

NOVEMBER 2018

DEGREES OF FREEDOM

DEPARTMENT OF STATISTICS



EDUCATIONAL TRIP TO YAKULT

BY ANUNA BANERJEE



On 1st October 2018, the Department of Statistics, LSR organised the Annual Educational trip for the Academic Year 2018-19 wherein more than 60 students from across the three years visited the Yakult plant at Sonapat, Haryana; the only production plant of Yakult in India. Yakult is a \$10 billion Japan-based firm which sells probiotic milk in order to ensure the health of our gut. Their objective is to help us realise that loving our intestines is important and this fact was repeatedly drilled into us by Mr. Aadish and Ms. Swati who showed us around and made our visit a really enriching experience. The visit was undertaken with the objective of giving the students a practical insight into how industrial firms work and how Statistics is a multidisciplinary subject with practical usage in every industry. Yakult uses more than 135 quality control measures and random sampling at various stages; all of which requires extensive knowledge of statistical tools and methods. We were shown an informative power point presentation on the evolution of this probiotic drink and its benefits for the human body.

The Yakult production unit uses state-of-the-art technology and machinery imported from Japan. Stringent cleanliness and hygiene measures are employed in order to ensure that Yakult achieves its aim of improving health instead of contributing detrimentally to it. A very striking feature about the distribution channels of Yakult is the home delivery system which acts as a woman empowerment initiative. The "Yakult Ladies" go around from door to door in various cities and towns, selling the Yakult bottles. This system has manifold benefits.

1 - People who might not be aware of the benefits of Yakult and hence might not have purchased it earlier, get informed about the importance of probiotics in their regular diet.

2 - The Yakult ladies are generally ladies who hail from not-very-privileged backgrounds and have not had a "complete education" as such and Yakult strives to work them to their full potential and ensure that they have the means to stand on their own two feet. The trip was a very enlightening experience and gave the students a first hand experience of witnessing how a real industry works and how Statistics is a very relevant subject in today's rapidly growing world which relies increasingly on data day after day.

WORKSHOP ON PYTHON!

"Whether you want to uncover the secret of the universe, or just want to pursue a career in the 21st century, basic computer programming is an essential skill to learn." - Stephen Hawking

Coding requires and improves our logical reasoning skills. Keeping this in mind, the Department of Statistics of LSR curated a Python workshop open for all the years and all the departments. Mr. Mukul Singh Chauhan, a data analytics and coding expert agreed to be the workshop instructor. This three day workshop was designed to teach basic Python commands so that the attendees become familiar with the interface. The main focus had been put upon the fundamentals while at the same time developing an interest in programming for future advanced study. Mr. Chauhan conducted all 3 of these sessions with great enthusiasm and energy. While his sessions were extremely informative and enriching, the participants thoroughly enjoyed themselves. The Department of Statistics looks forward to hosting more of such sessions for our college. We congratulate the Statistics Union for the success of its efforts.

