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Brij Disa Centre for Data Science & Artificial Intelligence

Communique
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ARTICLES

1 Modernizing Kirana Stores: Role of Digital Payment Systems

Author :

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Faculty, IIMA

Prof Borah's research interests are in the rea of international marketing, luxury marketing, supplier-relationships and business strategies in emerging markets. He has also conducted multiple training programs for working managers and entrepreneurs working in the luxury industry, banking and financial industry, FMCG industry etc.

Retail stores in Emerging Markets (EM) are evolving rapidly with the integration of technology. According to the World Payments Report (2018) published by Capgemini and BNP Paribas, the bulk of digital payment technology growth occurs in emerging markets (EMs), for example, by 36.5% in Russia and 33.2% in India per year[1]. A bulk of this growth is attributed to young population, government policies and fintech revolution which has encouraged customers to adopt digital technology. However, despite achieving a high growth rate, cash still remains a predominant mode of transaction, especially among unorganized retailers. One central question to both policy makers as well as managers is to understand why is there this affinity for cash? Is there any benefit for unorganized retailers to adopt digital payment systems?

I along with my co-authors started exploring this question. We started our investigation with a qualitative interview of 31 retailers who deal with product categories, such as grain, dairy, consumer processed goods (CPG), and general merchandise. There are multiple issues that come to light based on our interviews. First, we realized that there is a lack of consensus among retailers about whether digital payment systems have any impact on revenue. Many of them adopt such systems because other retailers in the vicinity have adopted the same. Second, a major concern that a retailer seems to be confused about is which technology to adopt? Should it be an app-based technology or should it be card-based technology? Or should it be both? Third, retailers also argue that the integration of technology with their existing systems is challenging. Many are not educated enough to keep track of digital transactions and even if they do, different payment technologies are difficult to integrate. We also observed that most retailers are worried about the transaction fees or fixed fees that they needed to incur to implement digital payment technologies. Finally, we observed that all retailers have different target segments. Some of them deal with customers who buy on credit and believe that investment in digital technology is useless. Again, there are those who have already made some initial investment in digital technologies and are more inclined to accept new modes of payment.

To corroborate the insights from our qualitative research we collected data from 403 unorganized retailers. Our sample comes from nine districts from seven states (Orissa, Bihar, West Bengal, Rajasthan, Karnataka, Kerala, and Maharashtra) and one union territory (Delhi). We find that while the adoption of digital payment technologies increases the performance of unorganized retailers, the relationship is non-linear. Beyond two technologies, adoption actually hurts unorganized retailers' performance. We also find that retailers who have already invested in technology have benefited more from digital payment technologies. On the other hand, if the bulk of the transactions is on credit, retailers benefit less from the adoption of digital payment technologies. We also find that app- based technologies and card-based technologies positively affect economic performance. On the other hand, account-based technology negatively affects economic performance. We also find a synergistic effect between card-based technologies and account-based technologies on economic performance.

Based on our analysis, we conducted a field experiment with 36 pairs of retailers and monitored both groups for six months. Half of these retailers have adopted a digital payment technology whereas the other half has not adopted any digital payment technology. We find that with the adoption of technologies, unorganized retailers gain approximately 9.6% in revenue. Our research has revealed interesting insights about the digital ecosystem. Based on our analysis and research, we provide the following guidelines for managers.

Show the Gains: Most managers who want to work with the digital ecosystem and modernization of unorganized retailers, must highlight the additional gain in revenue a retailer can achieve through digitalization. However, rather than adopting technologies in bulk, a gradual adoption is required.

Focus on Synergies: Most retailers would be willing to adopt technologies with some level of synergy. It is important to focus on synergies a retailer can achieve before suggesting which technology to adopt. Rather than focusing on bulk adoption, it is important to highlight the synergistic effect.

Make retailers prioritize technology: We believe that the greatest challenge is making retailers aware of the reward that technology can bring. Apart from an increase in revenue, a retailer should also be made aware of the additional advantages which technology adoption may achieve. As there is a learning curve associated with the adoption of digital technologies, highlighting the efficiency (sales per square ft., inventory per square ft.) a retailer can gain from the adoption of technology may help in convincing retailers. This is because most unorganized retailers struggle with space constraints and maintaining inventory is a significant challenge. In our work, we find that simple app-based technology can facilitate inventory and sales turnover. This may potentially help managers in convincing retailers.

Segment Retailers: While modernization of unorganized retailers is critical, it is important to understand that all retailers do not operate in a similar context. We advise that before even starting modernization, managers must understand the indigenous issues such as credit provided to customers. This is essential in determining the likelihood of success for managers.

Our research highlights that while digitization of unorganized retail is important, the key to success is stepwise digitization, which understands the idiosyncrasies of the context.

