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A Study On The Drivers Of Customer Satisfaction And Repeat Purchase In Online Shopping For Apparel: A Structural Equation Modeling Approach

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ABSTRACT

The study examines various factors of product and service information quality influencing customer satisfaction and leading repeat purchase. Structural Equation Model – Partial Least Square 4 is adopted to test the structural relationship between the variables. The factors of Product Information Quality, such as Experiment with Appearance is the strong influencing factor of customer satisfaction. The impact of another factor of Product Information Quality, Vividness of Product Presentation on customer satisfaction is insignificant. Statistically, the study proved that a strong correlation exists between the factors of Service Quality Information such as Retailers' Credibility -> Customer Satisfaction and Promotion Strategy -Customer Satisfaction. The result shows the requisite of customer satisfaction in online shopping for repeat purchases.

Key Words: *Product Information and Service Information Quality, Structural Equation Model, Customer Satisfaction, Repeat Purchases.*

1.Introduction

Online shopping has grown in popularity in developing countries alternative to traditional brick-and-mortar shopping and the number of online platforms for selling products and services is increasing tremendously year after year. (Statista, 2022) reports an estimated growth of the online industry in India would be 200 billion US dollars by 2027. The value share of the apparel market in e-commerce retail in 2020 is 40% (IBEF, 2022). Increasing trust in retailers' credibility, availability of products at competitive pricing, Option of Trial and Buy, and presentation of product information are the few factors that largely influence consumers to carry out online shopping for apparel in India.

The current paper intends to examine the quality of services offered, concerning retailers' credibility, promotional strategies, and quality of product information offered concerning vividness of product presentation, and experiment with appearance, in online shopping. Retailers' reliability is the key driver of customer satisfaction in online shopping as personal contact between the buyer and seller is lacking in e-

retailing. The success of the e-commerce website depends on the perception of trust in e-commerce sellers by the consumers. (Lee and Lin, 2005) The purchase intention of the consumer is affected by the e-service quality

of trustworthiness and reliability. Competitive pricing of the product is another influencing factor of customer satisfaction that attracts more consumers' participation in online shopping (Vasic et al., 2019). (Kim & Eom, 2002) Though an Effective user interface is one of the important factors of customer satisfaction, it does not guarantee that customers would be loyal to the online website and repurchase again from the same website. Fulfilling the expectations of the customers regarding the product and service would enhance customer satisfaction which leads to building positive relations and customer loyalty. (Ekasari et al., 2019) The effect of service quality, pricing of the product, and product quality on customer satisfaction are higher which persuades consumers to shop online. (Fiore & Jin, 2003) In the case of online purchases of apparel, customers are satisfied with the choice of the right apparel when it is possible to check the suitability of the apparel with physical appearance. Designing the online shopping website with Artificial Intelligence (AI) would enable the customers to experiment with the apparel appearance before placing an order. In this regard, the current research paper investigates the dimensions of product quality (vividness of product presentation and experiment with appearance) and service quality (retailers' credibility and promotional strategies) that determines customer satisfaction and make them loyal to the apparel website which paves way for repetitive buying.

2. Purpose of the Research

The current research aims to find out the significant factors of service and product information in online shopping leading to customer satisfaction and repeat purchases. First, the study examines the structural relationship between the service information factors of retailers' credibility and promotional strategies. Secondly, the effect of product information factors on the vividness of product presentation and experiment with appearance is examined. Thirdly, it tries to find out the impact of customer satisfaction on repeat purchases.

3. Hypothesis development and model formulation

3.1 Retailers' Credibility and Customer Satisfaction

For attracting and retaining consumers, the level of credibility, trustworthiness, and security needs to be enhanced since these factors of e-service quality have a significant impact on purchase intention and satisfaction (Lee and Lin, 2005). The effect of the factors of e-service quality, such as reliability and responsibility is high on customer satisfaction (Hung et al., 2014). (Mainardes et al., 2023) More than security and privacy issues in the online environment, customer perception of retailers' ethical practices stimulates positive customer experience. (Long and McMellon, 2004) Following ethical practices in

online trading to enhance retailers' credibility has reflected in customer satisfaction as distrust and uneasiness felt by the consumers is the cause for cancellation of the order. (Jun & Kim, 2004) Prompt responses to consumer issues would improve reliability, online service quality, and customer satisfaction. Hence, the following hypothesis is generalized,

H01: There is no correlation between Retailers' Credibility and Customer Satisfaction.

3.2 Promotion Strategy and Customer Satisfaction

Availability of the product at a competitive price is the key motivator of online purchases where the customers are value seekers and they prefer to buy from the e-retailers who offer discounts (Khan et al., 2015). In order to take the advantage of larger quantity sales, online sellers provide special offers and adopt a stage-decreasing range strategy. Making the product available at a low price keeps the consumers happy and satisfied (Hung et al., 2015). An offering of the product at the right pricing has been supported by (Prasetyo et al., 2020) that Product price and discounts had a high impact on buying decisions and customer satisfaction. (Khairawati, 2020) supports that discount promos and Master cards would enhance customer loyalty and satisfaction.

H02: Promotion Strategy does not influence customer satisfaction.

3.3 Experiment with Appearance and Customer Satisfaction

The addition of the feature of mix-and-match to offer clear details of trying on different apparel improves customer experience and attitude towards online apparel shopping. Customers who want to Experiment with Appearance (EA) have a positive shopping experience and attitude (Fiore & Jin, 2003). The effect of Perceived product risk in apparel online shopping is minimized through introducing the technology of Experiment with Appearance where then the consumer can try different new apparel to see how they look on them. Using such body scanning technology offers cognitive experience and satisfaction in making the right choice of product (Lee et al., 2010). Since, it is hypothesized that,

H03: The impact of the Experiment with an appearance on customer satisfaction is insignificant.

3.4 Vividness of Product Presentation and Customer Satisfaction

An effective virtual presentation of the product engages the customers emotionally that attracts customer attention. Presentation of the product with a three-dimensional view gives more knowledge about the product and builds a positive attitude (Jiang & Benbasat, 2003). Virtual presentation of the product in the form of a 3D image develops a positive attitude about the product and website that leads to customer satisfaction (Algharabat et al., 2017). (Park et al., 2005) Virtual product motion and enlargement of product image create a positive mood and purchase intention. (Flavian et al., 2017) A vivid presentation of the product in the form of videos would convince the consumers about the attributes of the product which causes purchase decisions.

H04: The effect of vividness in product presentation on consumer satisfaction is insignificant.

3.5 Customer Satisfaction and Repeat Purchase

Customer satisfaction determines that the product or service provides a pleasurable level of consumption-related fulfillment (Chiu et al.,2009). Customer Satisfaction has a positive impact on repurchase intentions. The more liking to use the company’s product and less liking to shop from other e-commerce websites (Kim et al., 2009). For attaining long-term growth, e-commerce websites regard customer satisfaction as a key influencer for online shopping (Deng et al.,2010). Customer satisfaction is derived through purchasing experience reliability and responsiveness to quality service that leads to repurchase intention (Subramanian et al.,2014). (Suhaily&Soelasih 2017) Positive perception of e-service quality and price positively influences customer satisfaction leading to repurchase intention. When the customers are satisfied with the decision of buying online, they would prefer to purchase again online.

H05: Customer satisfaction does not influence repeat online purchases.

4.Proposed Theoretical framework

Based on the review of the literature, the theoretical framework of the current study is proposed.

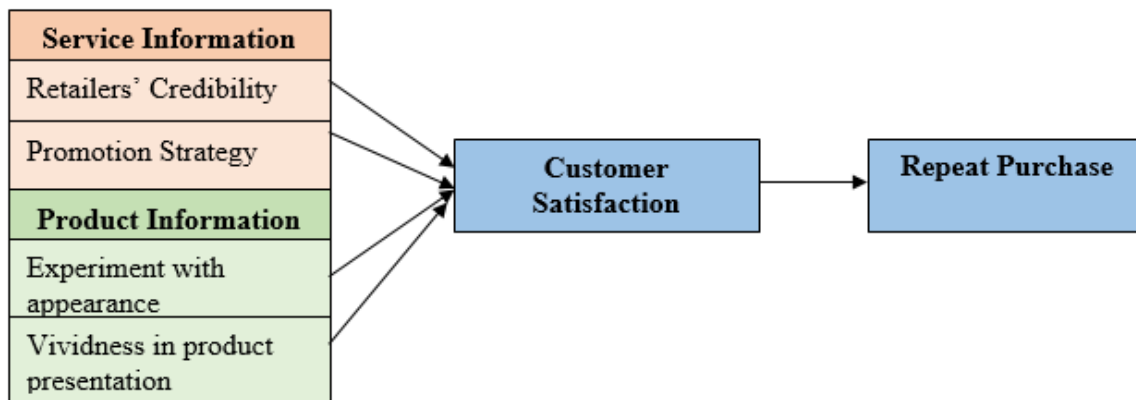


Fig. 1. Proposed conceptual framework

5.Research Methodology

The current research used a non-random sampling method of convenience sampling to collect the data from the population of Mumbai. A survey method is adopted for collecting the data. A questionnaire is distributed to the sample.The sample size for the present study is 105 which is higher than the minimum sample requirement of 80 according to the Sample-to-Variable Ratio which is calculated based on the 20:1 ratio. For analysing the primary data, the statistical tool Structural Equation Model- Partial Least Square is used.

6.Data Analysis

The validity and Reliability of the data are checked through Confirmatory Factor Analysis. The value of Average Variance Extracted (AVE) which is above 0.5 reflects the presence of Discriminant validity of the independent and dependent variables. The Composite Reliability of the variables has been proved which is above the minimum threshold value of 0.7 in the present study. Internal consistency of the items included in the construct is checked through Cronbach's Alpha which is more than 0.7 for all the dependent and independent variables. The value of factor loading of the items in the construct is > 0.7 (above 0.7) which proves the extent to which it measures the construct.

The effect of an independent variable on a dependent variable is known through the path coefficient -Beta (β) value. The impact of Retailers' Credibility \rightarrow Customer Satisfaction; Promotion Strategy \rightarrow Customer Satisfaction; Experiment with Appearance \rightarrow Customer Satisfaction; Vividness of Product Presentation \rightarrow Customer Satisfaction; Customer satisfaction \rightarrow Repeat Purchase are high with the path coefficient value of more than 0.20. The path coefficient value of Customer satisfaction \rightarrow Repeat Purchase is 0.629 which shows the key variable for repeat purchase is customer satisfaction. Experiment with Appearance \rightarrow Customer

Satisfaction (β -0.483) is the strongest independent variable influencing customer satisfaction in online shopping. Customers who are sure about the right choice of apparel are likely to be satisfied with online shopping for apparel. The shortcoming of online shopping regarding physical trials on clothes can be overcome with image interactivity technology where the consumers prefer virtual try-on to check how the apparel looks on them before placing the order. The Beta (β) value of Retailers' Credibility \rightarrow Customer Satisfaction is 0.263 which proves retailers' credibility is the strongest independent variable of service quality in measuring customer satisfaction in online purchases. Experiments with Appearance, the factor of Product information, and Retailers' credibility of Service Information are the significant variables determining customer satisfaction.

The effect of the drivers of online shopping, such as Experiment with Appearance, Vividness in product presentation, Retailers' Credibility, and Promotion Strategy on Customer Satisfaction is strong with the R Square value of 0.599 which shows a 60% variation in Customer Satisfaction explained by tested independent variables. The influence of customer satisfaction on repeat purchases is moderate as the value of R square for repeat purchases is 0.396. 40 percent of the online customers satisfied would like to repurchase online.

Table 1: Goodness of Fit Model (GoF)

Variable	AVE	Composite Reliability(ρ_a)	Cronbach's Alpha	Composite Reliability(ρ_c)	R Square	R Square Adjusted
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Retailers' Credibility	0.915	1.097	0.972	0.977		
Promotion Strategy	0.662	0.876	0.872	0.907		
Experiment with Appearance	0.721	0.888	0.870	0.912		
Vividness of Product Presentation	0.794	0.931	0.913	0.939		
Customer satisfaction	0.800	0.939	0.937	0.952	0.559	0.540
Repeat Purchase	0.659	0.813	0.725	0.847	0.396	0.389

Source: Compiled from Primary Data using Partial Least Square

Table 2: Factor Loading

Variable	Factor Loading	Remark
Customer satisfaction1	0.845	Valid
Customer satisfaction2	0.927	Valid
Customer satisfaction3	0.918	Valid
Customer satisfaction4	0.890	Valid
Customer satisfaction5	0.890	Valid
Experiment with Appearance 1	0.787	Valid
Experiment with Appearance 2	0.915	Valid
Experiment with Appearance 3	0.881	Valid
Experiment with Appearance 4	0.808	Valid
Promotion Strategy1	0.801	Valid
Promotion Strategy2	0.775	Valid
Promotion Strategy3	0.837	Valid
Promotion Strategy4	0.787	Valid
Promotion Strategy5	0.865	Valid
Repetitive Purchase1	0.903	Valid
Repetitive Purchase2	0.551	Invalid
Repetitive Purchase3	0.927	Valid
Retailers Credibility 1	0.959	Valid
Retailers Credibility 2	0.960	Valid
Retailers Credibility 3	0.938	Valid
Retailers Credibility 4	0.969	Valid

Source: Compiled from Primary Data using Partial Least Square

Table 3: Path Coefficient

Path Coefficient (Beta Value)

Variables	Path Coefficient	Rank
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Retailers' Credibility -> Customer Satisfaction	-0.263	3
Promotion Strategy -> Customer Satisfaction	0.256	4
Experiment with Appearance -> Customer Satisfaction	0.483	2
Vividness of Product Presentation -> Customer Satisfaction	0.225	5
Customer satisfaction -> Repeat Purchase	0.629	1

Source: Compiled from Primary Data using Partial Least Square

7. Testing of Hypothesis

The hypothesis framed to validate the objective of the study has been tested through Bootstrapping Method.