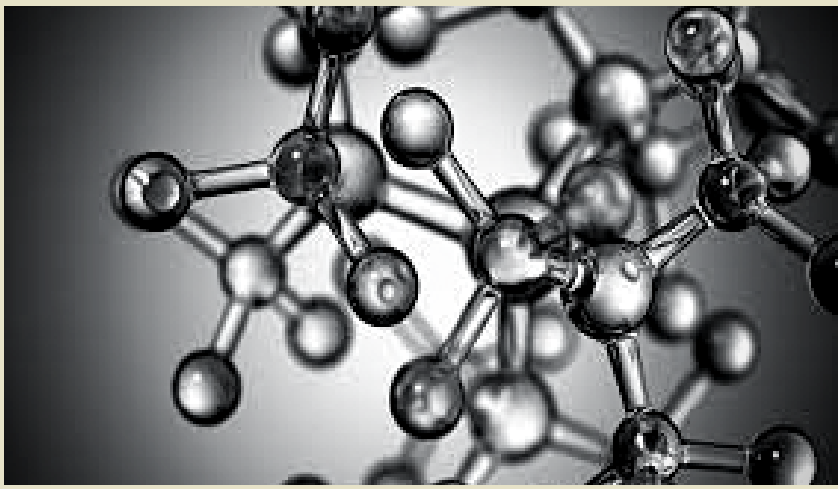


NO PEACE FOR THE OPPRESSED

BY SHRUNATRA MISHRA



As the 7-year war in Syria approaches its “conclusion”, peace isn’t a luxury the people of Syria can enjoy anytime soon. The war has taken a toll on the economy and the infrastructure of the country, leaving it floundering hopelessly for want of stability. The highly politicised Syrian war has made the headlines over the years for Assad’s wily strategies, the US’s weakening stand for the rebel forces, Turkey turning a Russian proxy in the NATO, Russia’s support of Assad to create for itself a stronghold in the Mediterranean and so on. However, in this political jigsaw, the human rights violations and loss of life remain reduced to figures on sheets of paper; these “collateral damages”, constantly overlooked and undermined by the nations involved in this tug of war. The beginning of the war in Syria may be traced to the peaceful civil uprising on the 15th of March, 2011 in Damascus, as a part of the Arab Spring Protests, wherein the protestors demanded basic democratic reforms and rights. However, what followed over the years shook the very soul of humanity. The creation of several hostile groups, with many having links with terrorists and militants, maligned the rebels in the eyes of the world. Thus was born the dreaded ISIS with its motto of the establishment of a Caliphate, with an extremist agenda. What started as the movement with Democratic fervour got soon projected as anti-human Terrorist activities. Hence, now we witness a situation wherein thousands of innocent citizens being branded as terrorists lie at the mercy of Assad, Russia and Iran’s combined forces in Idlib. The forces of the ISIS in Syria stand routed; the children of their operatives, orphaned and are under constant threat of attack, and they struggle for survival. While the ISIS has claimed the lives of innocents all over the world and their sins are unredeemable, is it fair for these children to suffer for the sins of their parents and elders? Is it fair that they face the unfiltered ostracism and wrath of the world just because they were born to parents involved in acts of blind hate and terror? The fact remains that unless the interested Governments stop treating human lives like pawns in a board game, Syria will never achieve stability. Idlib might fall to Assad’s forces and his reign might be firmly re-established in the region but the brutality of the Syrian war will remain indelible in the memories of those who survive it. We won’t have trials such as those in Nuremberg to punish those who exploited their power and wealth to violate the basic human rights of the people of the Republic of Syria. The role played by Assad in the creation of ISIS will not be questioned. Nor will Putin’s motives and methods for achieving his goals be assessed. Yet again, there will be rebellions. Yet again, terrorism will raise its ugly head. Yet again, there will be massacres and destruction.



SCIENCE LEARNS FROM IT MISTAKE TOO

BY RISHU JAIN

It is a known fact that the researches which are conclusive in nature and produce the expected or desired results are more likely to be published, isn't it? But does the positivity of the result lead to future productivity and producibility of the research? Are we really able to differentiate between pseudo positive and positive results? If a result cannot be reproduced in future to promote further research, it is an undesirable positive result which does not serve our purpose.

Scientific studies should always be published irrespective of their result. That's one of the conclusions of a research project conducted by the German Centre for the Protection of Laboratory Animals at the German Federal Institute for Risk Assessment (BfR),

the results of which have now been published in the journal PLOS ONE. Studies, whether conclusive or inconclusive, should be published so as to help increase productivity in future, thus saving time, energy, capital investment, human resources requirement, etc.

Study of a seemingly negative result will lead to the identification and hence rectification of the errors more quickly. Hence, any research, irrespective of it taking us to the desired result, should be valued, as proven in the research project on laboratory animals conducted by the German Centre for the Protection of Laboratory Animals at the German Federal Institute for Risk Assessment (BfR). Learning from the mistakes conducted in a previous research increases the probability and the rate of achieving success.