(Original article: Adhikary, A., Diatha, K. S., Borah, S. B., & Sharma, A. (2021). How does the adoption of digital payment technologies influence unorganized retailers' performance? An investigation in an emerging market. Journal of the Academy of Marketing Science, 49(5), 882-902.)

[1] https://worldpaymentsreport.com/wp-content/uploads/sites/5/2018/10/World-Payments-Report-2018.pdf

2 Building Inclusive AI products

Author :

Anuj Kapoor
Faculty, IIMA

Prof Kapoor's research interests are in the economics of digitization, artificial intelligence, privacy, and digital platforms. His research focuses on understanding how big data and artificial intelligence shape consumer welfare and digital markets. He works closely with firms to suggest to them more ways to become data driven. He has ongoing collaborations with various tech start-ups in India in the digital media, finance, and health tech space.

Imagine how people of color feel when the only “flesh” colored bandage available in the market is light pink. What does it say to certain consumers? A pink color bandage represents their flesh or not? Similarly, understand the thought process of a consumer when she finds that XL or plus sized clothes that a store carries are too small for her. Along the same lines, putting yourself in the shoes of an individual in a wheelchair will make you feel all the more agonized with her routine shopping experience. A wheelchair person occasionally cannot reach half the items on the shelves without having to ask for assistance and the assistance is not easy to get.

These frustrations are not just limited to the physical world. Think about a situation in which you visit a website on your phone and it isn't optimized for mobile use. Either the text is too small to read, and when you zoom in, you can see only a small portion of the page. Another possibility is that as you try to rotate the phone, the page header will occupy so much screen space you won't be able to see anything else. Exhausted, you may give up and leave the site or head off to a competitor's website. The experience is certainly different, but the feelings of exclusion and frustration over being denied access to something you need or want won't leave a positive impression on you.

There are umpteen other scenarios where technology may unintentionally exclude users. For example, a user applies a filter on a photo but their skin tone is lightened, reinforcing bias against people of color. Similarly, a user goes to search for information about great scientists, and mostly men appear in the results. Further, a user attempts to create a new product login, and there are only binary gender options. All these options restrict the legitimate choices that a user should have been provided. Most importantly, many of these product and service offerings are powered by AI and machine learning algorithms.

Broadly, consumers who do not subscribe to the parameters established by the majority of the population are often made to feel as though they have been forced to live in a world where they are not welcome and the world has not been designed for them. They may be like the majority of the population in every other way, but due to one dimension of diversity that singles them out, they feel unwelcome and ignored.

These underrepresented users usually fall into the set of users who identify themselves as women, LGBTQ+, of lower socioeconomic status, are people with disabilities, age 65+ and have varying education levels. Interestingly, research suggests that such underrepresented consumers along with the majority of consumers prefer brands that demonstrate diversity, though the underrepresented users are more likely to have stronger emotions about their product or service. Further, inclusive product design is often framed as benefiting only under-represented communities.

Product inclusion is the practice of applying inclusive cultural and community insights throughout the entire product development process, from initial design through launch. The goal is to achieve product excellence and grow the business by building for everyone, with everyone. To build inclusive products, one needs to follow the 3P framework targeting people, processes and products. This framework is followed by Google and was introduced by Lauren Thomas Ewing.

People: This involves users and the people within the organization who invent, design, develop, test and market products. To put together inclusion principles into practice, organizations have to focus on the needs of all people while building diversity within the organization and working to make everyone more aware and sensitive to the needs and preferences of the underrepresented users.

People + Process = Product, no product design and development processes must operate within a framework for integrating product inclusion into the work. For example, the product design processes can include design sprints that bring in different perspectives from across the organization and from outside the organization to provide insight into the ways different users may perceive and interact with the product.

Product: The product is the result of people executing a process, but it is also the ultimate goal that drives the creative process. A focus on making a product as exclusive as possible is one key to achieving that goal.

Framework source: Building For Everyone: Expand Your Market With Design Practices From Google's Product Inclusion Team

To understand various research methods that help better understand historically underrepresented users:

Dogfooding: Google believes that one needs to eat their own dogfood before releasing it to users. Dogfooding involves internal discussion about or testing of products prior to launch. Dogfooding may involve focus groups or user testing.

Adversarial Testing: Google uses a diverse group of internal testers (dog fooders) and assign them the task of trying to "break" the product before it launches. The goal is to reveal any defects, including anything that may or appears to be exclusive of underrepresented users, so issues can be addressed prior to product launch. Members of these underrepresented groups are known as 'Inclusion Champions'.