The result of the study strongly supported that Repeat Purchase is determined by the level of customer satisfaction that has the P value of $0.000 < 0.05$. Consistency with the results of the existing study (Chiu et al., 2009; Kim et al., 2009; Deng et al., 2010; Subramanian et al., 2014; Suhaily & Soelasih 2017) the current research evidenced that customers satisfied with online purchases prefer to buy again either from the same website store or different online store in future.

It is proved that Experiment with appearance is the strongest driver of online shopping for apparel with the P value of $0.000 < 0.05$. It is proved that customers prefer to use body scanning technology and virtual models to see how do they likely to look in the apparel. Adding such features to the online website gives pleasure in trying different garments to see how they look in the style of the apparel.

It is statistically proven there is a positive correlation between retailers' credibility and customer satisfaction. The P value of Retailers' credibility -> Customer Satisfaction 0.010 which implies customer perception of trust in retailers influences the customer to shop more. Retailers' credibility is a significant factor in online shopping since personal direct contact between the seller and buyer is lacking. Retailers' honesty regarding the products/services, post-purchase service, and financial aspects has more impact on customer satisfaction.

The effect of vividness in the presentation of the product on customer satisfaction is insignificant. The Null hypothesis H04 is accepted as the P value is $0.075 > 0.05$ which implies an effective presentation of the product with animated images, and video is not influencing customer satisfaction. It supports the fact that customers are satisfied if they are delivered with a product that matches the virtual image. Physical Product quality determines customer satisfaction rather than the Quality Virtual Image of the Product.

Table 4: Hypothesis Testing

The Result of Hypothesis Testing (Bootstrapping Method)

Paths	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values	Hypothesis
H01. Retailers' Credibility -> Customer Satisfaction	-0.263	-0.255	0.101	2.589	0.010	Not Supported
H02. Promotion Strategy -> Customer Satisfaction	0.256	0.269	0.110	2.332	0.020	Not Supported
H03. Experiment with Appearance -> Customer Satisfaction	0.483	0.460	0.134	3.612	0.000	Not Supported
H04. Vividness of Product Presentation -> Customer Satisfaction	0.225	0.227	0.126	1.781	0.075	Supported
H05. Customer satisfaction -> Repeat Purchase	0.629	0.639	0.074	8,520	0.000	Not Supported

Source: Compiled from Primary Data using Partial Least Square

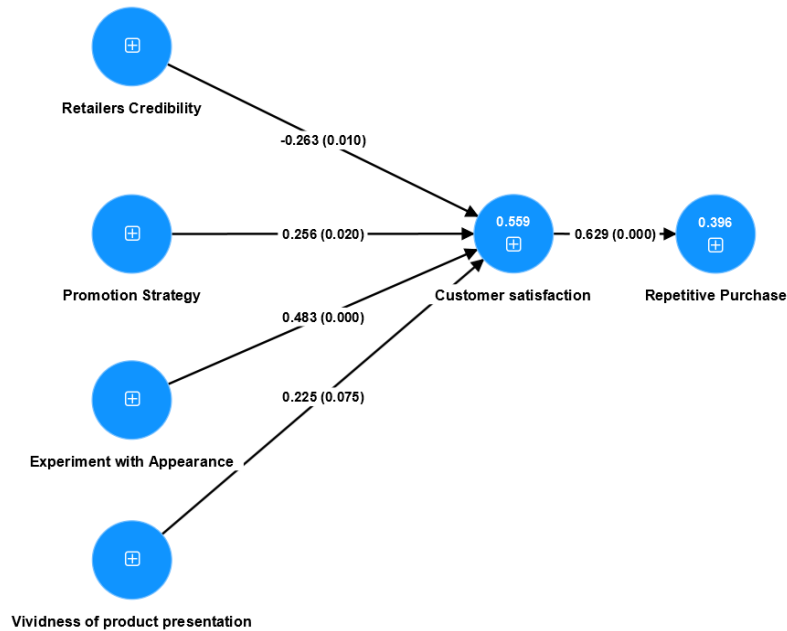


Fig 2. Structural Equation Model Source: Structural Equation Model using Partial Least Square

8. Practical Implications

The results of the current research would provide practical implications for E-retailers of apparel. The significance of the factor, Experiment with Appearance implies the necessity to incorporate the website attribute that facilitates the customer to try virtual try-on the apparels which are sparsely used by online shoppers. Customer Relation Management and offering of products at a competitive price would attract customers and makes them loyal to the online website.

9. Limitations and Scope for future research

The population of the current research is the Mumbai region and it may generate different results in other geographical locations. There are various factors causing customer satisfaction in online shopping. The results of the present study are based on testing a few factors (Experiment with Appearance, Vividness of product presentation, Retailers' Credibility and Promotion Strategy) of Product and Service Information Quality responsible for customer satisfaction. The impact of socio-demographic factors could be explored in future studies.

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A Pilot Study On Cryptocurrency Adoption Decision In Mumbai

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ABSTRACT

The advancement of technology in the past few decades has allowed currency to evolve from the physical domain. One of the results of such development is cryptocurrency. This paper aims to investigate the current knowledge of the general public about cryptocurrency, whether the public has a comprehensive understanding of the functioning of cryptocurrency and all of related processes; its utility in the near future. This paper also aims to ascertain the amount of government control the respondents deem necessary to ensure and carry out smooth and licit operations. Cryptocurrencies can address many of the issues that plague the economy such as cost of mediation, non-reversible transactions, and market instability (Nakamoto, 2008).

In this pilot study, we derived the information through a research method that included data collection via

a questionnaire survey on Google forms, which allowed us to gather diverse information about people's basic knowledge of cryptocurrency. Some of the questions asked were if they had heard of the term "cryptocurrency" and if they had ever traded crypto. These types of questions assisted in gaining a basic understanding of people's perspectives on Cryptocurrency. The information we gathered has been represented graphically. The research findings help researchers and cryptocurrency developers understand consumer behavior regarding their inclination towards using cryptocurrencies.

Keywords: *Cryptocurrency, Blockchain, Technology, Government*

INTRODUCTION

Bitcoin is a digital currency and decentralized network that processes transactions using a peer-to-peer network. The Bitcoin system uses cryptographic evidence in its computer software to execute transactions and to confirm the legality of Bitcoins instead of depending on third parties that may be trusted, such as banks and card processors. (Nakamoto, 2008). Bitcoin was the first decentralized cryptocurrency to be created, which came into existence in 2009. Since the inception of Bitcoin, several other cryptocurrencies and altcoins have seen a meteoric rise in fame in the past few years. Some of the most renowned cryptocurrencies are Ethereum and Shiba Inu. Cryptocurrencies can be used to facilitate transactions and purchase and sale of goods and services. However, a major drawback that makes people wary of cryptocurrency is the fact that the value of cryptocurrency is highly volatile, and they are not backed by any physical assets or government. The future of cryptocurrency is still erratic as its rudimentary functions can be affected due to government control and various other factors that contribute to the uncertainty such as the increasing use of blockchain technology, Central Bank Digital Currencies, and global economic conditions.

OBJECTIVES

The intent of this paper is:-

1. To gauge the respondent's knowledge about cryptocurrency.
2. To ascertain the respondent's expectations regarding cryptocurrency in the forthcoming years.
3. To assess the respondent's perspective on government intervention concerning cryptocurrency.

LITERATURE REVIEW

With the advent of Bitcoin in 2009, there has been a steady influx of cryptocurrencies and altcoins in recent years. The expeditious growth of cryptocurrencies has various implications in the financial and economic sphere. This literature review aims to supply an analysis of

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the current knowledge and outlook of consumers towards cryptocurrencies.

Cryptocurrencies have been described in studies as digital or virtual money that uses cryptography to ensure transaction security and decentralised ledgers to ensure transaction integrity (Nakamoto, 2008). Cryptocurrency has also been the subject of research on its financial implications, including its effects on asset pricing and market efficiency (Cheah & Fry, 2015; Urquhart, 2016). Studies have also indicated that cryptocurrency can be utilized to conduct illegal and illicit activities (Meiklejohn 2013; Böhme et al 2015). With the advent of cryptocurrencies, there have been growing concerns regarding regulation for protection of consumer rights, compliance with implemented tax codes and ensuring the stability of the economy (European Banking Authority, 2014). To explore many facets of the adoption of cryptocurrencies, researchers have employed theories like the Diffusion of Innovation Theory and the Unified Theory of Acceptance and Use of Technology (UTAUT). The Diffusion of Innovation Theory (DoI) seeks to explain how, why, and how quickly new ideas, breakthroughs, and technology spread (Rogers, 1995). The diffusion of innovation theory was employed by (Prethus and O'Malley, 2017) to examine the end-users' motives and adoption hurdles for cryptocurrencies. The results imply that individuals' interest in technology is what drives them to accept Bitcoin. The value & security issues, as well as the fact that they are hoping for other people to accept Bitcoin first, were two difficulties from the non-users' point of view.

(Venkatesh et al. 2016) created the Unified Theory of Acceptance and Use of Technology (UTAUT) model to comprehend how consumers embrace and use new technological advances like cryptocurrencies. UTAUT was used in an empirical study by (Gunawan and Novendra, 2017) to examine the adoption of Bitcoin in Indonesia. The study discovered that the dimensions of performance expectancy and social influence have a significant impact on behavioural intention to use Bitcoin. Additionally, the primary elements affecting the use of Bitcoin technology are performance expectations and favourable conditions. Nseke used the UTAUT to examine how Africans were utilising new technology. The UTAUT model now includes the constructs of hedonistic motivation, habit, and pricing cost. Identifying whether cryptocurrencies would have a big impact on economic growth was the objective. Of some of the African countries. According to the study, the conceptions of performance, effort expectations, and social influence are essential for African nations. In addition, Nseke contends that the primary benefit of utilising Bitcoin is the secrecy of transactions, while its disadvantages include high volatility, a lack of user friendliness, and its use in illegal activities.

As a relatively new technology, cryptocurrencies possess great potential to alter the economic and financial landscape but are met by their own set of problems such as a lack of supervision, and unstable price levels.

RESEARCH METHODOLOGY

The research is primarily database where the responses from 74 respondents have been collected through Google Forms. The respondents were asked about their knowledge and expectations towards cryptocurrency. Under this study, secondary data was sourced from a variety of publications, books, websites, etc.

DATA COLLECTION AND INTERPRETATION

Null hypothesis: The financial literacy surrounding cryptocurrency is low among the respondents

Alternate Hypothesis: The financial literacy surrounding cryptocurrency is high among the respondents

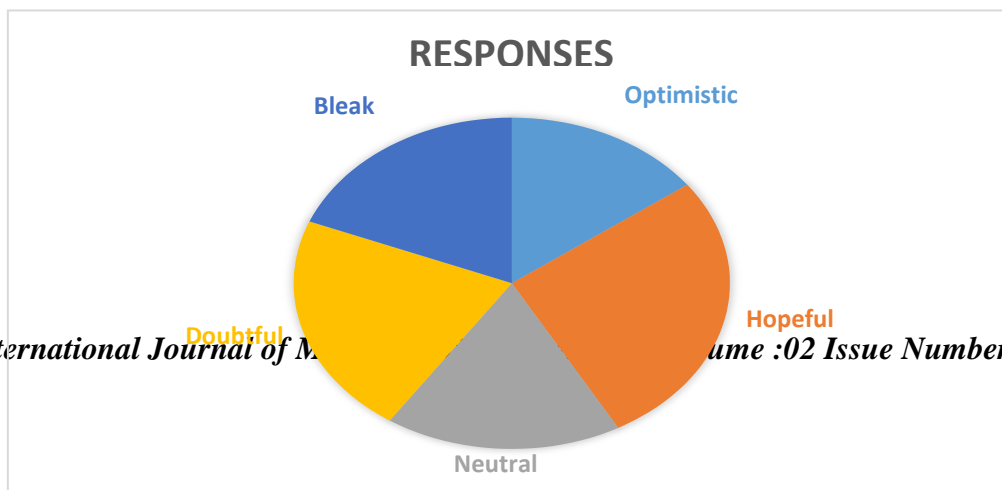
Percentage of respondents aware about cryptocurrency (74 Respondents)	
Response	Percentage of Respondents
Yes	83.80
No	16.20

Percentage of respondents aware about the working of cryptocurrency (74 Respondents)	
Response	Percentage of Respondents
Yes	37.83
No	62.17

From the above collected data, we can imply that majority of the respondents are aware about cryptocurrency. However, only a small percentage of respondents had a comprehensive understanding about the underlying processes pertaining to cryptocurrency

Null Hypothesis: The respondents are doubtful about the usage of cryptocurrency in the future