GAMBLER'S FALLACY - A STATISTICAL PARADOX

Imagine yourself to be playing a game where you have to flip a coin and bet on the outcome of it being a head or a tail. The first ten flips yield the same outcome – head. So now you think to yourself that this winning streak of heads will not last and bet on tails. It's not just you, but other people too have a similar thinking that since head has been the outcome since the past few times it shall now most likely be a tail.

However, the above assumption, despite sounding perfectly logical to our minds, is not so logical after all. This kind of a situation is what defines a Gambler's Fallacy where we tend to believe that the probability of future events occurring is affected by the outcomes of past events.

This fallacy came to notice in 1913 in a casino where the black colour came up in a roulette wheel 29 times. The probability of that actually happening, as calculated by David Darling, is 1 in 13,68,23,183!! The reason this incident became such an iconic example of the Gambler's Fallacy was that large amounts of money were lost, since, after black appeared for the 10th time in a row, the players started placing even larger bets on red based on their false logic concluding that black would not come up again. This left the owners at least 10 million francs richer!

This fallacy arises as we are inclined to believe in the “law of small numbers” i.e. the characteristics of a large population can be concluded from a small number of observations or data points. According to this, winning streaks will eventually even out so that they can be representative of the larger set. Statistically, it is wrong to hold much belief in this law as larger the sample set of a population, the more accurate its behaviour predictions would be. So, a small set of observations wouldn't really display an accurate picture of the larger population.

In conclusion, I think it's time luck gets its due credit in making us win (or lose) as we can just calculate the probability of a win but guarantee nothing more!

-Areena Makker

MACHINE LEARNING

BY RHIA SAHNI

The statistical machine learning has been considered as a collection of modern statistical methods that employ techniques from machine learning, data mining, optimization, differential geometry, etc. Two characteristics distinguish the statistical machine learning from classical statistical methods: the data type and the purpose of data analysis. Data of new types have been generated by a variety of fields. The new data types have a great impact in statistics. They require and lead to creations of many new statistical methods of inference and prediction. Particularly, the statistical machine learning focuses on the new data types such as high-dimensional data with a large number of variables relative to the number of observations, multivariate functional data, or the so called “Big Data” with both large numbers of variables and observations. On the other hand, the statistical machine learning focuses on inferences of new types including detecting non-linear geometric structures in data cloud, selecting important variables with or without projections, and providing data-driven answers to scientific questions, etc. With a very broad scope, the statistical machine learning is roughly divided into two sub-fields - the supervised learning and unsupervised learning, that depends on whether a response is being assigned for each observation. Sometimes, a further categorization is mentioned in literature if we



considered regression and classification problems separately in the supervised learning regime. Both the Bayesian method and multivariate statistical methods have been broadly employed in all these three fields in the statistical machine learning. Multivariate statistical methods are extensively applied in the statistical machine learning given the multivariate nature of the data of interest.