Research methods source: Building For Everyone: Expand Your Market With Design Practices From Google's Product Inclusion Team

When deciding which metrics to use, thinking about different classifications or groups of metrics can be helpful. The inclusion team at Google breaks down metrics into different buckets to better understand them in terms of their application or function. One way to classify metrics is to divide them into two buckets which are socialization metrics and product inclusion metrics.

Socialization metrics are frameworks that Google uses to track progress in terms of diversity and inclusion awareness and participation among the team members working on an AI product. Here are some points to note:

Number of leaders engaged in product inclusion.

Number of product areas or business units that have diversity and inclusion objectives and key results (OKRs).

Number of volunteers working to support product inclusion.

Classification (PI) metrics are measurements used to track progress in terms of integrating product inclusion into what the product teams are doing and the final KPIs and outcomes of those initiatives involving AI product development. Here a some points to note:

Diversity of representation on a team.	Number of users buying or engaging with a product or service.	Number or frequency of negative user experience reports/escalations.

Metrics source: Building For Everyone: Expand Your Market With Design Practices From Google's Product Inclusion Team

This article lays a framework to build inclusive products.

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3 Moving beyond Loyalty Programmes of Food Delivery Platforms

Author :

Neaketa Chawla

Neaketa is a Post Doctoral Researcher at IIM Ahmedabad. Her specialisation is Industrial Organisation, where she has used game-theoretical and microeconomic tools to understand the pricing and competitive behaviour of digital platforms. She is also deeply interested in identifying the different techniques in which platforms can use data to understand the causal impact of their decisions on customers and business partners.

The food delivery market has consolidated over the past few years in India. After Zomato acquired Uber Eats in January 2020, Zomato and Swiggy remain the two most dominant players in the Indian food delivery market. In a business where instant gratification must be delivered at scale, these platforms have used a combination of marketing strategies to entice customers to stick to their service. In this article, we bring into sharp focus the loyalty programmes offered by Food Delivery Platforms (FDPs). We discuss what factors affect their price and how they are different from membership schemes offered by traditional businesses. We understand how they work and enable an FDP to earn more money. Additionally, we also discuss advances in Artificial Intelligence (AI) that can help FDPs build effective service platforms that provide differentiated service to their consumers.

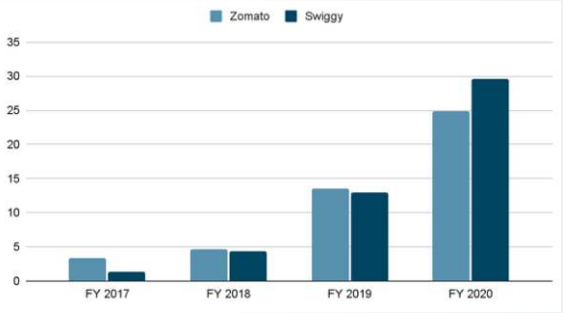

Fig. 1: Revenue of Food Delivery Platforms (in Billion INR)
Source: Statista

Both Zomato and Swiggy offer premium subscriptions to their customers. Zomato launched its premium programme, Zomato Gold, in 2018 where members could get two dishes at the price of one while dining at partner restaurants. After Covid-19, Zomato rebranded this subscription as Zomato pro that offered discounts both on delivery and dining out. Swiggy launched its premium service, Swiggy One, in 2021. Members get unlimited free deliveries on orders above Rs 99 and additional discounts on ordering food from select restaurants under this programme.

Typically, when a business offers two versions of its service, economists call it second-degree price discrimination. The main motive behind a price discrimination strategy is to earn more profits by capturing a bigger part of the consumer surplus. However, food delivery platforms are not traditional businesses and standard predictions about price discrimination might not hold true in their case. An FDP is a two-sided platform that connects restaurants and buyers where both sides (restaurants and buyers) value the presence of the other side. In other words, restaurants benefit if there are more buyers and buyers benefit if there are more restaurants. This is the defining feature of a two-sided platform that determines its pricing structure. Loyalty programmes are launched not necessarily to increase the money made from consumers but to earn higher commission from the restaurants.

In fact, on both Swiggy and Zomato, the delivery charges paid by consumers have gone up over the past few years [1]. However, FDPs have not capitalised on this opportunity to increase the price of their premium offerings, especially when demand for online food delivery has increased sharply after covid-19. Swiggy has altered its three-tier membership plan, Swiggy Super, to a flat one-tier membership, Swiggy One, which is priced at Rs. 79 a month. Zomato Pro is also priced at Rs. 75 a month as compared to Zomato Gold for which consumers paid around Rs. 1800 per year.