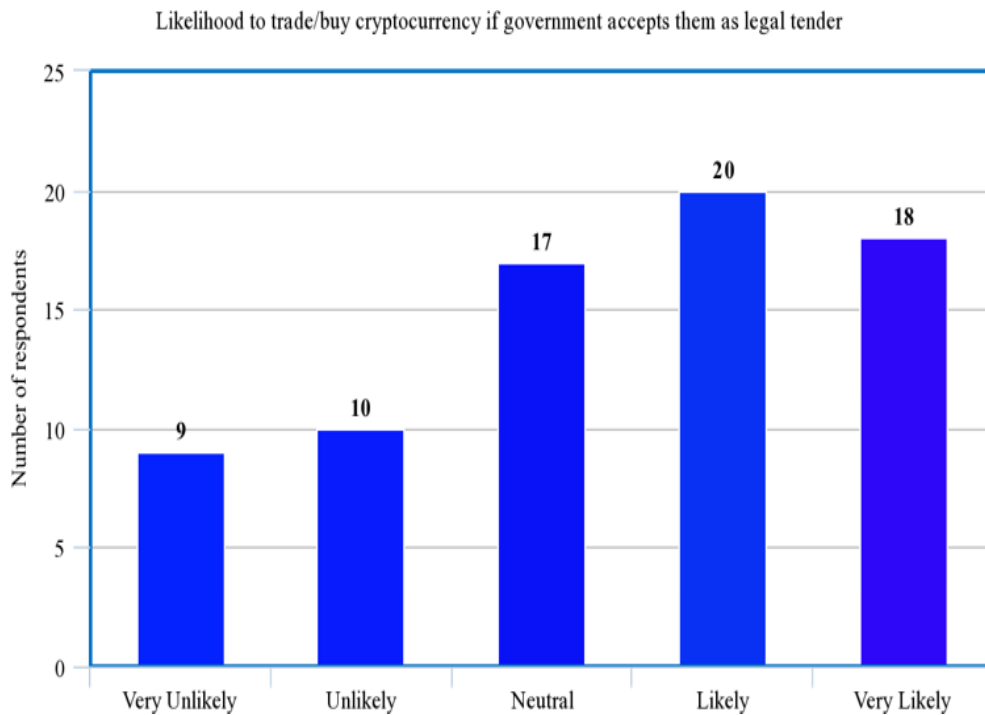
Alternate Hypothesis: The respondents are optimistic about the usage of cryptocurrency in the future



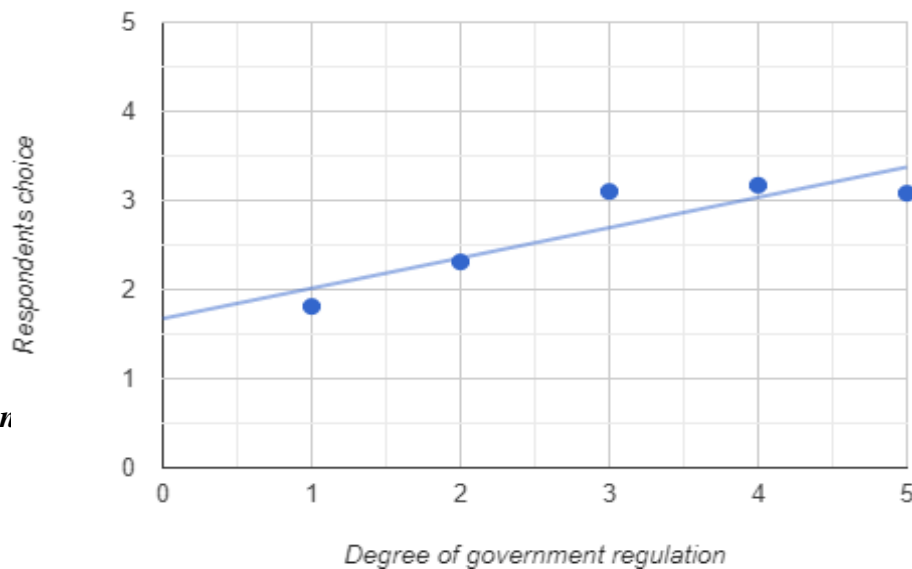
From the above collected data, we can infer that a sizable portion of the respondents have a positive outlook on the future of cryptocurrency. However, many respondents are also unsure about the future of cryptocurrency.

Null Hypothesis: There is a negative correlation between government intervention and respondents' willingness to trade/use cryptocurrency.

Alternate Hypothesis: There is a positive correlation between government intervention and respondents' willingness to trade/use cryptocurrency.



Scatter plot for correlation between degree of government regulation and people's willingness to invest/trade cryptocurrency



For the above data, the value of $r = 0.8393$. Hence it is evident that there is a **fairly strong positive correlation** between the degree of government regulation and people's willingness to invest/trade cryptocurrency.

CONCLUSION

In conclusion, while cryptocurrency has the potential to revolutionize the financial industry, it is still in a relatively nascent stage. As with any new technology, cryptocurrency also experiences a fair share of problems such as stability and regulatory issues. Cryptocurrencies are also highly volatile which makes it difficult for the common investor to predict the position of the asset in the future. The lack of regulation and absence of any supervising authority also makes it a safe haven for illegal and illicit activities. Hence, it is not advisable for all investors and should be approached with due diligence and one should only deal in cryptocurrency after they have a comprehensive understanding of the operations of cryptocurrency. However, it also cannot be denied that cryptocurrency and blockchain technology have great potential and soon, may also become easier to facilitate for the average investor. Hence, the need of the hour is to keep yourself informed and up to date with the most recent developments in cryptocurrency and blockchain technology.

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Ethical And Legal Aspects of Moonlighting in India

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ABSTRACT

Moonlighting refers to the practice of taking up a second engagement, while continuing to be a full-time employee in one organization. As such, moonlighting covers a range of dual engagements. A large number of employees moonlight nowadays. The focus of the employer must not be banning employees from moonlighting rather than focusing on preventing any conflict of interest. Organisations can run smoothly if there are proper laws, rules and regulations regarding moonlighting. Appropriate policies must be framed to overcome the effects of moonlighting and maintaining harmonious relationship between employer and employees in an organisation.

Keywords: *Moonlighting, Dual Employment, Gig Worker, Freelancer,*

Introduction

Employers need to recognize that the workplace of the 2020s is vastly different from the one that they were accustomed to in the first two decades of the 21st century. COVID-19, the advent of work-from-home, greater internet penetration and speeds, a much younger workforce, and challenging economic circumstances together challenge previously sacred rules of employment and these developments have pushed organizations to think beyond boundaries while framing workplace policies and moonlighting is one new phenomenon to get attention.

It is no secret that Indian workers face a double-edged sword when it comes to moonlighting. This can be a great way to earn extra income and gain valuable experience while working full-time for an organization, but if caught it can be considered a breach of contract and lead to termination. Moonlighting could be considered cheating if an employee's contract calls for non-compete and single employment, which is the situation with many conventional employment contracts. However, it is not cheating if the employment contracts do not have such a clause or provide relaxations.

Under the Factories Act, dual employment is prohibited. However, in some states, IT companies are exempt from that rule. Before looking for side jobs or starting a business, it is crucial for employees to carefully check their employment contract with their principal job to ensure compliance with any moonlighting policies. Biggest issue of all is absence of clear policies for Moonlighting.

Objectives

- i) To understand the concept and reasons of moonlighting
- ii) To study various laws regulating moonlighting
- iii) To suggest certain measures for companies to regulate moonlighting

Research methodology

In this article, various ethical and legal of employee moonlighting will be examined. Data for conducting this study has been compiled from secondary sources from journals, Internet, articles and the books.

Definition of Moonlighting

Moonlighting is a term used to refer to the practice of taking up another job, while working full-time for a different organisation, typically to supplement the salary received from the full-time employment. It is termed as moonlighting, because it is taken up after normal day shift in the night, therefore termed as moonlighting. Most of the Indian companies are not in favour of additional jobs due to issues like conflicts of interest, job performance, or misuse of an employer's resources. Some of the reasons why employees moonlight are-

1. Salary for higher level employees at management level increases manifold every year whereas fresher package increases is at a very slow pace.
2. Some employees have sharp mind and work at a speed higher than others. They can work more than other employees in eight hours and believe employer has no right on life of employee beyond office hours, so long as employee is productive, loyal to company and not working against interest of employer, employee should be allowed to work at some other place.
3. Moonlighting can also emerge from hobby or interest, or a work opportunity which can be helpful in future.

Had the founders not done moonlighting/ side-hustle, India would have been deprived of giants like Infosys and many others. The legislation in India does not entirely ban moonlighting, there are a number of laws that mention multiple works. Therefore, at-times it becomes difficult for companies to function in absence of clear-cut rules and laws.

Gig Economy and Reasons for Multiple Jobs

Gigs, is defined as an alternative work arrangement that very often depends on the latest technology where worker has own schedule of work and pay. Gig workers include a variety of workers like temporary help agency workers, on-call employees, contract workers, independent contractors and gig workforce is commonly referred to as Moonlighters or Freelancers. Moonlighters are generally referred to as freelancers. They are basically who hold multiple jobs which may constitute one full time and one or two-part time jobs. Alternatively, they may hold all part time jobs and make a portfolio out of their different job profiles to market themselves before the prospective employers.

Freelancers may or may not hold a primary job, but moonlighters do and ultimately may become freelancers after quitting it. It all started to some extent with the conception of Uber, where workforce started thinking that they can earn in addition to their primary jobs with the help of their own vehicles on the way to their personal destinations without being worked extra actually.

Today the face of Gig economy has evolved manifold. It has changed from ambiguous searchings' and hirings through consultancy firms to digitally secured platforms. Where a number of online platforms act as a bridge between work seekers and work providers. After US in world India comes second in terms of Gig workforce.

Earlier, Indian gig economy used to be of temporary and contract employees but now with the ever-changing demands of the different sectors, it is expected to have heterogenous super specialised group of talent in an organisation. That's where moonlighting and crowdsourcing come into the picture. Some of the challenges before the ordinary workforce and the reasons why some of them get into multi jobs are that they have to compete with their own colleagues in this ever-changing job world for their survival, to beat sky rocket inflationary prices of their requirements, monetary requirements of their old age, retirement other contingencies etc.

Why are employers against moonlighting legal contract?

The practice of moonlighting raises ethical, compliance and legal issues, both for employers and employees. At first glance it looks both are against each other as employees want the freedom of profession on the other hand employer expects unhindered and complete time, attention and skill of the employee, in consideration for the remuneration being paid to them.

Wipro's Chairman RishadPremji said that “*Wipro employees working for competitors is a complete violation of integrity in its deepest form.*” He was criticised for it, but if his statement is analysed from the perspective of employment contract conditions there might not be strong opposition of same.

Generally, employment terms include clauses like, firstly, the employees agree to devote their full time and attention to the employer i.e they will exclusively work for employer. Secondly, will not take up employment or any other form of remunerative enterprise while working for the employer. Thirdly, will not engage in any activity or act that could give rise to a conflict of interest and in the end, certain restrictions which may even extend to post-employment depending on the sector, which prohibit the employee from taking up any position or interest with a competitor or a client directly or indirectly.

If these conditioned are analysed, moonlighting raises certain concerns, from an employer’s point of view:

- Taking up a second engagement with a competitor would be considered to be a clear breach of the agreed employment terms, which the employee himself had agreed to.
- Engaging with a competitor through moonlighting, is likely to pose both a conflict of interest and apprehension of misuse of confidential information of employer.
- Working on two jobs at a time is likely to reduce the efficiency and productivity of the employees. It could also have a major impact on the employee’s mental and physical health, and may lead to increased absenteeism, late coming/late logging in, reduced engagement in the role, etc.
- Reasonable personal usage of employer property such as laptops, internet connection etc is understandable but it is used for other employee it is misuse of company resources.

Industry Outlook towards Moonlighting

Industry experts from various fields have different opinions about moonlighting. Some experts are in favour of it and some are completely against it. Employers in the IT sector namely, Tata Consultancy Services (TCS), Infosys, IBM, and Wipro have all stated that they are opposed to the trend, and they also believe it will be difficult for any employee to balance many tasks, but Tech Mahindra has indicated that accept this trend of multitasking.

Employees at Infosys were informed in an email with the subject line “No Double Lives” that moonlighting was against the company’s code of conduct and might result in dismissal and that employee should work only for one company and stay loyal to employer. IBM-US based claimed that the moonlighting practice was unethical, and that the employer did not encourage it in the workplace. All of their employees sign a contract stating that they will work full-time for IBM once they start with them. Therefore, it is unethical for employees if they start doing second jobs. Tata Consultancy Services

considers, moonlighting as an ethical issue and believe that if they do something like this for short-term profits, the company will lose out in the long run.

On the other hand, recently a major fintech, Cred stated that it supports side jobs. It also quoted that its head of design and engineering is part of the Carnatic rock band 'Agam'. Tech Mahindra also expressed support for the idea of moonlighting for allowing staff to take on extra work. If given the opportunity, the company is also thinking of making moonlighting a business policy, but employees should be upfront about it.

Rajeev Chandrasekhar, India's minister of state for skill development, entrepreneurship, electronics has come openly in support of moonlighting and said, there will be a time in near future where employees will divide their time in multiple projects and will become both job givers and job doers. Sacking employees and slaying their careers for moonlighting will ruin lives of people and will be considered as ticket to hell for companies.

