computing, 18-22 Feb, UP
- Entrepreneurship Using Blue Ocean Strategies and Starting a Technology Business Incubator, 18-22 Feb
- Laboratory Experiments on Microwave and Antenna, 18-22 Feb
- CAD Using CATIA, 18-22 Feb
- Orientation Programme on PWD Act, 2011, Feb
- Skill Development and Employment Enhancement in Rural India Feb, NITTTR CHD/ Outstation

- Optical Fibers and Their Applications, 04-08 Mar
- Entrepreneurship, Management and Employability-oriented Skill Development Programmes, 04-08 Mar
- Personality Development for Staff, 04-08 Mar
- Mechatronics, 04-08 Mar
- Introduction to Wireless Sensor Network, 11-15 Mar
- Script Writing and Video Lecturers, 11-15 Mar
- Recent Developments in Refrigeration and Air Conditioning, 11-15 Mar
- Digital Library Management, 18-20 Mar
- Nuclear Techniques and Instrumentation, 18-22 Mar
- Embedded System Applications, 18-22 Mar
- Building Positive Attitudes, 18-22 Mar, IRDT Kanpur
- Small Hydro Power Plants, Subject to permission obtained from SHPP Chamba, SHPP Chamba

ENGINEERING COLLEGES

- Open Source and Multimedia, 14-18 Jan, NITTTR CHD/ Outstation
- PCB Layout, Fabrication and Testing, 14-18 Jan
- Achieving Managerial Excellence, 14-18 Jan
- Modeling and Simulation Using MATLAB, 14-18 Jan
- Effective Teaching and Classroom Communication, 14-25 Jan
- Nuclear Energy and Power Options, 21-25 Jan
- Structural Design Using ETABS, 21-25 Jan
- Laboratory Application in Quality Control of Concrete, 21-25 Jan
- Computer Aided Circuit Simulation, 21-25 Jan

10. Independent Study Techniques, 21-25 Jan
11. Microcontroller Applications, 28 Jan - 01 Feb
12. GIS Applications in Engineering and Sciences, 04-08 Feb
13. Computer Networking with CISCO Technology, 04-08 Feb
14. Wireless Communication and Mobile Computing, 04-08 Feb
15. 4G Technology, 04-08 Feb
16. Laser Science and Technology, 11-15 Feb
17. Soil Investigation Techniques, 11-15 Feb
18. Faculty Development: Planning and Management, 11-15 Feb
19. Auto CAD 3D, 11-15 Feb
20. Power Supply Design Fabrication and Testing, 11-22 Feb
21. Open Source Technology, 18-22 Feb
22. Entrepreneurship Using Blue Ocean Strategies and Starting a Technology Business Incubator, 18-22 Feb

23. ANN and FL using MATLAB, 18-22 Feb
24. Preparing Students for Job Interviews/Development of Generic Skills/Soft Skills, 18-22 Feb, GEC Sundernagar
25. CAD Using CATIA, 18-22 Feb
26. VLSI System Design Engineering, 04-08 Mar
27. Mechatronics, 04-08 Mar
28. Digital Signal and Image Processing, 11-15 Mar
29. Recent Developments in Refrigeration and Air Conditioning, 11-15 Mar
30. Digital Library Management, 18-20 Mar
31. Faculty Development Programme (FDP) on Entrepreneurship Development (DST sponsored), 18-29 Mar
32. FACTS Technology, Subject to permission obtained from GND Delhi GND Delhi

NATIONAL SEMINARS/CONFERENCES

National Seminar on
Sustainable Development of Rural India by 2022 (7-8 March, 2013)

National Conference on
Advances in Manufacturing Technology (14-15 March, 2013)

Note : The above programmes will be conducted at NITTTR, Chandigarh unless otherwise stated.
For details please visit our institute **website : www.nitttrchd.ac.in**

9th Inter NITTTR Sports Meet

19-22 Feb. 2013

The Institute Wishes The Readers

*Happy
New Year*



Centre for Development of Technical Competencies (CDTC) has been set up at the institute for students of engineering colleges, polytechnics and professionals from industry and academia for the following activities.

Student Training for Engineering Students | Laboratory Practices for Engineering Students | Customized courses for Field Professionals | Fabrication of Models for Outside Agencies

All these activities are accomplished by faculty and staff of various departments of the institute apart from collaborative efforts with outside agencies.

Contact : Er. Vinod Kumar Sonthwal,
Phone : 0172 2759646/2759677, **Mobile :** 09872024966

Farewell

Shri Partap Chand
(Senior Technical Assistant)
Superannuated on 30.11.2012

We invite articles and news items regarding innovative projects on technical education from teachers, administrators and others concerned with technical education in the states and centre.