THE SIXTY-FIFTH

ANNUAL CONVOCATION

24 December 2022

ADDRESS BY

GUEST-IN-CHIEF

PROF. BIMAL KUMAR ROY

Former Director, Indian Statistical Institute

&

Former Chairman, National Statistical Commission

JADAVPUR UNIVERSITY

KOLKATA 700 032

INDIA

THE SIXTY-FIFTH

ANNUAL CONVOCATION

24 December 2022

ADDRESS BY

GUEST-IN-CHIEF

PROF. BIMAL KUMAR ROY

Former Director, Indian Statistical Institute

&

Former Chairman, National Statistical Commission

JADAVPUR UNIVERSITY

KOLKATA-700 032

INDIA

CAN YOU MAKE A RIGHT DECISION?

by

Prof. Bimal Kumar Roy

His Excellency the Governor of West Bengal and Chancellor of the University - Dr. C.V. Ananda Bose, Vice Chancellor - Prof. Suranjan Das, Pro-Vice Chancellor - Prof. Chiranjib Bhattacharjee, Deans of the Faculty Councils, Members of the Jadavpur University Court, distinguished faculty members, other members of the University, graduating students, Ladies and Gentlemen.

I thank Prof. Suranjan Das for inviting me to address an assembly of bright young adults who are on the verge of making a move or have already taken a decision for the next few years ahead.

In that context, many of you have had to face an interview board, be it for a job or a higher degree. And there you have seen people like me on the other side of the table. You may know that ISI was the first institute in India to offer M Tech in Computer Science way back in 1981.

To get admitted, you have to clear the interview. I share one experience of mine in one such interview. The first candidate on the day was from a very reputed institute. I usually ask questions which test intuition. The person fumbled at the first question. I offered him another, slightly easier question now. He answered it correctly. I was satisfied. For me the interview was over and with a positive note.

The next candidate was from a so-called ordinary institute. Further, the person's marks were not that impressive, so to say. I asked him the identical first question. After taking a bit of time, the candidate hit the right chord. I can candidly say now that I was a bit surprised. I asked him another question, now a little tougher than the first one. Again the person took his time and then said he was trying an answer about which he was not quite confident. The answer was perfect. I said fine.

Yet something was bothering me. I had to decide to admit a person with not so good credentials on the basis of only two questions answered

correctly. Afterwards, in the class, I found this student to be one of my brightest ones and much better than the one with some reputation. In fact, he was quite ordinary.

What did this episode teach me? As an individual whenever you have to make a decision, you are prone to make unintended errors. I should have rejected the admission of the first candidate.

What prevented me?

Perhaps, my mind-set or belief which was biased by the societal norms of reputation. This belief nearly made me commit another error of rejecting a very good candidate. The conviction in my belief made me ask a tougher second question. Definitely this was not fair. However, I can assure you it was completely unintended. The failure or success to unearth the truth, the real, on the basis of some indicators or information or data, like the answers to the questions, is the ultimate challenge an individual faces when he has to choose, he has to decide between alternatives. This can happen in every walks of life. Your decision turns out to be incorrect later. And you need to live with this reality of life. As a scientist, a statistician's life is to face this challenge to the best of his ability to confront any decision making that is posed to him/her.

How the mind-set can create a kaleidoscope of diverse and conflicting narratives of the reality is brilliantly captured in Rashomon by Akira Kurosawa. This is one example I use while teaching the problems of modelling data. Each character in the film is building a model. Each of them uses a viewfinder controlled by his or her mind. The result is a set of craftily created narratives, which are contradictory and yet giving a very good fit to the real event. However, we realise each narrative is biased and the truth can be very different.

The primary question is therefore, whether there is some principle one can follow to remove this gossamer of noise to reach closer to truth.

On this, our own, Prasanta Chandra Mahalanobis, PCM said: Any such principle used should NOT be decided either by (i) authority, or by (ii) belief or by (iii) majority. To validate a scientific principle and to pronounce it acceptable, it must be produced before the Court of Statistics.

The court would examine: is the principle of validation a derivative of power of an individual? Or is it imposed by a collective? Can it be a legacy of the social monolith? Any evidence in any of these directions would lead to the dismissal of the principle by the court. The important question is how you ensure removal of bias from what is observed. Once that can be achieved one may use the bias freed information to check the scientific principle. It may lead to a modified yet acceptable model.

