

**SEMINAR REPORT**  
**ON**  
**Artificial Intelligence and Jobs**

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**SEMINAR GUIDE**

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**MKSSS's**  
**Cummins College of Engineering for Women, Pune**

**(An Autonomous Institute Affiliated to Savitribai Phule Pune University)**

## **CERTIFICATE**

This is to certify that Ms. Akshada Malpure has satisfactorily completed the seminar on

## **“Artificial Intelligence and Jobs”**

in the partial fulfilment of her term-work (Seminar) as a part of syllabus for T.Y B.Tech. Computer Engineering for the Academic Year 2021-2022 as prescribed by MKSSS's Cummins College of Engineering for Women, Pune (An Autonomous Institute Affiliated to Savitribai Phule Pune University)



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**Seminar Guide**

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## **ABSTRACT**

The concept of Artificial Intelligence (AI) has attracted a number of scholars in the status and development from many countries. Even though Artificial Intelligence has become an basic and integral part of many lives already, it has had a mixed impact on the society. Artificial Intelligence has promoted the modification and upgradation of economy and society but simultaneously had an adverse effect on the employment structure. It has already automated many jobs and continues to do so, but the end result on the employments remain uncertain and vary according to the industry and demand. Artificial Intelligence research papers, venture capitalism, start-ups have increased exponentially in the last decade. With the increased numbers, there is a significant surge in accuracy and the imports of robots have grown 2.5 times which predicts the future of this unavoidable technology.

In this report, we observe the impacts of Artificial Intelligence on employment and how can we prevent its negative impacts. Also, we propose a novel Artificial Intelligence technology, Sequential Optimization of Naive Bayesian (SONB), which not just makes expectations, yet additionally learns the fundamental example and consequently assesses absent or untrustworthy element values

According to analysis new technologies will certainly cut jobs but at the same time new ones will also be created. This report focusses on a big rising question these day “How will Artificial Intelligence affect jobs”, the reasons, it’s consequences and possible measures to optimize the problem.

Keywords-Artificial Intelligence; employment

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## **CHAPTER I**

### **1.1 Introduction to Artificial Intelligence**

Artificial Intelligence is the branch of computer science which gains intelligence and attempts to perform actions like a human. It has become a technical science that explores and develops various theories, methods and technologies for making various enhancements in human intelligence. There are many researches in this are including robotics, recognition systems, natural language processing and expert systems.

Even in case of employment it has penetrated into all walks of life. There are some fields in which there cannot be a replacement of workers due to technology but Artificial Intelligence technology is different. It is very versatile and covers a wider range of industries in people's employment. Many of the companies have even faced a situation of being majorly replaced by artificial intelligence.

Besides its impact on employment, artificial intelligence technology is used in the selection of the company hiring or recruitment process itself. The recruiting and selection process involves multiple stages in which the applicants and employer both acquire information about each other. Every stage is an eliminating stage. In the recruitment process the AI agent does the judging of the client based on various factors involving newer and newer technology. It has even had a positive impact on the clients, say for example, the nervousness of the applicants may be reduced as they need to perform in front of a bot unlike in case of person-to-person interview. These points help to figure out that the chances of being qualified for the next round increase.

Artificial Intelligence (AI) innovations have been effectively applied to many fields, like object recognition and speech recognition. Among these applications, few think about cases where some element values are absent or inconsistent, for example, in the expectation of occupation jumping designs where many profiles are inadequate, despite the fact that these missing elements might be significant for organizations (for example Human Resources and the board). In this report, we propose a novel Artificial Intelligence technology, Sequential Optimization of Naive Bayesian (SONB), which not just makes expectations, yet additionally learns the fundamental example and consequently assesses absent or untrustworthy element values. We dissected a few significant occupation bouncing elements and applied it to foresee appraises missing qualities and accomplishes best in class execution. Furthermore, the

exactness of profound learning is worked on by 3% on the new dataset created by SONB over the crude information. In outline, we present a book Artificial intelligence innovation for anticipating, which could likewise be utilized to gauge missing qualities in the information. It is applied to an enormous (20,185,365 representative profiles) dataset and effectively predicts work jumping designs for representatives in light of their profiles, which could be an important asset for organizations

## **1.2 The Development of Artificial Intelligence**

In the Dartmouth Conference held in 1956, the concept of artificial intelligence was proposed, marking the birth of artificial intelligence. It was during this period that the trend of AI grew and the researches in this field started. In the 1960's, compliance and connectionism, as the main genre went into depression. The lack of hardware capabilities and defects in algorithms, the development of artificial intelligence did not flourish. In 1970's, the research of backpropagation algorithms started. The costing of computers and computing cost gradually began to increase, the research and application of expert systems were difficult to progress and hence artificial intelligence began to make breakthroughs.