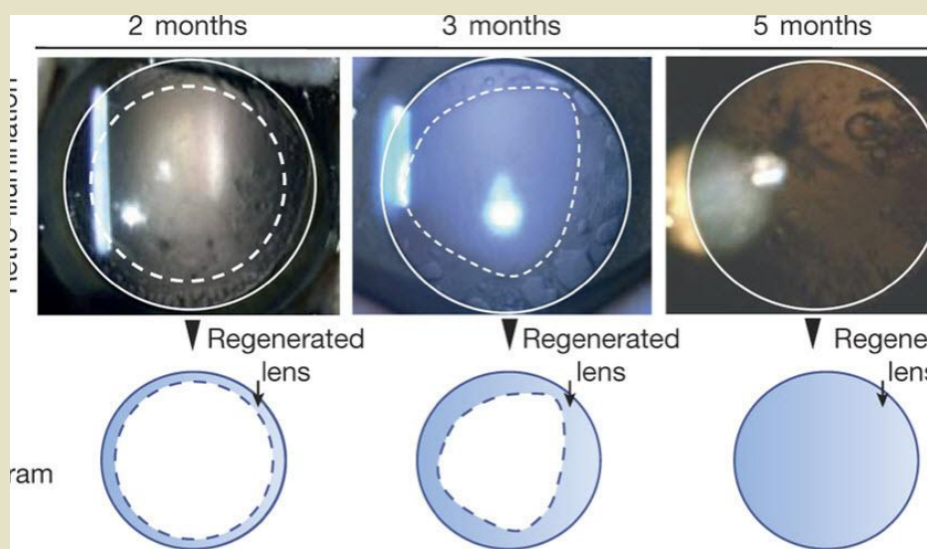
The Bayesian method is adopted to the statistical machine learning in both the conceptual and technical fashions. For example, the naive Bayes classifier is a widely-used powerful method for classification problems, especially in the high-dimensional settings; and it is motivated from the Bayesian concept on optimizing a posterior risk function. Technically, the Bayesian method provides tools to refine existing machine learning method, introduce coherent probabilistic learning models, integrate techniques from other fields with machine learning methods, and design new computational methods. A challenge for employing the Bayesian method in the statistical machine learning is developing tractable computational schemes. Markov Chain Monte Carlo provides a systematic and efficient treatment to computational issues when we apply the Bayesian method. Last but not least, multivariate functional data analysis is sometimes also considered falling into the regime of the statistical machine learning. Particularly, it is very important to identify the principal component directions or effective dimensions for multivariate functional data.

FEW FACTS

COMPILED BY AREENA
MAKKER

For a full probability of two people sharing a birthday, there need to be at least 366 people. However, for half this probability only 23 people are needed.

You are 93 times more likely to die of contact with a hot water tap than by a shark attack.



SCIENTISTS GROW EYE LENS FROM PATIENTS' OWN STEM CELLS

CONGENITAL CATARACTS-LENS CLOUDING THAT OCCURS AT BIRTH OR SHORTLY THEREAFTER-IS A SIGNIFICANT CAUSE OF BLINDNESS IN CHILDREN. TODAY, JUVENILE CATARACT IS THE LEADING CAUSE FOR BLINDNESS AMONG KIDS IN THE WORLD.

BY AARUSHI SHARMA

I was born with congenital cataract but my parents didn't know this until I was 10 years old. After freaking out, getting accustomed with this fact, and consulting dozens of doctors across India, I was operated at the age of 12. When you've worn your shades for quite some time and then suddenly you remove them, how colourful everything looks, right? It was as if my thick, cloudy shades were removed after 12 years. The first thing I saw with my new eyes was the red colour on the hospital bed sheet and no kidding, I realised that I didn't know what red looked like for so long. Now after approximately six and a half years, this disease and these memories come up rarely. Recently while having an online conversation with an old school mate (who pretends to be a science geek), this disease came up through one of his lame jokes. I got to know from him about a new technique undergoing further research. In this, scientists grow eye lens from patient's own stem cells to restore vision. Presently, the people who get operated for cataract get

either myopia or hypermetropia except if a bifocal lens is used. This is because of the inability of the artificial lens to contract and relax - changing its focus situation wise. However, unifocal lenses are preferred over the bifocal ones as they are more durable. Moreover, when I was operated I was the oldest among the rest of the patients, being 12 years old. I witnessed cases of 10 days old and 1 month old babies being diagnosed with cataract. These infants were so small that the artificial lens' sizes were too large for their eyes. They had to wait and live partially or even completely blind for at least a year or two to be fit for the lenses. If the aforementioned stem cell technique succeeds, we would find a way better solution to the problem of using spectacles and would be able to operate on any patient regardless of age. Researchers at University of California, San Diego School of Medicine and Shiley Eye Institute, with colleagues in China, have developed this eye lens restoration treatment that has been