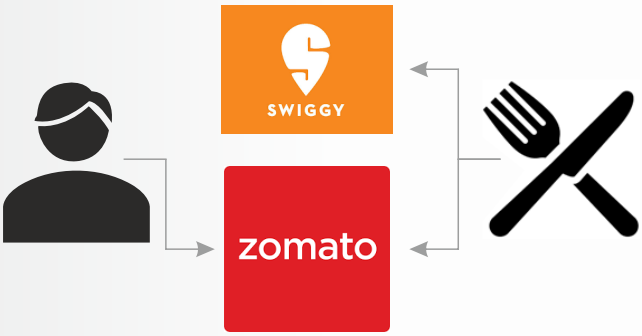

Fig 2: Food Delivery Platforms are Competitive Bottlenecks where restaurants list on multiple platforms, but consumers mostly use one platform.

*Figure is for representational purpose only

One contributing reason behind this is that food delivery platforms are essentially competitive bottlenecks. While restaurants enlist on multiple platforms, consumers generally prefer using one platform over the other [2]. In effect, this makes consumers more valuable for the platform. Platforms compete more fiercely on the consumer side where even premium subscriptions are offered at prices that are exceptionally low. Loyalty programmes push consumers to order more which in turn enable FDPs to earn more through restaurant commissions. Not only do consumers get attractive prices, FDPs also offer them services beyond food delivery. While Swiggy has started delivering groceries and daily use items through Instamart, Zomato is now promising instant delivery which it claims would deliver food in less than ten minutes.

If not for the attractively low prices of premium subscriptions, the consumers would be attracted to the services provided by another FDP, at lower prices, that offers more or less the same choice of restaurants. Taking the example of Amazon would give us a better insight into the main argument. Amazon began offering its premium service in the US in 2005 at $79 per year. The price increased to $119 per year in 2018. Today, Amazon Prime costs $139 per year compared to Walmart+ which is $98 a year and offers identical delivery services. However, even at its current price, Amazon's prime subscription is a steal given the unrivaled benefits of delivery, cloud storage and streaming content that Amazon offers to its US customers [3]. These services help differentiate Amazon's core service of selling goods online. Studies have shown that Prime customers on average spend more than non-prime customers [4]. This enables Amazon to make more money from the sellers through commissions. Increased spending from consumers leads to higher sales by the sellers and higher earnings for Amazon. In India, Amazon began offering its prime subscription at INR 599 a year in 2016. The membership price has today increased to INR 1500 a year, where Amazon guarantees a truly unique service to its customer base, one that its competitors cannot match. This includes two-day delivery along with access to entertainment content on its streaming platform.

The road ahead requires FDPs to leverage technology to provide a truly different experience to their consumers. FDPs cannot continue to depend on partner restaurants to sustain the discounts they give on the buyer side. As consumers become more tech-savvy, they are using multiple food delivery platforms to satiate their hunger needs. In effect, they are increasingly becoming loyal customers of online food delivery but not of a single platform. Copycat marketing strategies rolled out under competitive pressure can hardly provide the differentiating factor that would make a customer pay more. Amongst all this, restaurants are rallying against the high commission rates charged by FDPs as it becomes increasingly unsustainable for them to cover such high costs [5]. We briefly discuss some ways through which AI can help enhance user experience and help an FDP build a differentiated customer service.

Chatbots: Conversational AI can provide a much simpler and seamless experience on online food delivery apps. Currently, users have to open the app, find their favourite restaurant, select the dishes they want to order, choose customisations, move multiple items to cart before checkout and then finally make the payment to place their order. It is a long sequence of steps that has a huge potential to be simplified. A chatbot with capabilities to customise orders can make the entire process simpler. All the consumer needs to do is to tell the chatbot the cuisine they want and the number of people they are ordering for. It is up to the chatbot to recommend appropriate dishes based on past order history and the profiling data of the customer. It also provides an opportunity to share promotional messages and cross-sell different food items. However, operationalising a seamless chatbot experience is not an easy feat. Clumsy interactions can defeat the entire purpose and leave the consumer exasperated. Investment in natural language processing is only the first step toward building a seamless chatbot experience. In the US, many drive-through restaurants have increased the amount of orders they can handle by

employing a chatbot [6]. The platforms also have to ensure smooth collaboration with restaurants to build a satisfying customer experience. For now, FDPs only use chatbots to address consumer complaints and queries regarding their order.

Menu Engineering with Partner Restaurants: Platforms can help restaurants build custom menus using data generated on their platform. These menus can be created based not only on the consumer preferences but keeping in mind different characteristics like the time of the day, customer's location, weather, traffic conditions and availability of delivery partners. Taking it a step, ahead end-to-end customisation can also incorporate any information regarding food allergies, specific instructions regarding cooking, use of cutlery, etc. given by the consumer.

Multiple Ordering: At present, it is not possible to order food from multiple restaurants at the same time. Multiple orders will have to be placed by the customer to have food delivered from different places. It is also not possible to combine restaurant delivery orders along with orders placed for items such as groceries. FDPs can simplify this experience by stacking multiple orders and delivering all of them at once. Partnership with nearby restaurants can help achieve consolidation in last-mile delivery, especially delivering multiple orders together.