Financial Legal Issues in Moonlighting

An employer may also come across financial practical issues, when making contribution to provident fund contributions under the Employees' Provident Funds and Miscellaneous Provisions Act, 1952, where an employee is employed by more than one employer. As per existing rules, an individual member of the Employees' Provident Fund Organisation is allotted a Universal Account Number (UAN), which is linked to a code number allotted to an employer who is covered under the EPF Act, since employee is employed at two places this may make it administratively difficult for more than one employer to make EPF contributions in respect of the same individual at the same time. This issue employer can face while making contributions under the Employees' State Insurance Act, 1948.

The debate regarding moonlighting is wide open. It is also clear that an employee cannot escape tax liability, but the head under which the income from moonlighting will be taxed could vary from company to company and employee to employee. It is possible, an employee who is on payrolls of two companies may just do a stary one-off project for some firms.

Ethical concerns in moonlighting

As per old companies they never allowed their staff to work for any third party whereas some new age companies' managements are of the opinion that morality should evolve through time and employees should inform or take permission from companies to do double jobs.

According to the recently initiated Swiggy's Industry First policy, they permitted their regular employees to take outside projects subject to certain terms and conditions. Some of the conditions were, that employees can take on any job or activity that can be completed after hours or on the weekend without affecting their productivity or posing a conflict of interest with the regular job, also a prior clearance is

required for any initiatives or tasks that could potentially present a conflict of interest or interfere with an employee's job duties. To get the project approved by the team, the employee will need to provide a few basic details about their side gigs. The organization is of the opinion that working on such initiatives can greatly aid in an individual's professional and personal growth.

An unstable work environment, fears of recession and job losses have made employee look for second job. Although moonlighting is an attractive option for employees because it helps them achieve a career, growth and additional income, employers are concerned about company information and the risk that employees may not be able to give their all. It can be on the top and bottom of the pyramid.

Implementing moonlighting policy requires carefully crafted rules and regulations, considering both the specifics and guidelines for which employees can perform additional duties. For Moonlight, if the contract contains a single, non-competitive employment contract, this could be considered cheating, which is the case with most traditional employment contracts. But the employment contract is not fraudulent if it does not have this clause or doesn't say how to get out of it.

Legal status and applicability of relevant laws of moonlighting in India

The concept of 'double employment' or 'dual employment' has not been expressly defined under Indian laws though there is limited reference to it in certain statutory provisions. Therefore, the position under Indian law is that, dual employment is permitted, subject to the employment arrangement providing for dual employment or with prior consent of the respective employers.

In a case involving the transfer of an employee from a factory to the head office, *Manager, PyarchandKesarimalPonwal Bidi Factory vs. OmkarLaxmanThange and Others* (AIR 1970 SC 823), the Supreme Court made the following observation: "The general rule in respect of relationship of master and servant is that a subsisting contract of service with one master is a bar to service with other master unless the contract otherwise provides or the master consents. The Madras High Court in the case of *Government of Tamil Nadu vs. Tamil Nādu Race Course General Employees Union* (1993 I LLJ 977 Mad), observed that dual employment will be permitted if there is no prohibition in the employment contract or if the employer consents. Thus, in order to avoid indulgence in moonlighting by an employee, the contract of employment must be examined.

Thus, dual employment is permitted only in certain cases only but that too with prior approval of employers.

Indian laws do not define moonlighting. In India, it's legal to hold multiple jobs without breaching the law. A person with a similar set of jobs may raise questions about a breach of confidence because many employers place such restrictions in their employment agreements in addition to rules barring holding

down numerous jobs. However, the laws mentioned below regulate dual or double employment to a certain extent.

As per Section 60, of **The Factories Act, 1948** prohibits dual or multiple employment. It inter alia restricts an employer from requiring or allowing an adult worker to work in the factory on any day on which they have already been working in any other factory, unless otherwise stipulated except in the cases that may be specified. However, an IT specialist or any employee holding an administrative or supervisory function is not included in the Factories Act's definition of a worker.

The Factories Act, 1948, and certain state shops and establishments legislations (such as those applicable to Haryana and Delhi) impose restrictions on working hours in the context of dual employment, even though they do not explain the concept of dual employment or otherwise state that dual employment is permissible. For example, if the daily prescribed working hours are 8, and an employee is employed by A company and B company, both companies must ensure that the total hours worked by the employee on any given day for A and B companies put together, should not exceed 8 hours.

The Bombay Shops and Establishments Act, 1948, Section 65, prohibits double work on holidays or while on vacation. No employee shall work in any establishment, nor shall any employer knowingly permit an employee to work in any establishment, on a day on which the employee is given a holiday or is on leave in accordance with the provisions of this Act.

Section 9 of the **Delhi Shops and Establishments Act, 1954**, states that “No person shall work about the business of an establishment or two or more establishments or an establishment and a factory in excess of the period during which he may be lawfully employed under this Act. This act plays restriction on double employment. As per act, no person shall work about the business of an establishment or two or more establishments or an establishment and a factory in excess of the period during which he may be lawfully employed under this Act.

As per Section 7 of **The Punjab Shops and Commercial Establishments Act, 1958**, “No person shall work about the business of an establishment or two or more establishments or an establishment and a factory in excess of the period during which he may be lawfully employed under this Act”. The Act governs employees who work in, among other places, retail establishments, dining establishments, theatres, and other public amusement or entertainment facilities, as well as information technology and information technology-enabled services. In a case involving Metso Paper (India) Pvt Ltd vs. Mr V. Gokulakrishnan, a Delhi District court backed the termination of the employee who held two jobs.

Each state has a unique Shops and Establishments Act. For instance, the Delhi Shops and Establishments Act of 1954 forbids multiple work Interestingly, in 2016, in Gulbahar v. The Presiding Officer, the Punjab and Haryana High Court upheld the dismissal of a driver (who was employed on a salary by the

respondent) on the ground of dual employment. The Court ruled that this constituted a violation of his employment terms, which required him to work exclusively with the respondent.

The model standing orders under **Industrial Employment (Standing Orders) Rules, 1946**, which provides that a workman shall not at any time work against the interest of the industrial establishment in which they are employed and shall not take any employment in addition to their job in the establishment which may adversely affect the interest of their employer; however, the employer may, at their discretion, permit the worker to take up an additional job or an assignment with or without conditions following the prior permission of the employer.

The Supreme Court in *Niranjan Shankar Golikari versus The Century Spinning & Mfg. Co. (1967)* upheld the non-compete clause of an employment contract, thereby preventing an employee from joining their employer's competitor during the term of the employment contract. The court further held that a negative covenant can be enforced only if it is reasonable, and not excessively harsh and one-sided. This Act mandates that employers in industrial establishments specify the terms of employment in detail and submit proposed standing orders for certification to the certification authority. It is applicable to all industrial facilities that employ 100 workers or more (50 workers, in the case of facilities for which the Central Government is the Appropriate Government).

All country citizens have the right to practise any profession and to engage in any occupation, trade, or business, according to Article 19(1)(g) of the constitution. Moonlighting can be brought under the ambit this article. However, this article is also subjected to reasonable restrictions

Article 21 of the constitution includes right to life and personal liberty. Right to life has been read broadly with right to livelihood in the case of *Board of Trustees of the Port of Bombay v. Dilipkumar Raghavendranath Nandkarni (1983) 1 SCC 124*.- The Court concluded that "the right to life" guaranteed by Article 21 encompasses "the right to livelihood"

If an employee's contract stipulates non-compete and exclusive employment, as is the case with many traditional employment contracts, moonlighting might be regarded as cheating. If the employment contracts do not contain this clause or offer exceptions, it is not considered cheating. The concept of 'dual employment' is not dealt directly by the Indian law. However, there are certain statutes that govern them.

Ways to Legally Regulate Moonlighting

Where employers seek to permit moonlighting, it should be ensured that there is a well-defined policy within the ambit of which employees can enter into. In framing such a policy, a few considerations can be taken into account as mentioned below:

Exclusivity clause-Companies looking to prevent employees from moonlighting should specifically prohibit from moonlighting such a practice in their employment contracts by way of an exclusivity provision and state that the breach of the exclusivity provision would amount to misconduct. The exclusivity clause must be drafted in such a manner that, employees should be prohibited from taking up any other work for the duration of their employment with the company and not just during their working hours. An exclusivity provision that is operational only during working hours would allow employees to accept other engagements during their non-working hours.

Extent of prohibition-The prohibition on other engagements should extend to not only employment relationships, but also consultancy and advisory arrangements. Where relevant, the prohibition may be extended to directorships, shareholding, etc. Prohibitions of this nature would be considered legitimate and are enforceable under applicable laws. Any form of moonlighting would be a breach of the exclusivity provision described above.

Approval and Conflict of Interest-Employees may be permitted to engage in their second role, subject to obtaining the prior approval of the employers, and providing periodic disclosures/undertakings regarding the other engagement. For instance, if the other engagement is non-competitive, is unlikely to pose any conflict to the employer, and the employee believes it will require a defined amount of time (which is not significant) and is for a specified duration, then the employer may permit such employee to do so.

Define the range of activities that are prohibited- One of the ways of preventing moonlighting is expressly permitting moonlighting that is not detrimental to business. Accordingly, the boundaries of the permitted engagements must be clearly defined. Employers must also clarify the permissibility of using office resources and the premises for the second engagement. Therefore, if an employee is found moonlighting, an employer would have the right to take appropriate action for breach of contract.

Protection of proprietary information – specific restriction should be imposed on employees in relation to the usage and divulging of proprietary information of the employer since this will be the primary area of concern of any employer permitting moonlighting.

Nature of legal relationship – If an individual is employed by more than one employer, it may lead to some legal and practical complications. Accordingly, employers should specify the nature of the legal relationship that employees may create in relation to their second engagements.

Impact on culture of company-Apart from the legal considerations employers will also have to consider softer aspects such as the impact of moonlighting on company culture, the industry at large, the capacity of employees to perform their primary work at optimum levels if they moonlight outside working hours, the target talent pool, etc.

Applicability based on role or seniority of the employee-Permitting senior employees or employees working on confidential projects to have second engagements by virtue of their roles and responsibilities within the organisation may make companies apprehensive. Accordingly, it would be important to clarify who within the company (if anyone) may or may not enter into other engagements. For instance, a senior executive/manager or a compliance officer, or people in the HR department who access sensitive business or personnel information, may not be permitted to engage in another engagement, as the scope for breach of confidential information is significant and poses great risk. Consequently, the organization may also need to ensure that people in such positions are adequately compensated, so as to minimize the risk of their seeking other employment/engagements.

Transparency in the process – Transparency is key to ensuring that the permission to moonlight is not abused. Accordingly, companies should clarify the process by which employees can take up second engagements, i.e., if employees are required to obtain prior approval or if they are only required to notify certain persons, etc. while they are considering outside engagements. A well-defined clear process, with details of who to approach, who makes the decisions and the time frame for communicating these decisions should be communicated to employee.

Conclusion

Moonlighting is a sensitive and complicated situation for the companies to deal with. Having no concrete law in this regard makes it even more prone to be bend according to one's own interpretation. From the viewpoint of general public, this seems justified and fair. But the companies run on laws, policies and contracts. The absence of which can lead to mismanagement. Thus, the court or the Government can come up with an effective law to deal with 'dual employment' or 'moonlighting', to make it easier to regulate and govern well.

The legal position in India prohibits a non-compete clause, which leads to an implication that moonlighting is violative of employment contracts. But legal jurists have always considered this to be unjustified. This is so because the law, by this, implies an interference into the liberty of individuals while entering contracts and thus affects trade. Thus, moonlighting can be permitted when there is a well-defined policy regarding the nature of agreements that employees can enter during and post-employment.

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HumanComputerInteraction:GestureMouse

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ABSTRACT

Inthe newageofInnovation,remotemouseoracontactlessmouseutilizesgadgets,sinceitutilizes power from the gadget sources like battery and gain extra space. During COVID pandemic it is encouraged to makesocial separationand keep awayfrom contact things. This paper proposes a wayto control the position of cursor with the bare hands without touching any electronic devices. In this way it makes Human-Computer Interaction simple by using hand gestures. As computer technology is growing up, HCI is rapidly increasing. By using Hand Gestures, we can perform all basic mouse functions (Left-right click, Double click, Drag and copy, etc). This system takes frames using Webcam or built in camera. It can be an alternative way for traditional touch screen. This project makes use of Machine Learning and computer vision algorithms to recognize hand gestures which work smoothly. Our goal of AI Virtual Mouse is to form a replacement for the traditional mouse system that can perform mouse functions. We used Python

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programming language for implementation of this project.

Keywords: *Handgestures, AI, Media-Pipe, Open-CV, VirtualMouse, HCI (Human-Computer Interaction).*

INTRODUCTION

In this technological world, it's almost impossible to imagine life without computers. The invention of computers is one of the greatest inventions of humankind. In daily life, we interact with computers to make our tasks easier. Thus Human-Computer Interaction has become a trending topic for research.

Vision and gestures are important approaches for communication among human beings and the same role is played by the mouse in GUI (Graphical User Interface) computers. So a combined methodology can be used to make a better interactive system for Human-Computer Interaction devices.

We can interact with mouse by using hand gestures. Basically, Gestures is a movement of hand, or other body part that is intended to indicate something.

In this project, a finger tracking based virtual mouse application will be designed and implemented using a webcam. To implement this, we use Artificial Intelligence object tracking concepts such as Open-CV python, Media-pipe, PyAutoGUI module of python. The processing of images and videos and capturing

activities like face and object detection all makes uses of Open-CV package. For hand tracking and hand tricks we used MediaPipe. Additionally, the desktop window operations like scrolling and left-and right-clicking are carried out using the Autopy and PyAutoGUI packages.

