15 Integrated Research and IRADe Action for Development

KP @85 Festschrift Conference - Session 9

Date: 20th February 2021 (Saturday)
Time: 18:00 - 20:20 (IST)

Dr. Kirit Parikh

Chairman, Integrated Research and Action for Development (IRADe)

Mr. Rajbans Talwar

Optimisation Consultant, STEAG, New Delhi

Dr. Jyoti K Parikh

Executive Director, Integrated Research and Action for Development (IRADe)

Dr. Lakshmi K. Raut

Visiting Fellow, Center for the Economics of Human Development, University of Chicago

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18:00 - 18:40 PM	**Presentation on** " Determinants and Predictions of Risks of Diseases in Middle Ages–Statistical Models versus Neural Network Machine Learning Models"	• ***Dr. Lakshmi K. Raut,*** *Center for the Economics of Human Development, Visiting Fellow, University of Chicago*
19:20 - 20:00 PM	**Presentation on** "Flexibilization and Scheduling in a Power Station"	• ***Mr. Rajbans Talwar,*** *Optimisation Consultant STEAG, New Delhi*
20:00 - 20:15 PM	**Q& A Session**	**Discussants-** • ***Dr. Suresh Velangapudi,*** *Independent Expert* • ***Dr. Kirit Parikh****, Chairman, Integrated Research and Action for Development (IRADe)* • ***Dr. Jyoti K Parikh****, Executive Director, Integrated Research and Action for Development (IRADe)*
20:15 – 20:20 PM	**Closing Address** *&* ***Vote of Thanks***	***Dr. Jyoti K Parikh****,* *Executive Director, Integrated Research and Action for Development (IRADe)*

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Abstracts

Presentation 1 - " Determinants and Predictions of Risks of Diseases in Middle Ages–Statistical Models versus Neural Network Machine Learning Models "

Presenter – Dr. Lakshmi K. Raut, Center for the Economics of Human Development, Visiting Fellow, University of Chicago

Draft prepared for presentation at the 85th birthday celebration of Professor Kirit Parikh. Professor Parikh and I crossed roads on many occasions. He has worked on so many fields focusing mainly on public policies for India. I have not directly worked with him, but I have known Professor Parikh's work through his collaboration with my Professor and Mentor, late T.N. Srinivasan and his mentoring my classmates and contemporaries at the Indian Statistical Institute, New Delhi. I have felt his academic contribution–even contribution in the architecture designs–at the Indian Statistical Institute, New Delhi and Indira Gandhi Institute of Development Research, Mumbai where I have spent time.

This paper is dedicated in loving memory of my younger brother and my mother both of whom passed away at premature ages – brother from lung cancer in Delhi and mother from heart attack in my village, and my father who lived to be 85 in my village and never been to a doctor. They never smoked, never drank, and had normal BMI, not sure about CES-D and other standard biomarkers. Why are there incidence of diseases and death at premature ages? This paper is an inquiry in this vein.

Identification of factors and prediction of the risks of diseases are important for public policies and disease diagnosis in healthcare. The biomedical literature suggest that much of an individual's later life health outcomes is programmed at early stages of life. The programming is strongly modulated by the epigenetic inputs created by the environment in mother's womb at prenatal stage and by the environment at early postnatal ages. The most important epigenetic factor is stress of any kind – psychological, financial, social, and chemical. Other significant factors are diet, smoking, substance use, and exercising. These modulating factors are important throughout life, with stronger effects imparted in early stages of life. I use the most popular statistical model – multinomial logit model – and the neural network model – multi-layer deep learning model – for identification of important determining factors and prediction of the risks of various diseases that individuals experience in their middle ages. I use the Health and Retirement Studies (HRS) data to that end. I compare their predictive powers using confusion matrix indicator and discuss various criteria used by these two methods to identify the important factors of the risks. I discuss pros and cons of these two types from prediction and inference viewpoint.

Presentation 2 - "Flexibilization and Scheduling in a Power Station"

Presenter – Mr. Rajbans Talwar, Optimisation Consultant, STEAG, New Delhi

There is increasing pressure on fossil fuel-burning power stations to flexibilise their operations. Towards this end, there are solutions that enable individual units to achieve higher ramping rates by means of better designed components, additions and modifications to existing equipment, and improved instrumentation and control. Flexibilisation at the station level calls for determination of unit-level set points based on considerations of unit-level performance with a view to reduce the station-level cost of generation.

Recent work in providing decision support to the station operator by means of an optimisation model based on on-line performance data is reported here. Three considerations are involved in answering the question: what are the optimum unit-level set points?

- The regulatory framework
- The operator's constraints and priorities
- The adequacy and robustness of the optimisation model

The performance of the decision support system is compared in two different operating scenarios. In one the generation schedule is relatively stable throughout the day whereas in the other station the units are required to double their generation within an hour.