Even though the online food delivery market is dominated by a few players, competition is fierce. Although a majority share of consumers patronises a single food delivery platform, preferences can change as consumers become more tech-savvy. They can use multiple food delivery platforms depending on what they want and ditch one platform in favour of the other based on their needs. Food delivery platforms must look beyond run-off-the mill promotional strategies and deep discounts to truly provide a unique experience to their customer. They will have to ensure that the consumer chooses their brand for product-specific reasons rather than to exhaust discount coupons and avail cashback offers.

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RESEARCH PROJECTS

Hiring for the Future - A People Analytics Approach

Prof Aditya Moses

The future of work is a critical aspect for many organizations. A 2020 report by the World Economic Forum suggests that among the various challenges faced by an organization, one of the most critical areas is skill gaps. The top skills and skill groups which employers see as rising in prominence in the lead up to 2025 include groups such as critical thinking and analysis as well as problem-solving, and skills in self-management such as active learning, resilience, stress tolerance and flexibility. On average, companies estimate that around 40% of workers will require reskilling of six months or less and 94% of business leaders report that they expect employees to pick up new skills on the job, a sharp uptake from 65% in 2018. The changing nature of work and the exponential technology development imply that employees need to constantly re-skill and up-skill. In the current environment, while knowledge can be accessed via multiple sources the behaviours to develop oneself become more important. What behaviours will organizations require for ensuring they have a workforce that can reskill and upskill exponentially? This will be the primary area of research for this study. Prof Aditya Moses

Using a data-driven approach, this study uses surveys and NLP to understand which behavioural traits enable re-skilling at pace. We will employ text-mining methods and techniques to identify behavioural traits that help workers re-skill.

An iterative gradient-based bilevel approach for hyperparameter tuning in machine learning

Prof Ankur Sinha

Hyperparameter tuning in the area of machine learning is often achieved using naive techniques, such as random search and grid search that only lead to an approximate set of hyperparameters. Although techniques such as Bayesian optimization perform an intelligent grid search on the domain of hyperparameters, it does not guarantee an optimal solution. A major drawback of most of these approaches is that as the number of hyperparameters increases, the search domain increases exponentially, thereby increasing the computational cost and making the approaches slow. The hyperparameter optimization problem is inherently a bilevel optimization task, and there exist studies that have attempted bilevel solution methodologies for solving this problem. These techniques often assume a unique set of weights that minimizes the loss on the training set. Such an assumption is violated by deep learning architectures. Our study is on gradient-based bilevel optimization method for solving the hyperparameter optimization problem. The method is general and can be easily applied to any class of machine learning algorithms that involve continuous hyperparameters.

Prof Anirban Banerjee

High-frequency trading: Measuring latency from big data

Over the last decade, the Indian market has seen significant growth in algorithmic trading and more specifically, high-frequency trading (HFT) activity. During this period, we have witnessed a significant change in the trading landscape as presently close to half of the trading volume in the stock exchanges is contributed by algorithms. This rise has not always been smooth as there have been calls for regulations to restrict algorithmic trading activity due to the fear of probable market manipulation.

Latency is considered one of the most important market parameters for HFTs. Using a large novel dataset of order and trade level data from the NSE, we would like to inspect how the latency in the Indian market has changed and if that has caused any shift in the way HFTs operate. We would also like to observe how the different market quality parameters have evolved over this time.

Employee Reviews - A Text Mining Perspective

Prof Adrija Majumdar

With the emergence of web 2.0, there is a deluge of online text. Technologies like online communities, social media, crowd funding platforms have further contributed to the volume of content. From the firm's perspective, understanding consumers' sentiment from the text is of supreme importance. The literature on online reviews has predominantly focused on ascertaining consumer sentiment of a firm's products and services. We extend this stream of research and focus on analyzing reviews that employees post regarding their organizations. The study will seek to identify different dimensions that employees highlight in their reviews and their association with overall job satisfaction. We further wish to understand if employees' perception of the firms also impacts the firm's performance. The unstructured and noisy nature of the text data often poses significant challenges for organizations in leveraging them for decision making. We will employ text mining methods and techniques to quantitatively analyse the large dataset of employee reviews. The research will have implications for both theory and practice.