tested in monkeys and in a and in a small human clinical trial. It produced much fewer surgical complications than the current standard-of-care and resulted in regenerated lenses with superior visual function in all 12 of the pediatric cataract patients who received the new surgery. "We believe that our new approach will result in a paradigm shift in cataract surgery and may offer patients a safer and better treatment option in the future."- Kang Zhang 'You don't know what you've got until its gone!' - Linkin Park. This quote is too apt when it comes to our sensory organs. We usually don't think about our senses until an organ stops working. Presently medicinal research is undergoing development at full swing. This might be just another scientific research paper for some, but for a young child of 2 or 3 diagnosed with congenital cataract, whose world hides away behind the fuzzy clouds- it is full of infinite possibilities!

HINDUISM-A MISUNDERSTOOD RELIGION(?)

BY ANUNA BANERJEE

Diwali, so attending that would mean I would not get to hang out with my friends and burst firecrackers and party (FOMO much ?). I cited “atheism”, “I don’t believe in God” and “I don’t think I identify as a Hindu” as excuses and emerged triumphant in my (what I believed at that point) struggle to free myself from the binding clutches of religion. I now realize that it was probably “being a Hindu” that allowed me to get away with all of my tomfoolery. Whenever I would say “I don’t believe in religion”, my mother would pipe up saying “Hinduism is not a religion, it’s a way of life” or “You do realize it is your “religion” that allows you to not believe in religion” and I would flippantly brush these statements aside. But as I grew up, I started paying more heed to these words and (metaphorically) scratched my head every time she said things like that. That brings me to my point; is Hinduism really an “ism” or is it a way of life? Do we even understand the limitless scope of what Hinduism actually is? Is it really the intolerant, close-walled semblance to a prison that it has been drawn up to be in recent times? I do not pretend to be a theologian or a well-read scholar as I write this and this is basically just me organizing random facts I have come across while researching from a few books and (obviously) Google.

Let me start with where the term “Hindu” originates from. Is it a religious identity or more of a geographical one? The word "Hindu" essentially comes from the word Sindhu. Anyone who is born in the land of Sindhu (the river Indus) is a Hindu. Being a Hindu does not mean having a particular belief system. There is no particular god or ideology that you can call the Hindu way of life. You can be a Hindu irrespective of whether you worship a male-god or a female-god, whether you worship a cow or a dog or a horse or a Tulsi plant or a Banyan tree. If you don't worship anything you can still be a Hindu. It is only recently that this geographical and cultural identity has attempted to transform itself into a religious identity called Hinduism. Hindu was never an “ism”, and the attempt to organize it as a religion is still not successful because the Hindu way of life, which is referred to as Sanatana Dharma or universal law, is all-inclusive in nature. The Mahabharata, an essential text while studying the itihasa of Bharat, is an epitomisation of the limits of what is acceptable in Hinduism. Was Kunti shunned from society for having borne a child out of wedlock (Karna)? None of the Pandavas were biologically Pandu’s offspring. They were all essentially borne using sperm donors. Did that make Kunti or Madri “dirty women”? Were they blacklisted from invitation lists to society events? Nuh-uh, I think not. Satyawati invited her son (born out of wedlock), Vyasa to impregnate both her daughters-in-law via Niyoga Pratha after her other son, Vichitravirya (her legitimate son and the king of Hastinapura) died childless and this practice was completely acceptable by Hindu standards. In fact, logically speaking, the mighty race of kurus is not even descended from Shantanu (Satyawati’s husband, the king). They are all descended from the queen and they are none the weaker for it, which in my opinion is quite the feminist statement. The caste system that is still predominantly present in India is in my opinion, the biggest misinterpretation of Hinduism. The Bhagavad Gita does not even support the idea of caste by “birth”. It proposes a different view of Varna — class, not caste. The distinction in class is internal, not a societal construct. It is meant to determine one’s inner qualities, or gunas, and select the duty that corresponds to one’s inner nature. That is the Gita’s view of class — not the caste system which ranks one according to birth, regardless of one’s qualities. Krishna’s interpretation of class is that it constantly changes, based on your qualities and actions. A person may be tamasic, and thus internally, a shudra, but can change and become sattvic, and thus, a Brahmin. The system of classes is for a spiritual aspirant to determine their unique dharma — the duty that they are best-suited to perform. It has nothing to do with one’s family lineage. This is in contrast to Shankaracharya’s interpretation throughout the Gita — that class is according to the rules of the Smritis, and thus, by birth. Gerald James Larson – an Indologist and classical Indian Philosophies scholar, states "if there is any one text that comes near to embodying the totality of what it is to be a Hindu, it would be the Bhagavad Gita. Whatever the religious implications may be, the fact remains that this holy grail of what being a Hindu actually means is in full support of a fact we all morally know to be true; that the caste system is absolute drivel.” The Nasadiya Sukta also known as the Hymn of Creation is the 129th hymn of the 10th mandala of the Rigveda . It is concerned with cosmology and the origin of the universe. An atheist interpretation sees the Creation Hymn as one of the earliest accounts of skeptical inquiry and agnosticism. Astronomer Carl Sagan quoted it in discussing India's "tradition of skeptical questioning and unselfconscious humility before the great cosmic mysteries." I could go on and on about the millions of examples from history that provide unquestionable proof for the fact that Hinduism is a highly tolerant way of life and not the intolerant religion that it has been portrayed to be in recent times. In fact, at the rate this religious extremism is going, it might even reach a point where Hindus massacre people and cite “their interpretation of their religion” as their motivation; to provide a veneer for human rights violations and acts of terrorism and pass them off as acts of religious faith. I will end by quoting Sadhguru, “To preserve, protect and nurture the fundamental ethos of Bharat, the legacy of wisdom and unbridled exploration of life is a true gift to humanity as a whole. As a generation, this is an important responsibility that we should fulfil. Let not the limitless possibilities that the sages of this land explored and expounded be lost in religious bigotry and senseless simplistic dogmas.”