This technology is quite efficient and helps to provide quick solutions to AI projects.

Requirements

- Python Version 3.8.5
- Minimum RAM 4gb
- Webcam
- Code Editor (VS code)

Objective

1. To create a system which won't require any hardware to operate the mouse in this way it will reduce hardware cost.
2. To find an alternative way to use at public places to reduce the spread of virus through touch.

Limitations of Existing System

- The existing systems are our traditional hardware mouse system either wire or wireless. This means

the actual hardware requirede.g.forwiremouseitrequireswiretoconnectwithdevicesanditalsorequiremousesensors (CMOS sensor) for detecting the surface, this means physical mouse also require flat surface to operate.

- Other existing virtual mouse controls consist of simple mouse operation which uses colored tips like red, green, bluecolor.These colored fingersactasanobjectthatwebcamsensestocaptureactionandthenimageprocessing technique is applied.
- Someexisting systems use a fewfingerstoperformspecificoperations.Suchsystemsaremorecomplex to use.

Proposed System

There is no specific algorithm which we have used for virtual mouse but there is some python in builds modulesusedwhichwillhelpinprocessingthissystem.ThemodulesnamesareOpenCV,MediaPipe,PyAutoGUI I, and maths.

Algorithm Used for Hand Tracking

The system will be taking the real- time video as a input from the webcam and converting it into the array form tofindthecoordinatesoftheframe.These coordinateswillhelptheprogramtolocatethefingersinanaccurateposition. By identifying the finger position, the system will perform certain functions.

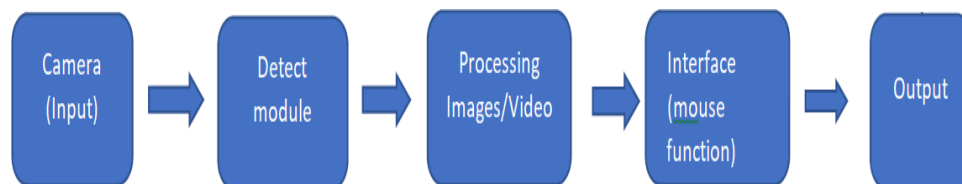


Fig.1:BlockdiagramforSystem

AboutMediaPipe:

MediaPipe is an open-source framework developed by Google that enables the development of multimodal machine learningpipelines.Itisdesignedtobeflexible,scalable,andhigh-performanceanditcanbeusedtobuildawiderange of applications that involve real-time video and audio processing. Some examples of the types of applications that can be built with Mediapipe include:

- Gestureandhandtracking
- Facedetectionand recognition
- Objectrecognitionandtracking

- Augmented reality
- Audiorecognitionandtranscription
- Speechrecognition

Italsoincludestoolsforvisualization,debugging,andprofiling.Mediapipeiscross-platformandcanbeusedona variety of devices, including mobile phones, tablets, and desktops.



Fig.2:HandLandmarkspointusedbyMediapipe

Open-CV Module

Computer vision is a process by which we can understand the images and videos how they are stored and how we can manipulate. Computer Vision is the base or mostly used for Artificial Intelligence. Computer-Vision is playing a major role in self-driving cars, robotics as well as in photo correction apps.

OpenCV (Open-Source Computer Vision) is a free and open-source library of computer vision and machine learning algorithms. It is designed to provide developers with an easy-to-use interface to develop applications that process visual data, such as identifyingobjects, facial recognition, and image stitching. It was used to construct the AI virtual mouse system. It builds real-time computer vision applications. It is a huge open-source library for computer vision, machine learning and image processing and now it plays a major role in real-time operation, which is very importantintoday’ssystems.Whenitis integratedwithvariouslibraries,suchasNumPy,pythoncan process the OpenCV array structure for analysis. To identify image pattern and its various features we use vector space and perform mathematical operations on these features.

Working/Methodology

A. Creatingthespaceforthesystemandgettingnecessarylibraries

WeuseVScodeforcreatingourproject.Weinitializeourworkspaceandinstallallournecessarylibraries (Open CV, Mediapipe, and Autopy) in VS code. Then we import this libraryin our program.

B. GettingtheWebcamready

Inthisstep,weinitializethewebcamofoursystemtoopenandfunctionouraccordingtoourrequirements.

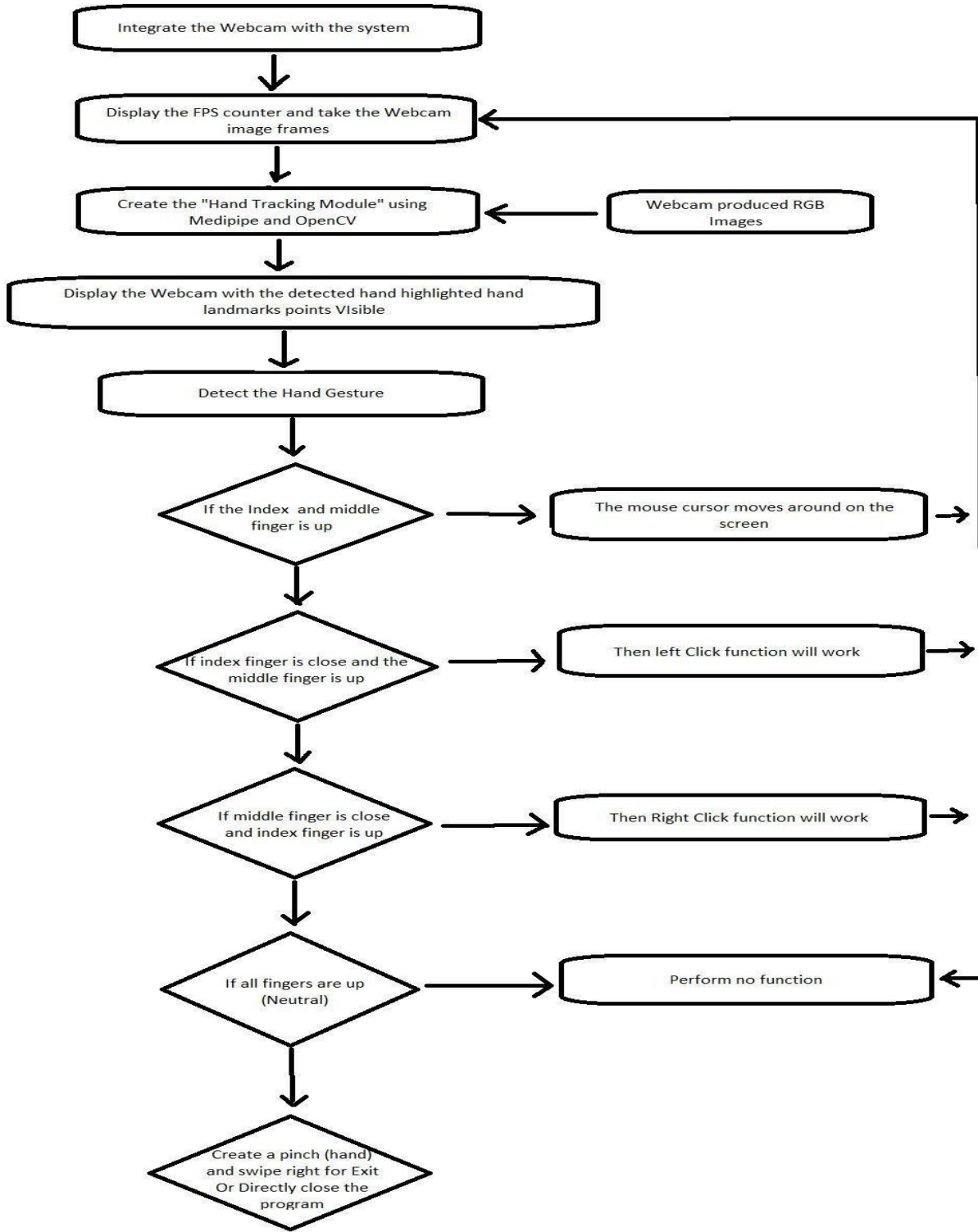
While writing the code, we give the default '0' value in the webcam code, depending on the number of capturing devices. Now we write a simple code which gives the real-time frames of the webcam which is displayed on screen. This helps to check how the webcam will work smoothly.

C. HandTrackingModule

After the video-capturing device is set, we start by writing our hand detection code.

It includes getting the necessary 20 landmark points of the hand which help in getting the position of fingers. We use MediaPipe for this process as it makes it easier for us to work. We set names for left and right hands such as "major" for right hand and "minor" for left hand in function. After this, the coordinate system gives coordinate values for our fingers which are stored in the form of an array. In this way, we define the various functionalities of a mouse in our hand tracking system. This is done by implementing various hand gestures for certain functions.

ActivityDiagram:



Hand Gestures:

- **HandLandmarksdetection(Neutral)**

Above fig shows, the detection of landmarks which also detect cursor (all fingers is up). This type of gesture doesn't perform any function (Neutral).



Fig.4:HandLandmarksdetection

- **CursorMove**



Fig.5:Cursor move

Abovefigshows,cursormovinghandgestures.This handgesture(one index and one middle finger is up) moves cursor on the computer screen and performs all basic mouse functions.

- **LeftClick**

Abovefigshows, Leftclick.This handgesture(onemiddlefingerup) can perform left click just like traditional mouse.



Fig.6:Left Click

- **RightClick**



Fig.7:RightClick

Abovefigshows,rightclick.This handgesture(oneindex fingerup) can performrightclickjustliketraditional mouse.

- **DoubleClick**



Above fig shows, double click. It can be performed by both middle and index finger up then take both fingers close to each other.

Fig.8: Double Click

- **Drag and Copy**

Above fig shows, Drag and copy gesture. This can be performed by taking cursor to any file and on that file create a punch for dragging and copy where you want.



Fig.9: Drag and Copy

- **Volume Control**



Above fig shows, Volume Control gesture. This can be performed by creating a pinch of hand just like the above picture, for low volume move this gesture slightly down and for high volume move this gesture slightly up. In this way we can control the volume of our system.

Fig.10: Volume Control

- **Exit Control**

Above fig shows, exit program gesture. Same as volume control but different in function, create a pinch of hand just like the above picture. But if you want to exit program or switch off your virtual mouse then swipe your pinch to the right side, it will close your virtual mouse.

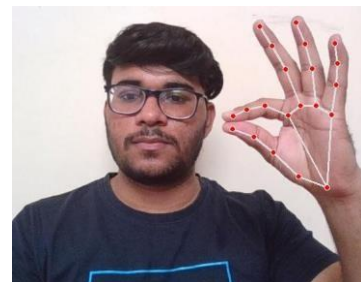


Fig.11: Exit Control

Advantages

The main advantage is to interact with a computer as a non-contact human computer. It also increases:

Human Computer Interaction.

- It reduces hardware cost by eliminating use of mouse (such as USB cable, Mouse sensors - CMOS).
- Convenient for users.
- We don't need to carry anywhere like traditional mouse and also reduce space.
- System can be extending to eye recognition-based system where we can control the system with eye. This will be efficient for handicapped people.

Disadvantages

- Since the system is dependent on webcam, in dim light the camera is not able to capture any movement or hand gesture to a certain extent. But if we use day and night cameras it will work.
- Less accuracy but fast as compared to traditional mouse.

Scope

The scope of this project is to develop AI Virtual mouse that will be operated without touching and devices. In this pandemic world, a touch less mouse will be useful to eliminate the risk of spreading viruses. Like a self-ticketing system at the railway station, many people touch the same screen which can increase the chances of spreading viruses. It can also improve the scope of HCI technology. In this way, Virtual mouse can be useful.

Conclusion

Since, we are developing a system to control the mouse cursor using a real-time camera. It is based on computer vision algorithms and can do all mouse functions. This system could be useful in presentation and to reduce workspace. Virtual mouse technology is a useful tool for providing an alternative way to interact with a computer's GUI in situations where a physical mouse is not available or practical. It can also be used to make the computer experience more accessible to people with disabilities, or to provide additional functionality. The development of this technology will be key in helping users interact with their devices even more efficiently. However, there are also some challenges to using hand gestures to control a virtual mouse. One challenge is that it may require a lot of training and practice to become proficient at using hand gestures to control the cursor accurately. This would lead to a new era of Human Computer Interaction (HCI) where no physical contact with the device is required.

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Stock Market Prediction Using Sentiment Analysis with Machine Learning Models

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ABSTRACT

Stock market forecasting is very important in the planning of business activities. Stock price prediction has attracted many researchers in multiple disciplines including computer science, statistics, economics, finance, and operations research. In this paper we present a detail survey on stock price trends. All key terms and phases of generic stock prediction methodology along with challenges, are described. A detailed literature review that covers data preprocessing techniques, feature selection techniques, prediction techniques, and future directions is presented for news sensitive stock prediction. Recent studies have shown that the vast amount of online information in the public domain such as Wikipedia usage pattern, news stories from the mainstream media, and social media discussions can have an observable effect on investors' opinions towards financial markets. Our main contributions include the development of a sentiment analysis dictionary for the financial sector, the development of a dictionary-based sentiment analysis model, and the evaluation of the model for gauging the effects of news sentiments on stocks for the pharmaceutical market. Using only news sentiments, we achieved a directional accuracy of 70.59% in predicting the trends in short-term stock price movement. Stock market prediction is a challenging task as it requires deep insights for extraction of news events and stock price trends.