Prof Samrat Gupta

Causes, Symptoms and Consequences of Sociocultural polarization

The Information and Communication Technology (ICT) provides users unparalleled access to information from around the globe. In spite of demographic differences, people can communicate, express and evolve their opinions on topics ranging from politics to culture. The wide-ranging information exchange on digital media can lead to two scenarios viz. formation of public sphere or formation of echo chambers. While the public sphere, which promotes greater diversity, is a well-researched domain, substantially less research has been conducted on echo chambers in relation to socio-cultural events. Despite the huge affirmative impact of socio-cultural events on society, the proliferation of controversies around them and reinforcement through echo chambers is collectively having malefic effects on societies. Recent controversies around socio-cultural products such as movies, painting, books, cartoons, etc. resulted in serious outcomes. For example, Indian movie Padmavat brought polarization of public perception which further reinforced through echo chambers and escalated into widespread agitations. It led to mass destruction of property and human suffering during agitation. We believe this represents a mounting problem for society, one that is likely to intensify in the era of social media. Thus, understanding the causes, symptoms and consequences of socio-cultural polarization is critical and would be valuable for developing interventions to reduce unhealthy societal and organizational polarisations.

Can an AI Coach Help You Lose More Weight Than a Human Coach: Empirical Evidence From a Mobile Fitness Tracking App

Prof Anuj Kapoor

Artificial intelligence(AI) assisted tools are increasingly being used in health care contexts to provide advice and motivation. But whether AI can be a good or even better substitute for human involvement in these contexts is an open question. We provide empirical evidence to answer this question specifically in the context of fitness tracking mobile applications (apps). In addition to facilitating the tracking of activity and food intake, such apps provide advice and motivation in the form of targeted messages to their consumers, and this can be done through human coaches or an AI coach. An AI coach allows these apps to scale their offerings to a larger number of consumers, available on demand to consumers, and potentially more finely targeted by leveraging vast amounts of data. On the other hand, human coaches might be better placed to show empathy, and consumers might also feel more accountable to humans. We compare human and AI coaches on their effectiveness in helping consumers achieve their weight-loss goals. Our empirical analysis is in the context of a large-scale mobile app that offers consumers different levels of subscription plans with human and AI coaches respectively, and specifically compares adopters of the two kinds of plans on their weight loss and goal achievement. We address the potential self-selection in plans by employing a matching-based approach. We find, for our sample of almost 65000 consumers that human-based plans do better than those in AI-based plans in helping them achieve their goals, but that this differs by consumer characteristics including age, gender and body mass index (BMI).

Prof Sobhesh Kumar Agarwalla

State-space models of implied volatility and information content of option prices

Prof Vineet Virmani

The proposed research project on modeling implied volatility (IV) and understanding the information content of option prices is part of our larger research agenda on studying ways to quantify uncertainty in financial markets, focusing on India. Traders in options markets do not usually quote option prices, but the volatility implied by them. IV is that volatility input to the famous Black-Scholes option pricing formula such that the Black-Scholes prices match the market price of the options. It has been observed that IV is not a constant but varies systematically with strike/delta and expiration date. The shape of the observed relationship between implied volatility and strike is called volatility smile or skew. In this project, we plan to explore various ways of modeling the dynamics of volatility smile using variants of state-space models and the Kalman Filter.

CONDUCTED SEMINARS

Topic: Auditing and Designing for Equity in Resident Crowdsourcing

Prof. Nikhil Garg
Assistant Professor,
Cornell Tech Jacobs
Technion-Cornell Institute

Modern city governance relies heavily on crowdsourcing (or "coproduction") to identify problems such as downed trees and power-lines. A major concern in these systems is that residents do not report problems at the same rates, leading to an inefficient and inequitable allocation of government resources. However, measuring such under-reporting is a difficult statistical task, as, almost by definition, we do not observe incidents that are not reported. Thus, distinguishing between low reporting rates and low ground-truth incident rates is challenging. First, joint with Zhi Liu, we develop a method to identify (heterogeneous) reporting rates, without using external (proxy) ground truth data. Our insight is that rates on duplicate reports about the same incident can be leveraged, to turn the question into a standard Poisson rate estimation task—even though the full incident reporting interval is also unobserved. We apply our method to over 100,000 resident reports made to the New York City Department of Parks and Recreation, finding that there are substantial spatial and socio-economic disparities in reporting rates, even after controlling for incident characteristics. Second, I'll briefly overview our work in redesigning inspection decisions to improve system efficiency and equity.