What role can a Statistician play in making decisions free from biases? I use the word biases to emphasize the plurality of various kinds of bias. There are essentially two stages in this process.

The first and the foremost is the checking for biases when you are collecting information to make your decision. How do you make your observations free from biases? Statisticians, all over the world, from the time they were given some role to play in decision making, offered randomization as a solution towards removing observational bias. Randomization, being ideally non-deterministic, takes care that all possibilities are treated equally and anonymously, eliminating the authority of any individual or of a collective or of any legacy.

Ronald Fisher pioneered this approach and developed the method of design of experiments, which is now a staple. A proper randomization is difficult to implement, however.

To give an example, the random numbers we all use from machines are essentially pseudo random. Any truly random series, by definition, should not have any pattern. In other words, all possible patterns should be there. There is no machine which can produce such a series.

The second stage is the analysis and interpretation part. This part entails you to put your scientific thoughts and perceptions from experience to be cross-examined by the touchstone of observations. If you want to check whether these two are working in tandem to help you discover rules, you need to find applications in real life, in real decision making, and in as many fields as possible - Agriculture, Biology, Anthropology, Economics – all found useful applications. You may know that PCM started his work mainly in Anthropometry. The famous D^2 statistics

was invented as an upshot. J B S Haldane, a pioneer in introducing Statistics to Biology, was chiefly responsible for the design of the B.Stat program in ISI which accommodated various fields from Sociology to Physics.

A statistician's role is important when we do not have a deterministic system or a prevailing Law. "If Chance is the antithesis of Law, we must study the Law of Chance", proclaimed C R Rao, the living legend of Statistics.

And in doing so, a statistician must bear in mind that all his decisions from data are bound to be affected by Nature or Chance playing a hide and seek game and having fun perhaps. This happens in every other field of science where you have some element of uncertainty and you use observations to reduce the noise. Your carefully obtained data may conflict with your guess about the reality. You may have guessed the right track, yet data leads you to choose a wrong path. You may have a wrong address, but data leads you to that house only. Thus the very choice of the decision you put at the altar of chance, the Agnipariksha of data by which you expect the Law of Chance to reveal itself, is itself a big challenge. Wisdom and experience, in the specific scientific domain, play a crucial role here.

One example where this challenge is quite extreme in nature, in my opinion, is in the field of decision making in socio-economic issues. This could be the reason why economic policies have witnessed failures from time to time. It remains a very difficult problem and no robust solution could be provided by the statisticians.

One reason could be the extreme heterogeneity of the behavioral responses and a huge number of factors. While modelling, economists generally view profit maximization as the exact dual to the cost minimization. I think this aspect also needs a review since several dimensions of costs, which are important for the society, are ignored. Further, the dynamic aspect of the decisions and the subsequent effects on the stakeholders complicate the problem.

It may be of some interest for this audience to know how someone like me from Statistics became interested in Cryptology.

You know that in the 1990s computer and information technology took a giant leap with the creation of World Wide Web. At that time I was a faculty in the computer science unit. Somehow I started pondering about the aspect of cost of this innovation. I began thinking about whether this could make some of us quite vulnerable since information could be accessed more easily and whether that could affect the quality of life and affect the security of private information.

Can statistics have a role in making the system less vulnerable to unauthorized access and abuse? I was teaching the students of M.Tech in Computer Science.

Throughout my teaching career I have benefitted in a big way from some extraordinary students - by their intelligent questions, probing questions – for some of which I did not have a good answer. These questions gave me a deeper understanding of the subject I was teaching.

I can tell you that I had the fortune of having two such students from this University, who became very much excited and enthusiastic about the issues in security of information sharing. With them I could confidently tread an uncertain route. We could attract international attention.

Cryptology began its journey in ISI with statistics playing a key role. Jadavpur University had an indirect contribution in it.

So what could be the way forward? How do you build a truly scientific temper? This is a genuine requirement for the advancement of our own good.

If you want an answer from me, I will tell you to find the biases and prejudices sitting happily in your own mind. Find in your own and perhaps unique way to overcome these. Light the lamp within – as the great Budhha emphasized – Atmodipa Bhava. Trudge the path which may not be smooth. It will however have more light with a clear and decisive direction.

Printed by : Shri Pijush Kundu (Foreman)
Jadavpur University Press (Printing) , Kolkata -700032