Keywords:

Stock Market Prediction, Sentiment Analysis, Feature Selection, Arima Model, Long Short Term Memory Model, Twitter Analysis.

INTRODUCTION

Stock market trends are extremely volatile in nature that makes prediction quite hard. This volatile nature attracts researchers to investigate sophisticated techniques for better prediction. Prediction of stock market trends with high accuracy generates significant revenue. Fundamental and technical analyses are two basic approaches used for stock trend prediction. Technical analysis inspects past data and volumes of stock prices while fundamental analysis not

only considers stock statistics but also evaluates industry's performance, political events, and

economic circumstances. Fundamental analysis is more realistic because it evaluates the market in a broader scope. This survey puts emphasis on research work based on fundamental analysis, where textual data is considered along with stock price historical data for stock trend prediction.

We use various natural language processing (NLP) and text analysis tools to figure out what could be subjective information. We need to identify, extract and quantify such details from the text for easier classification and working with the data.

Twitter is one of the important and popular social media where anyone can post tweets about any event. This is an open platform where people may express their views/opinions or emotions freely. Due to less internet charges, less expensive portable devices and increase in social importance, people have Twitter accounts. Most of them tweet on different events. In the social networking age, people express their opinions and feelings through Twitter. So Twitter contains a huge amount of data.

Twitter sentiment analysis is one of the recent and challenging research areas. As social media like Twitter contains a huge amount of text sentiment data in the form of tweets, it is useful to identify sentiments or opinions of people about specific events. Sentiment analysis or opinion mining is useful for review of movies, products, customer services, opinions about any event etc.

LITERATURE REVIEW OF SENTIMENT ANALYSIS:

This section briefly outlines the research on stock prediction techniques. It summarizes the techniques that only consider numerical financial data for stock prediction. Then it discusses the feature extraction from textual data.

Stock trend prediction using textual data.

The unstructured form of textual data makes it difficult for data mining techniques to mine information from text. Moreover, these text mining techniques can be further classified as fact mining and opinion mining techniques. In this section, literature regarding text processing techniques is discussed and divided into three groups: shallow feature-based text processing, event extraction-based text processing, and sentiment analysis.

Sentiment analysis based text processing.

Stock prediction using sentiment analysis is an attractive area of research as it gives deeper analysis of textual data. In Sehgal & Song (2007), Yahoo financial message board is used as a source of textual data for predicting stock trends. They inferred public sentiments from web messages and proved its correlation with stock trend. Naïve Bayes, decision tree, and bagging algorithms are used as prediction algorithms. They also added an important contribution in terms of trust value parameter. It is calculated using the author's past performance related to correct predictions. On the basis of trust value, unreliable sentiments are filtered which further enhances prediction accuracy. However, they have

only considered past day web sentiments while there are web sentiments that have long term correlation with stock value.

It is shown by experiments in Wu et al. (2012) that the use of sentiment analysis-based features along with technical indicators enhances prediction performance. They used pointwise mutual information (PMI) measurement to extract sentiment analysis-based features. PMI measures the strength of semantic association between words and seed words from positive and negative class. The proposed technique for features extraction from stock news captures effective features which enhance prediction performance. But technical analysis can be improved further by examining different combinations of technical indicators.

Machine learning techniques for stock prediction using numerical and textual data.

In literature, machine learning based stock prediction techniques are divided into shallow learning and deep learning techniques. Research papers for stock prediction are discussed in earlier section in the context of text mining approaches. In this section, these research papers are outlined under machine learning categories.

Table 1 below contains information about various researches that have been carried out on stock market prediction using sentiment analysis.

REFERENCE	DATASOURCE	Numerical Data	Textual Data	Algorithms Used	Accuracy
1. Ding et al. (2016)	S&P 500 through Yahoo Finance, News articles from Reuter's website from October 2006, to November 2013	Stock price data	Knowledge driven event embedding (KGEB)	KGEB-CNN	Accuracy = 66.93%
2. Vargas, De Lima & Evsukoff (2017)	S&P 500 index series are obtained through Yahoo Finance, News articles from Reuter's website from 20-10-2006, to 2-11-2013	Technical data	Word embedding and sentence embedding	Combines LSTM with CNN	Accuracy for word embedding and technical indicator = 61% Accuracy for sentence embedding and technical indicator = 62%
3. Deng et al. (2019)	DJIA index from 08/08/2008 to 01/01/2016. Stock price data from Yahoo Finance, news headlines from Reddit World News Channel	Stock price data	Knowledge driven event embedding	Knowledge Driven Temporal Convolutional Network (KDTCN)	Accuracy = 71.8%
4. Jin, Yang & Liu (2019)	Apple stocks from Yahoo finance, Stock comment dataset from stock tweets	Stock price data	CNN as a base learner for sentiment index	EMD based enhance LSTM (EMD-LSTM) with attention layer	RMSE = 3.196534 MAPE = 1.65 MAE = 2.396121 R2 = 0.977388
5. Li, Wu & Wang (2020)	Hong Kong Exchange daily prices from January 2003 to March 2008, FINET news	Stock price Data & Technical data	News sentiment analysis using sentiment lexicon	LSTM	Test Accuracy for 3 out of 4 sectors is comparatively better using domain specific dictionary.

Table 1 Literature Review

Finally, the table outlines state of the art techniques in the context of news sensitive stock prediction model. By observing this table, it can be deduced that hybrid approaches for feature extraction and prediction perform better by combining strengths of

different approaches.

1. RESEARCH METHODOLOGY:

The sources of papers for this study are IEEE Xplore AND Re-searchgate. Total 20 articles presented in this research paper which are related to sentiment analysis. The algorithms used in this paper are mainly Long Short Term Memory (LSTM) & CNN.

Stock market prediction seems like a complicated problem because there are various factors that are still left unaddressed and do not seem to be statistical at first. But to our rescue there are various machine learning algorithms by using which we could efficiently predict current trends in the stock market by using references from the previous data. Here the dataset that we are going to use has been collected from Yahoo finance. This data set consists of nearly 9,00,000 records related to the stock prices required and many other values that are relevant to each other. This data predicted the stock prices at some intervals of time for each day in a year. Many sections such as volume, date etc were included in it. In order to simulate and analyze only one company's data was taken into account. The data considered or considered was readily available in the csv format which was first read and converted into a data frame by making use of one of the most popular libraries, Pandas in Python. In due course, one specific company's data was pulled out by separating data depending on the symbol field. After this, the data was segregated into testing and training datasets by performing normalization by using yet another popular Python library known as Sklearn library. The test set was placed as 20 percent of the dataset that was available. Although Machine learning has various algorithms that could be used for predicting the stock prices here in this paper, we make use of two main algorithms known as RNN and LSTM.

2. DISCUSSION AND ANALYSIS:

Sentiment analysis can be applied in many different domains. The major use of sentiment analysis is to analyze the texts which are available on social networking sites, where people share their views on a particular product or topic.

Companies use sentiment analysis tools in order to analyze the market, by analyzing the customer feedback.

Now-a-days even politicians are appointing

data analysts to analyze the political party related texts available on the news reporting websites and in social networking sites. Some of the major applications of the sentiment analysis are as stated below,

1. In Review-Related Websites.
2. The sentiment analysis can be used as a Sub-Component Technology.
3. It can be used in Business and Government Intelligence.

4. Sentiment analysis can be used across Different Domains.

Feature Selection:

Feature selection is the process of eliminating the redundant set of features, while selecting only those features from the dataset, which are most useful, or which are most relevant. The use of bigrams and trigrams will result in a problem resulting in the increment in the features. Most of these features are redundant and noisy in nature. To reduce the number of available features and to eliminate the noise, we can follow a basic filtering method.

Twitter Analysis:

Twitter data is also automatically classified into positive, negative and neutral according to query terms used in consumer review tweets. In the paper, the author uses Parts of Speech (POS) polarity technique and tree kernel technique.

Research work uses two types of resources such as hand dictionary of emotions and dictionary collected from web. Author used different types of classification and feature extraction algorithm.

ARIMA Model:

This ARIMA model was introduced by Box and Jenkins in 1970. The Box—Jenkins methodology is also referred to as a set of activities to identify, estimate and diagnose. ARIMA models with time series data. The model is the most important financial forecasting method. Models from ARIMA have been shown to be effective in generating short-term forecasts. The future value of a variable in the ARIMA model is a linear combination of past values and past errors.

Long Short-Term Memory (LSTM) Model:

Long Short-Term Memory (LSTM) networks are a type of recurrent neural network capable of learning order dependence in sequence prediction problems. This is a behavior required in complex problem domains like machine translation, speech recognition, and more. LSTMs are a complex area of deep learning. It can be hard to get your hands around what LSTMs are, and how terms like bidirectional and sequence-to-sequence relate to the field. In this post, you will get insight into LSTMs using the words of research scientists that developed the methods and applied them to new and important problems.

Data Collection:

The data collection from twitter, news headline and yahoo finance are collected for analysis.

Data Pre-processing:

Stock data extracted is not completely understandable because of public holidays and weekends where the stock market does not function. There are missing in the stock value. These empty values can be approximately using simple way. Consider, the stock value on a day is x and the next value present is y with some missing in between. So, the first value is estimated as $(x+y)/2$ and the same

method is used to fill the missing values.

Classification:

Use a bag of words containing information on sentiment (positive, negative, neutral) along with sentiment scores. After this, we adopt negation detection measures to differentiate between “good” and “not good”. In this blog we will be trying to do sentiment analysis on twitter dataset and categorizing them into positive, negative and neutral behaviour of people. If the entire review has a positive, joyful attitude on if something is mentioned with positive connections. So, it is considered a positive statement. If the entire comment has a negative, sad or if something mentioned with negative connections. So, it is considered a negative statement. If the review expresses no personal opinion in the comments and review transmits information. After the feature extraction we perform sentiment analysis using naïve bayes classifier. Stock market prediction: -

The obtained sentiment analysis data along with stock market data are combined and given as input to the training model. The stock market values are fetched using yahoo finance. The XGBoost classifier evaluates both the data and predicts the stock market value.

5. CONCLUSION:

This paper provides a review and comparative analysis of different stock market prediction parameter techniques. These techniques are used to evaluate stock market performance and trends. The stock market forecasting system is to increase accuracy. In this study to analyze a novel approach to improve the prediction of the results of stock, it means we will combine two or more methods to construct a novel approach method.

This paper presents an extensive study of stock trend prediction using news and stock prices. It presents a generic approach to implement a news sensitive stock prediction model and identifies three main phases. In each phase, challenges are identified and in search of opportunities existing literature is reviewed. This work has four major contributions. The first contribution of this paper is to provide a literature review on this topic. This work elaborates existing research papers and assesses their strengths and limitations.

In this paper we investigated how sentiment analysis of the twitter data is correlated to the prediction of the stock market price for all the companies which are taken. Sentiment analysis is a very important aspect in data analytics and advanced text processing. Each word in a given text is related to the adjacent or any other related words. Merely by looking at the occurrences of the positive or negative words in a text, we cannot conclude with a sentiment which it results in. As of now we have seen that

by implementing LSTM, ARIMA, Twitter analysis, feature selection, we have got highly significant improvement in the sentiment classification.

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Impact of Automation and Machine Learning on the Financial Industry

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ABSTRACT

The primary goal of this research was to examine the impact of machine learning on the digital age, particularly in the field of finance. This research looks at the use of machine learning, its challenges, opportunities, and impact on job openings and operations. This paper is based on the results of a qualitative text analysis on the topic of machine learning in finance. The theoretical section of this paper investigates the universal framework, such as the past, current, and next level of machine learning, with an emphasis on its benefits and drawbacks. The study also looks at the global acceptance of machine learning in the context of artificially intelligent development and startups in European countries. The qualitative methods in the paper were evaluated as the research methodology in this study. In addition, the study examined twenty electronic records and articles on machine learning in finance. The implementation and impact of artificial intelligence in financing were discussed during the research on how computer technology transforms the banking sector. According to research, several financial institutions have benefited significantly from the implementation of various machine learning and artificial intelligence technologies. This paper demonstrates that there is a lack of experience in the field of machine learning, despite the fact that many unskilled or semi-qualified tasks performed by humans are now performed by machines.

Keywords:Artificial intelligence, Innovation, financial services, virtual assistant, machine learning,
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INTRODUCTION

AI is defined as a machine ability to make rational brain-like decisions and to evolve over time. Machine Learning (ML), on the other hand, includes the creation of concepts, often statistical models, that provide accuracy in predictions. Because many people associate AI with robots that mimic human functions and creativity in their operation, the entertainment industries have exhausted their efforts to persuade people that AI also applies to robotics. Although this is true, facial recognition software, fingerprint scanners, chat bots, pattern recognition, computational business strategies, and psychological analysis add to the picture. Initially, incorporating AI into software development was only feasible for large organizations with the resources to hire highly qualified professionals. AI programs have been designed, with few programming lines in each preferred scripting language; an intelligent system is being designed. The goal of this article is therefore to examine how and why AI has been applied to various sectors, especially in the context of finance. In addition, the paper answers the research question in the study: what are the risks and opportunities of AI? What are AI's applications for the financial sector? How is AI adopted internationally? What influence would AI have on the career path of finance jobs and mechanisms? How could the development of Ai look like that? Which measures are taken by companies to thrive in a dynamic technological age? A text study of the qualitative research process has been used as an alternative to addressing these issues. The financial services industry uses AI to analyses massive amounts of data, track scams by detecting suspicious transactions, interact with clients electronically, and investigate a variety of other key functions. There are extremely significant beneficial events in the areas of facial reconfiguration, voice identification, and machine learning. New technologies provide significant benefits in order to maximize the value of customer proposals and drive enterprise productivity and efficiency. AI tools will provide significant benefits to the financial sector by automating certain activities and improving analytical capabilities over traditional techniques that are rapidly becoming obsolete.