Using Explainable AI – To understand what your brain cares about (March, 2022)
Dr Saikat Ray (Department of Brain Sciences, Weizmann Institute of Science, Israel)

Quantum Key Distribution: A paradigm shift in secure communication (February, 2022)
Dr Ravindra Pratap Singh (Professor, Physical Research Laboratory)

Can machines learn to see without humans teaching them? (January, 2022)
Dr Ishan Misra (Research Scientist, Facebook AI Research)

Advances in AI for Social Cyber-Safety
Prof. Srijan Kumar (School of Computational Science and Engineering at Georgia Institute of Technology)

Programmatic High Impact Information Systems Research Using Data Science to address Grand Challenges (November, 2021)
Prof. Sudha Ram (Anheuser-Busch Endowed Professor of MIS,
Entrepreneurship & Innovation in the Eller College of Management at the University of Arizona)

LEARNCOIN

A Classroom Cryptocurrency for Learning Blockchain Technology

A classroom cryptocurrency game (March 7, 2022)

The world has moved from Barter to Fiat Currency and there is a huge buzz around Cryptos. Blockchain technology is gaining considerable interest across industries and applications, with Bitcoin and Ethereum being the most famous cryptos. Applications of blockchain technology are not only restricted to finance but are finding takers in healthcare, automobile, manufacturing, travel, and even fashion.

The concept of blockchain networks is hard to understand as it requires knowledge of a wide variety of disciplines from cryptography to economics and finance. Keeping this in mind, Prof. Ankur Sinha created an engaging game which is a physical simulation of a blockchain network following the standard rules of blockchain technology for teaching purposes. The game is played with a hypothetical cryptocurrency called LearnCoins and helps the participants understand how blocks are verified and added to the blockchain. Various consensus algorithms are discussed and concepts such as Distributed Ledger, Proof of Work, Proof of Stake, Nonce and Hash are shown at work in a physical setting. The game was recently played by IIMA PGPX students from the Batch of 2022. It was played in tandem with an engaging debate on the benefits and issues with virtual currency.

Prof Ankur Sinha
Associate Professor,
IIM Ahmedabad

CXO CONCLAVE

CXO panel discussion on Rejuvenating businesses in the era of AI+ (March 16, 2022)

Prof Indranil Bose
Distinguished Professor,
NEOMA Business School

The Brij Disa Centre of Data Science and AI recently organized a CXO panel discussion on "Rejuvenating businesses in the era of AI+". Professor Indranil Bose moderated the discussion, and company founders from diverse technology backgrounds in the AI space shared their experiences and insights. The discussion explored how varied technologies such as predictive maintenance, robo-advisory, Omnichannel customer experience platforms and simulated reality are changing the business landscape. Panelists discussed how businesses can provide differentiated products and services for their customers in the times of publically available AI models and also create barriers to entry. Apart from that, themes related to the responsible use of AI and the role of new technologies in post covid recovery were also explored.

Speakers' Profile

Harsh Gahlaut
Founder & CEO,
FinEdge

Raman Talwar
CEO & Founder Director

Derick Jose
Co-founder & Chief Data Scientist,
Flutura Decision Sciences and Analytics

Laxmi Khatiwada
Cofounder & COO,
Simplify 360

AWS WORKSHOP

Democratizing AI for Academic Research

Prof Sanjiv Das
William and Janice Terry Professor of Finance and Business Analytics, Santa Clara University's Leavey School of Business

Dr Sanjiv Das, Professor, Santa Clara University, conducted a workshop on "Multimodal Machine Learning at Scale: Democratizing AI" for Academic Research.

Data analytics is mostly geared towards tabular data (numerical and categorical). Humans form decisions using this data but also make judgments based on text they read, such as news, reports, etc. Econometrics and Machine learning have been used successfully on tabular data and also on text and images, but the combination of text and tabular data is much more powerful. The workshop showcased various recent tools in AWS SageMaker JumpStart that demonstrate how combining natural language processing of text with tabular data brings better results and also brings machine cognition closer to that of humans. This is especially useful in finance, where humans have been using multimodal data to make decisions. The workshop demonstrated some use cases and tools for multimodal ML, showcasing how ML comes closer to being human.

SUMMER SCHOOL ON

LARGE SCALE OPTIMIZATION

Brij Disa Centre for
Data Science and Artificial Intelligence

MAY 6 - 13, 2022

After the enthusiastic response to the first summer school on Large Scale Optimisation held at the Indian Institute of Management, Indore, the next offering will be held at the Indian Institute of Management Ahmedabad, May 06-13, 2022. The program would provide rigorous training to the cohort in solving complex real-world optimization problems through contemporary solution methods. To this end, the program shall provide tutorials on several topics, like Lagrangian Relaxation, Benders Decomposition, Column Generation, Dantzig-Wolfe Decomposition, Cutting Plane Methods, Generalized Benders, Bilevel Optimization, etc. The workshop will give a comprehensive overview for solving large-scale Mixed Integer Linear Programs (MILPs) and Mixed-Integer Nonlinear Programs (MINLPs). Each session on a given topic will be followed by a research talk on a problem that demonstrates a successful application of the method.