In Hinduism, conscience, reason and independent thinking have no scope for development.”

- B R Ambedkar

Growing up, especially during my pre-teen years; like all adolescents, I too was consumed by an insane desire to disregard everything my parents stood for. Rebellion (or rather, what I believed was rebellion and was actually just blatant disobedience) coursed through my veins and I straight-up refused to attend anything even remotely related to religion because that was obviously very, very uncool. Bengalis celebrate Kali Pujo on the day most other Indians celebrate

FROM THE EDITOR'S DESK

Dear Readers,

The Editorial Core Team of the Department of Statistics, LSR, is thrilled to release the second edition of its quarterly newsletter “Degrees of Freedom” for this academic session. With the semester examinations approaching, we hope to provide you with some respite from the curriculum through the diverse collection of articles we have incorporated in the newsletter for your pleasure. Our articles include pieces on statistics, thought-provoking op-eds and write ups on the department events and activities. As always, we have included fun facts and quizzes in our newsletter to enhance participation from the student body.

We would like to express our gratitude to the general secretary of the Department of Statistics, Rishu Jain, for her contribution to the newsletter. This newsletter is a reality thanks to the support of our esteemed faculty members, the student body as well as the Statistics Union. Like every piece of writing, the success of the efforts we put into the making of the newsletter hinges entirely on the commendation and encouragement of our readers. We thank you for your time and interest.

Happy Reading!

Wishing you luck for the upcoming examinations and signing off till the next semester,

The Editorial Core Team

Department of Statistics.

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Rajni Tolani

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For complaints or suggestions with regard to the newsletter, please mail us on lsreditorial.statistics@gmail.com

QUIZ

An old wartime story describes a sailor who, during a pitched battle, put his head through the hole made in the side of his ship by an enemy shell. His theory was that the odds of another shell landing in exactly the same spot should be extremely low. Was his reasoning correct?

Mail your answers to this interesting problem at lsreditorial.statistics@gmail.com

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