REVIEW OF LITERATURE

Chui et al., (2016), Research in the fields of software engineering and analytics has been intensified in order to develop novel techniques for extracting information from a wide range of data sets. Statistical data can take various forms, be of various types, and be of comparable quality. Through experiential learning, such strategies may leverage the potential of machines to perform tasks such as image recognition and the use of natural scripts. The application of computational methods to tasks that previously required human creativity is commonly referred to as artificial intelligence.

De Prado (2018), Many modern mobile devices will recognize faces and signatures as primary security checks. AI integration has also been used to detect fraud in the financial system, identifying suspicious transactions and raising alarms. Several applications in the corporate world have now been developed that use AI to create computational models that can be significantly improved.

Mullainathan & Spiess (2017), AI is a broad term that refers to technological advances that enable computers to become intelligent. Deep learning, machine learning, image recognition, natural language processing (NLP), cognitive technologies, cognitive enhancement, machine intelligence, and increased intelligence are all terms related to AI. As it is used here, artificial intelligence encompasses all aspects of an event. AI is developing an autonomous, intelligent framework. ML is an AI category that allows a computer to advance its understanding electronically without the need for direct human intervention.

Gomber et al. (2018), AI is gradually becoming more prevalent in a variety of industries. There are an infinite number of requests for AI. Innovation could be used in a variety of industries and businesses. In the medical field, for example, AI has been tested and applied for dosing and separate treatments in patients as well as surgery. Furthermore, AI is used in the identification and marking of banking and finance operations, such as unusual use of ATM cards and large bank deposits, all of which assist the bank's fraud unit.

Baydin et al. (2017), Artificial Intelligence in the hypothesis and integration of information systems capable of performing tasks normally performed by human brains, such as visual perception, speech recognition, decision-making, and language translation. Alan Turing noticed that many people could analyse information, solve complex problems, and make sound decisions when computers could not do.

METHODOLOGY

Research Processes

Analysis includes finding and trying to redefine concerns, designing models or recommended solutions; collecting, arranging and analyzing data; rationalizing and drawing conclusions; and, ultimately, checking the conclusions to determine whether they are appropriate to the assumption. The research methodology describes the research road map and defines the key tasks of the local research community. The aim of this research is to recognize the influence of AI on the financial services sector.

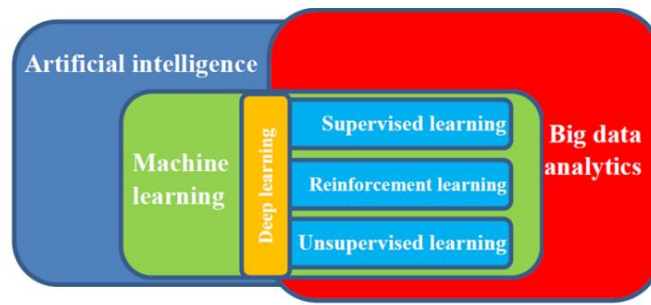


Figure 1: Huge data and the AI in machine learning and analysis

Research Methodology

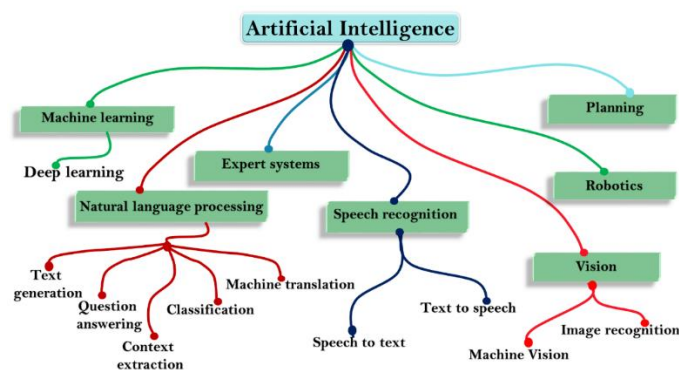
This research utilizes qualitative research methodology in studying the application and effects of the AI in finance besides investigating how artificial intelligence is changing the financial service industry. This research methodology seeks to explore the AI in finance in a broader and detailed way. Qualitative research focuses on quality causes, i.e. phenomena that respond to or involve quality. Qualitative analysis is intended to evaluate such processes or behaviors and then to show how they can be combined and grouped in order to produce measurable results. This form of analysis is more selective and requires a thorough interpretation of the variables. The benefit of this set of methods is that it is versatile and easy to respond to changes throughout the research setting and also at a low cost. Although quantitative data are established, qualitative data will be provided.

Document Analysis

Document analysis is a structured method in which records that can be both written and electronic (computer-based and online world) can be checked or reviewed. The choice of 'document review' as a study tool may have many advantages: it allows the investigator to reach out to 'inaccessible individuals or subjects.' Several documents in the 'public domain' are compiled by professionals and provide very useful knowledge and observations and documentaries that are available to the highest expectations and are therefore very economical. In particular, these records may be an incredibly accurate source of data as they are produced for domestic or foreign reasons. The qualitative data-collection system review was chosen for this study because it allows for the analysis of data collected by professionals, who are often not accessible through an outside methodology, and these documents are also readily available. For example, findings from various international organizations concentrate on long-term surveys that a single scholar cannot complete. These types of documents were thus useful for this research, and the majority of them can be accessed via official organizational websites.

Material used

As in every empiric approach used in qualitative research, the study of documents requires to be reviewed and evaluated in order to assess the context, gather insights and obtain information. This paper examines a variety of online resources selected on the basis of the following metrics: "AI and finance" "AI effects in finance," "AI application in finance," "Future of finance" and "AI strategy priorities." Throughout the study, it has been considered that the papers and articles used for the analysis have been accurate.



Source:<https://www.javatpoint.com/subsets-of-ai>

ARTIFICIAL INTELLIGENCE IN CHANGING FINANCIAL SERVICES

The financial sector is a major contributor to Ai technology, and its use is rapidly expanding. Hedge funds and high-frequency trading (HFT) financial firms were the first to adopt AI, but many implementations have since spread to other parts of the financial sector, including banks, insurance institutions, policymakers, and various FinTech platforms. There are numerous AI applications in such businesses, and the population is growing rapidly. Electronic trading, portfolio structure and optimization, robotic consulting services, automated customer service, business forecasting, and other forms of data-intensive analysis are just a few of the key aspects. The paper focuses on some of the specific applications where AI is changing the existing conventional financial sector.

1. Algorithmic Trading

Algorithmic Trading (AT), also known as the Automatic Trading System, has been a major player in international capital markets. AT can be traced back to the 1970s, when automated financial systems were introduced into American capital markets (Begum et al., 2012). According to Cartea et al. (2015), AT applies financial rules to such an advanced system, but then uses them for trading. Currently, AT has implemented a complex AI algorithm capable of acting incredibly quickly and thus trading much faster than humans. HFT and machines account for 50-70 percent of all financial market transactions and 60 percent of futures transactions.

2.Fraud Detection and Compliance

In most finance industries, the cost of compliance is relatively high in order to avoid related penalties. As a result, banks are implementing AI technology to make such transactions more efficient and reliable. Furthermore, McAfee reports that cybercrime currently costs the financial sector around \$600 billion per year, with identity fraud being the most prevalent. A number of financial institutions are currently using AI to detect fraud. They are all MasterCard holders (Ahmed & Siddique, 2013).

Their "Decision Intelligence" AI Programme uses available data to recognize trends in past MasterCard usage to create a "default transaction," and then MasterCard compares and scores any new clients' transactions versus their generic transactions.

3.Chatbots and Robotic Advisory Services

A Chatbot can respond to customers instantly and appears to be capable of providing 24-hour support seven days a week, and 64% of people are optimistic about talking to a Chatbot because it is both safer and more efficient than talking to a person. Such Chatbot frameworks can manage a large number of users while providing a high level of user support at a low cost. The Chatbot is built around NLP and ML algorithms to provide a personalized conversation framework (Lu et al., 2018). Robotic advisory algorithms are designed to find the best package for a client based on risk preferences and target. Currently, the advantages of using Chatbots have made it an industry practice for financial institutions.

4.Cyber Security

Cyber security and data protection are important because they reduce the risk of losing valuable and confidential data, which is why artificial intelligence is required to address this vulnerability. AI has limitless applications in a variety of industries and markets. Similarly, using AI to enforce a stricter network security scheme may help businesses protect themselves from cyber-attacks and identify newer viruses (Horowitz et al., 2018). Furthermore, these models can promote proper safety practices while also avoiding mistakes, making them a no-brainer to implement in a variety of situations. However, it is also important to remember that AI Technologies chips may contain malicious code and adware for a variety of political reasons (Donepudi, 2015).

5. Accounting and Auditing

Auditing is especially well suited to AI and business intelligence implementations because it has become increasingly difficult to incorporate large amounts of both structured and unstructured data in order to gain understanding of a company's financial and non-financial outcomes. Furthermore,

because many auditing activities are organized and redundant, the collaboration with AI will streamline these operations. In simpler cases, AI could be used to systematically encode account inputs and to build and improve fraud detection mechanisms through the development of advanced ML code (Shabbir 2018). In the audit market, more advanced AI technologies such as DL can be used to analyze multiple data sources in order to compile reports or predict accurate forecasts.

AI ADOPTION IN FINANCIAL SECTOR & POLICY IMPLICATIONS

Pioneers and developers are currently facing a number of challenges in implementing AI. App developers are struggling to acquire AI that is known to contribute and recognize usage occurrences. Leader's issues have shifted from 'if' to 'how.' Pioneers are working to solve challenges in attracting talent and resolving societal opposition to AI. Financial institutions carry out a wide range of operations, ranging from collecting basic information to making informed decisions or otherwise advising policy makers. At present, financial structure protocols are purposefully designed to leverage the collective mental capacity and comprehension of a number of individuals. Executives should be encouraged to reorganize their processes in order to have full AI capability. Adequate planning and policy are needed to build and maintain a dynamic environment for AI to support the economy more broadly. The implementation of digital technology is a crucial measure to ensure that companies can compete successfully across different industries and locations. AI is the primary set of approaches to be used for a specific business case. Leaders in the company need to be aware that the concentration of the workforce is increasing, not replacing it. In addition, the provision of knowledge and analytical culture is more important than the AI capability. If the findings and implications are not achieved, neither the predictive nor the descriptive mechanism can be achieved. ML requires you to benefit from the mechanisms of the available datasets.

Automation and Machine Learning in Transforming the Financial Industry. The AI project framework will allow decision-making by executives. In-house lifestyle startups can allow users to develop their own strategies to a complex challenge. Finally, financial institutions must upgrade their IT operating model in order to plan for the new standard. Firms should develop their technology skills, policies and be more intelligent about the needs of their customers. The organization should focus on cyber security before it appears to be urgent. It is important for companies to ensure that they have sole rights to the talents and abilities needed to perform and win.

CONCLUSION

The primary goal of this paper was to examine the impact of AI on digital society, particularly in the financial sector. It also attempted to describe the implementation of AI, its limitations, prospects, and

impact on employment and services. A document on the qualitative review of the process was used for this study to gather information on the implementation and impact of AI, as well as a proposal for the banking sector to adopt AI. It is speculated that the financial sector will be eager to design and implement AI for speed, accuracy, and performance. AI contributes significantly to changing and changing the culture of work and efficiency, and it has enormous potential. The recent surge in AI-based applications aims to be the most significant and influential technological transition in history. Its general-purpose existence, which facilitates the use of these newest technologies in various sectors and occupations, regardless of the level of professionalism of employees in the workplace, is a source of widespread collective fear of job losses and loss of power over individuals lives. Every business can use AI technology for financial and accounting purposes. It is important for companies and society as a whole to learn how to use and improve new technologies. In order to remain competitive, firms will need to incorporate AI, and workers will need to adapt their skills in order to retain employment.

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A STUDY ON CUSTOMER PERCEPTION TOWARDS FINTECH UNICORN START- UPS WITH REFERENCE TO FINTECH MOBILE SMART PHONE APPLICATIONS IN THANE CITY

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ABSTRACT:

Start-up India initiative was launched by Prime Minister Shri. Narendra Modi on 16th January 2016 which is a scheme towards entrepreneurship skill development, employment generation and

wealth creation. Today, India has the third largest start-up ecosystem in the World after USA and China. Finance is the lifeblood of any economy. With an increase in technology and market demand in the volatile, uncertain and dynamic business environment, there has been an increase in use of fintech mobile applications. This study is focussed on customer perception towards fintech unicorn start-ups with respect to fintech mobile smart phone applications w.r.t. its popularity, user-friendliness, awareness and other significant risks and rewards along with blockchain technology and for this data is collected with the help of structured questionnaire. Data being collected from Thanecity and analysed using SPSS Software.