Prof Sachin Jaiswal
Co-coordinator
Faculty, IIMA

Target Audience

- **Masters/PhD students in Operations Research/ Management Science/ Industrial engineering**
- **Industry Professionals in Optimization/Logistics/ Supply Chain Domain**
- **Faculty Members working with Integer Programmes**

Faculty

- **Prof. Amit Kumar Vatsa**
  Indian Institute of Management Indore
- **Prof. Ankur Sinha**
  Indian Institute of Management Ahmedabad
- **Prof. Ashutosh Mahajan**
  Indian Institute of Technology Bombay
- **Prof. Faiz Hamid**
  Indian Institute of Technology Kanpur
- **Prof. Goutam Dutta**
  Indian Institute of Management Ahmedabad
- **Prof. Jyotirmoy Dalal**
  Indian Institute of Management Lucknow
- **Prof. Sachin Jayaswal**
  Indian Institute of Management Ahmedabad (Co-ordinator)
- **Prof. Saurabh Chandra**
  Indian Institute of Management Indore
- **Prof. Yogesh Kumar Agarwal**
  Jaipuria Institute of Management (Retd., IIM Lucknow)

THE TEAM

Debjit Ghatak
Centre Head

Neaketa Chawla
Post-doctoral
Research Associate

Kulvinder Kaur
Post-doctoral
Research Associate

Arnab Chakrabarti
Post-doctoral
Research Associate

Prince Roy
Pre-doctoral
Research Associate

Satender
Pre-doctoral
Research Associate

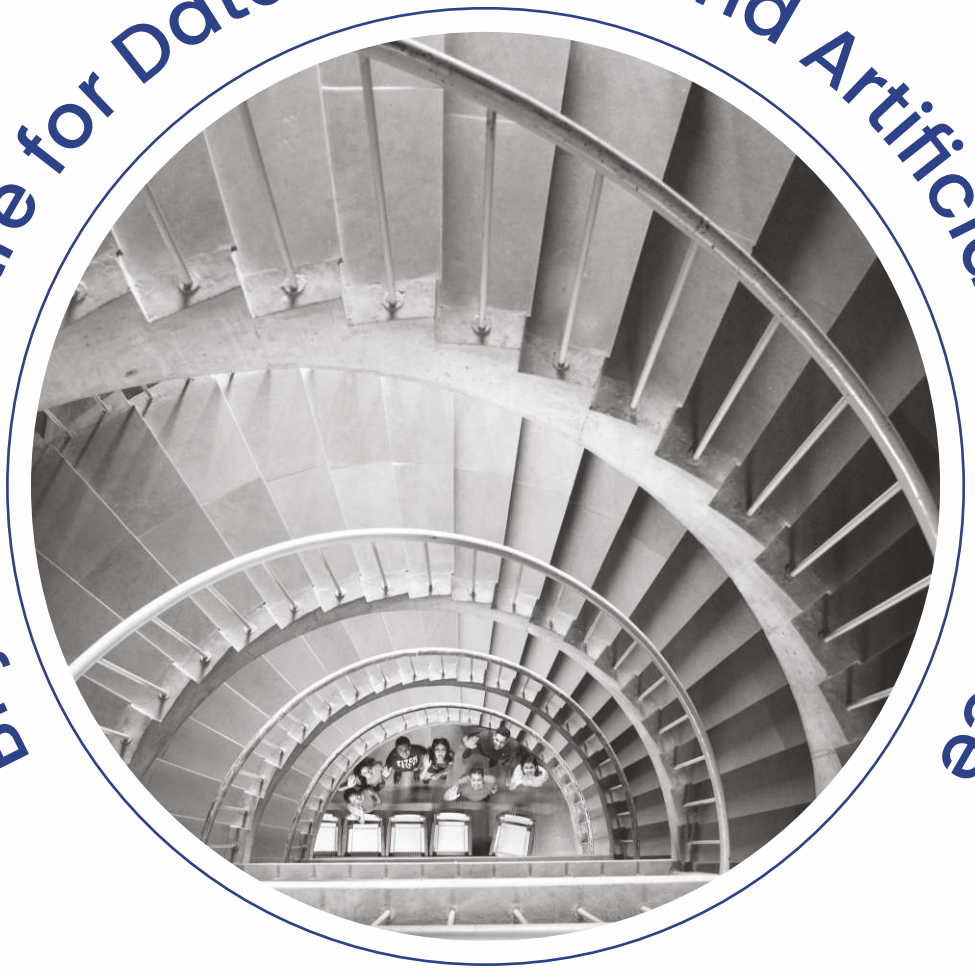
Vani Dwivedi Pandya
Pre-doctoral
Research Associate

Nebu Varghese
Pre-doctoral
Research Associate

Shivam Kumar
Pre-doctoral
Research Associate

Anjali Nair
Centre Secretary

Brij Disa Centre for Data science and Artificial Intelligence



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