Keyword: *Unicorn Start-up, Entrepreneurship Skills, Fintech mobile applications, Blockchain technology, Thanecity.*

1. INTRODUCTION

Fintech is intimately associated with the financial industry's digital revolution. The words financial services and technology are combined to form the name. The term "fintech" describes an industry

where financial services are modified by technology means. These transformative innovations happen in fintech companies. Fintech companies are occasionally start-ups. They are technology-driven businesses that are aggressively and digitally gaining market share and clients by offering simple-to-standardize financial goods and services. The transition away from physical service delivery toward digitization is a shared experience for all.

Introduction to Unicorn Start-ups

1.1 Introduction to Unicorn Start-ups

Start-ups are young business entities with an innovative idea aimed towards solving a significant problem of masses by means of a product or service business. The phrase "Unicorn Start-up" was first used by American venture capitalist Aileen Lee. A start-up valued at \$1 billion or more that is privately held and supported by venture capital is known as a unicorn. In general, investors and venture capitalists that have participated in various investment rounds value unicorn start-ups primarily on their perceived growth potential rather than their existing performance.

1.2 Entrepreneurship and Skill Development

Land, labour, capital, and entrepreneurship being the factors of production, entrepreneurship is the ability and process of creating, structuring, and operating a new business in order to produce economic value in the form of profits while accepting associated financial and other risks. The Ministry of Skill Development and Entrepreneurship, headed by Union Minister Shri Dharmendra

Pradhan and Minister of State Shri Rajeev Chandrasekhar, has been established on 9th Nov'14, aiming at creating a "Skilled India" through training and skill development, skill up gradation, vocational skills, innovative thinking, and the creation of new and innovative work opportunities.

1.3 Introduction to fintech mobile applications

Fintech, as the name suggests is nothing but finance made easy with the help of technology. Fintech mobile applications are smart mobile phone based applications which assists in financial activities viz., digital receipts and payments, credit score, loans, payment of utility bills, policy renewal etc. We all know these famous fintech mobile applications viz, Google pay, Paytm, Phone Pe, Policybazaar, Bharat Pe, Mobikwik, Amazon pay, Whatsapp pay, BHIM UPI etc.

1.3.1 Salary Dost- Loans Easy & Fast – A Fintech start-up in Thane city

This is a mobile smart phone fintech start up applications which offers loans and credit to consumers within seconds and located in Thane city. Salient features of this app are – Tailor made financial services, credit scores, hassel free educational, personal, car and housing loans without much paperwork, safety and confidentiality of documents, etc. As the name suggests, this fintech start up caters to the needs of salaried employees and also provides various employment opportunities for developers, credit managers and recovery and collection officers.

1.4 Blockchain Technology

Blockchain is a system for storing data in a way that making system changes, hacking, and cheating becomes difficult or impossible. A blockchain is simply a network of computer systems that duplicates and distributes a digital ledger of transactions across the entire network. Thus, in fintech industry, blockchain technology plays an important role in data safety and security and also meeting with the demands of legal and regulatory framework concerning protection against financial frauds.

2. REVIEW OF LITERATURE

Numerous studies have been done on start-ups in general, but little study has been done on start-ups relating to fintech and related mobile smart phone applications. Rarely, is there research on the impact of fintech mobile applications on business and societal behaviour, or on how these applications might contribute to a more sustainable future and digital economy. Rarely any study is conducted combining "Amrit Kaal Mahotsav" i.e. trends in digital economy w.r.t. fintech start-up mobile based applications and studying the impact of entrepreneurship and skill development after 75 years of independence. The lack of study connecting fintech related start-ups combined with entrepreneurship and skill development in the targeted geographic area creates a research gap.

Salamzadeh, Aidin & Kawamorita, Hiroko. (2015). Start-up Companies: Life Cycle and Challenges. Start-up businesses are recently formed businesses that battle for survival and further studies, the entire life cycle along with opportunities and challenges for start-ups.

Saliger, E. & Kordovitch, V. & Popova, O. & Popov, M. (2020). The Development of Fintechs as a Part of Digital Economy. This research paper discusses various opportunities for fintech business and concludes that data protection and security is a major risk.

F., Simon & Rosillo, Rafael & Fuente, David & Priore, Paolo. (2019). Blockchain in FinTech: A Mapping Study. Blockchain technology plays a very important role in data safe, security, privacy, scalability and also in legal and regulatory framework thus, further increasing the scope of research in blockchain technology

3. RELEVANCE OF THE STUDY

Ever since demonetization, there has been a tremendous increase in digital economy and fintech industry came into limelight. Further, start-up ecosystem is continuously growing becoming the third largest in the world. Thus, it becomes relevant to study about fintech start-ups and its role in the digital technology economy and its contribution in the growth and development of India along with its significant opportunities and challenges.

4. SCOPE OF THE STUDY AND RESEARCH METHODOLOGY:

This study is limited to customer preference towards use of fintech mobile applications in Thane city. Primary data is being collected from 100 respondents residing in Thane city, irrespective of age, gender, occupation or profession, using non-probability convenience sampling and sample size being determined using sample size calculator. Secondary data used to support the study is collected from books, journals, websites, and newspapers. Chi square is used as a statistical technique to test the hypothesis along with percentage analysis and pie chart using SPSS.

5. OBJECTIVES OF THE STUDY:

1. To study general awareness about fintech start-ups.
2. To study the satisfaction level derived by using fintech mobile smartphone apps.
3. To analyze various fintech applications and services used by customers.

6. HYPOTHESIS OF THE STUDY:

Hypothesis 1

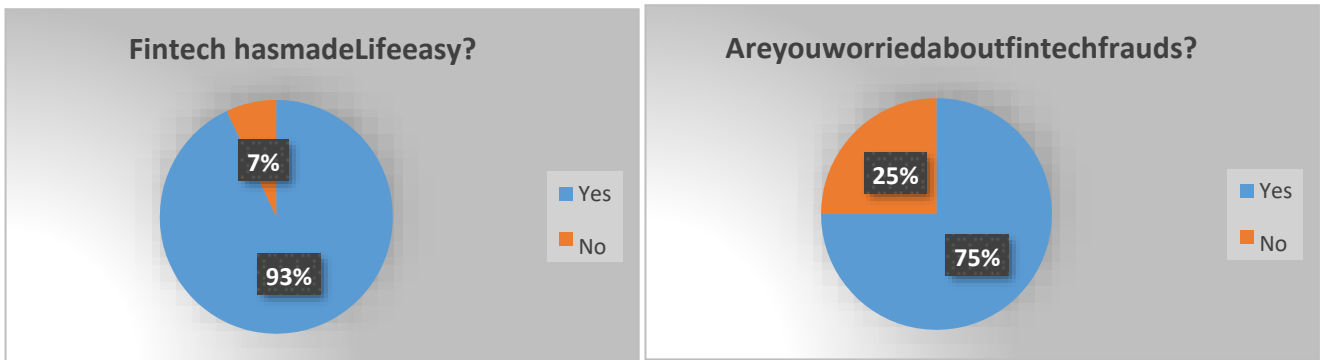
H₀: Customers are not satisfied with services provided by fintech mobile smartphone applications.

H₁: Customers are satisfied with service provided by fintech mobile smartphone applications

Hypothesis 2

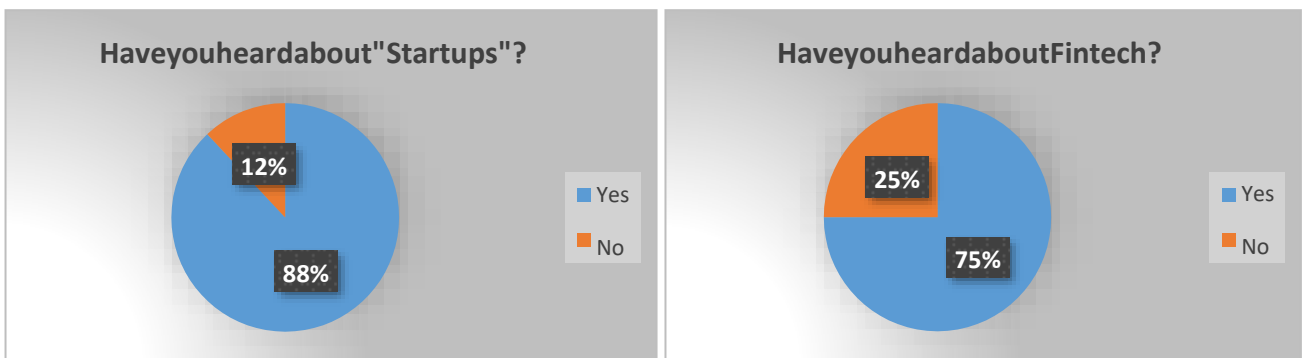
H0:Customers are not concerned about fintech frauds

H1:Customers are concerned about fintech frauds



7. RESULTS–DATA ANALYSIS AND INTERPRETATION

7.1 Customer awareness and concerns



Thus, the start-up ecosystem is quiet famous among masses these days. With an increasing awareness about fintech and its usage in the form of mobile smart phone based applications, life is becoming easier, however, people in general are worried about fintech frauds as well.

7.2 Hypothesis Testing:

Data collected was tested to be normal and non-parametric test was applied. Out of various nonparametric tests, viz., Wilcoxon Test, Kruskal Wallis Test, Chi-Square test, etc. we have applied Chi-Square test to test the null hypothesis and used SPSS for analysis. The results are as follows:

Test Statistics	Has fintech made life easy?	Are you worried about fintech frauds?
Chi-Square Value	73.96	25
Difference Value(df)	1	1
P-Value	0.00001	0.000

Interpretation: Results indicate that the calculated p-value is less than 0.05. Therefore, Chi-square test is rejected. Hence, null hypothesis is rejected and the alternate hypothesis is accepted.

Conclusion 1: Customers are satisfied with service provided by fintech mobile smart phone applications.

Conclusion 2: Customers are concerned about fintech frauds.

Further, analysis of fintech mobile smart phone application along with its offered services in terms of its popularity among the respondents is as under:

Sr No.	Application	Rank	Services	Rank
1	GooglePay	1	Payments Remittances	1
2	Paytm	2	Utility Bills	2
3	PhonePe	3	Payments Bank	3
4	AmazonPay	4	Insurance	4
5	WhatsappPay	5	Investments	5
6	PolicyBazaar	6	Credit Score	6
7	PaymentsBank	7	Loans	7

Apart from this, other apps preferred by respondents includes Razorpay, Instamojo, Pay U Fampay, Bharatpe, Groww, Paypal, Mobikwik, M-psea etc. Further, E-wallets are another significant fintech services.

8. CONCLUSION OF THE STUDY

With an increase in digital economy, customers in general are preferring fintech services including banking for their day to day operations, due to its user friendly interface. People are equally concerned about fintech frauds pertaining to data safety and security including cyber-attacks and crimes. With an increase in fintech crimes, it's crucial that fintech start-ups must put in blockchain

technology along with strong security systems so as to prevent frauds and meet anti-money laundering regulatory framework.

People in general are aware about start-

up ecosystem as well. Fintech is also creating new and innovative employment opportunities. Capitalising on its opportunities and eliminating its threats, fintech industries including fintech start-ups seem to have a bright future in the foreseeable future.

9. SUGGESTIONS AND RECOMMENDATIONS

After this detailed study, we definitely know that India has a great potential to become a superpower and Global leader due to having the largest youth population in the World who are relatively more tech-savvy and driven by technology. Capitalising on increasing start-up ecosystem especially in fintech industry, by taking advantage of entrepreneurship and skill development mentorship and incubation, one can create a win-win situation both for oneself and economy as a whole. Guidance and mentorship must begin from educational institutions itself. Further, colleges must encourage new and innovative business ideas through start-up fests and business idea competitions, further rendering full support to the best start-up idea in order to make it a reality. Also, start-up finance banks must be opened in all major cities giving affordable credits to worthy start-up with growth potential. Best investment is not in shares, debentures, stock, bonds, gold etc. but in oneself. One must invest time, money and efforts to constantly upskill oneself and learn something new and innovative, thus, giving higher returns.

Further, fintech start-ups can cater to tailor made customised requirements of its customers as compared with fintech giants. With easy integration with banking and other utility networks, fintech start-ups can increase its popularity. Agility and financial management is also what fintech start-ups must look for. Further, working upon IPRs is also a need for the hour. Value added features, user-friendly interface, data safety and security and business ethics is recommended along with constant check on the same. Automation and artificial intelligence could be looked up on so as to improve quality of services.

Chatbots are no doubt a trend these days. Fintech start-ups could take inspiration from fintech giants and further eliminate the shortfalls which those giants cannot follow due to its large scale of operations. Fintech start-ups could come up with personalised wealth management and personal finance services which could help especially low net worth individuals to monitor their savings, investments and expenditure and further suggest opportunities to grow wealth considering individual risk appetite.

Fintech start-ups thus, adopting these recommendations, a road map could be created and India will be able to achieve the vision of 40 trillion-dollar economy by its 100th year of independence.

11. LIMITATIONS OF THE STUDY

The study is limited to 100 respondents from Thanecity and related to fintech start-ups w.r.t. mobile smart phone applications.

12. SCOPE FOR FURTHER STUDY

Thus, from the above mentioned limitations, it's apparent on record that there exists further scope for study with respect to entrepreneurship and skill development, start-up businesses, geographic location, industry, environment sustainability analysis, business or employee perception for the said topic.

Further, there exists a large scope to study in detail on contribution of the Ministry of Entrepreneurship and Skill Development on success of start-ups in various industries. Further, data safety and security issues along with blockchain technology is another wide scope for research extending the current research topic on hand.

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