Back-propagation neural networks were widely recognized in the 1980's and research on algorithms based on artificial neural networks advanced rapidly. Along with this the computer hardware capabilities increased rapidly. Moreover, the development of Internet reduced the artificial intelligence computing costs and its development had no bounds. In 2006, deep learning was proposed and artificial intelligence once again achieved breakthrough development. In the first decade of the 21<sup>st</sup> century, the development of mobile internet brought about more application scenarios for the artificial intelligence. In 2012, deep learning algorithms achieved high level in speech and visual recognition.

Artificial intelligence, as groundbreaking research and a theoretical method and technology applied to the simulation and extension of human intelligence, is a science of applied system science. It has become one of the cutting edges of the 21st century and is very rich of knowledge and technology. Low consumption of material resources, high production efficiency, large potential growth and largescale developable fields, are now becoming the core driving force of the industrial reform. Therefore, all countries in the world are actively exploring artificial intelligence to play a greater role in economic and social production in the process of occupying a new level and exceling higher and higher.

## **CHAPTER II**

### **THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EMPLOYMENT**

According to studies it has been found that artificial intelligence can replace both physical and mental labor. BCG Ali Research Institute has published a set of data stating that within the next 5 years, 7.1 million jobs will disappear due to the arrival of the era of artificial intelligence. 702 occupations and 47% of jobs may be replaced by artificial intelligence. At the same time, for every robot deployed, 3.6 new jobs are created. While technological progress promotes employment growth, it will also have a negative impact on full employment, leading to a dilemma in macroeconomic policies.

#### **2.1 The Substitution Effects of Artificial Intelligence on Employment**

Artificial Intelligence is widely used in various fields, from medical care to customized education, from more efficient retail and manufacturing to autonomous vehicles. The world economic Forum had predicted that by 2025, the development of artificial intelligence would reduce the human jobs by 5 million. This rate will even go higher and higher as the technology progresses. This so-called technological unemployment is the unemployment caused by technological progress. This means that the more the advancement in equipment, the human labor will be replaced by it, resulting in increased unemployment.

- Many single-skilled occupations, cumbersome labor, especially some procedural, routine jobs or precision jobs that cannot be handled manually may be replaced by machines.
- Not all jobs have been replaced by artificial intelligence.

#### **2.2 The Creative Effects of Artificial Intelligence on Employment**

Although the new technological revolution will destroy some traditional jobs, the new employment opportunities it will bring will grow at a faster rate and also bring new jobs thus increasing the number of jobs. The high application of artificial intelligence will improve the quality of human life and change the living style. The use of new technology will not only improve work efficiency and promote the development of productivity, but will also have a decisive impact on labor, employment

and even social systems.

- Firstly, the rapid development of artificial intelligence can bring more new jobs because it efficiently promotes social and economic development. Rather than working on the tedious job of handling machines, humans can better focus on some other creative work which only humans can do.
- Secondly, the development of artificial intelligence has improved work efficiency, increased additional demand and reduced costs.
- Thirdly, the development of artificial intelligence has caused new business paradigms and new business formats in the form of employment, which will lead to new forms of employment, which will significantly increase the proportion of flexible employment in the society.

### **2.3 The Polarization Effects of Artificial Intelligence on Employment**

Many international scholars believe that the employment structure of the labor force is showing a polarizing trend. The demand for high income cognitive work and low-income manual work continues to increase, with the consequent decrease in routine work at middle income and workers at lower- income and middle-income levels face greater risks of job replacement.

What is the reason for this polarization?

- One of the reasons is because of the difference in the nature of work. The main role of artificial intelligence is that it replaces the repetitive, stylized work tasks and these tasks are mainly concentrated in middle-income jobs.
- According to cost-benefit analysis, the benefits of being replaced by middle-skilled labor are higher and technically more feasible, so middle-income workers will be replaced first. However, a certain creative and not stylized work task cannot be replaced in the short term.
- The substitution of artificial intelligence for middle-income jobs has formed a squeeze on middle-income workers. Middle-income workers have shifted to high-income and low-income jobs, and thus high-income and low-income labor has increased.

- Additionally, technological progress has also created a direct demand for highly skilled labor, which has resulted in a polarization effect on employment.

In near future as the level of technology continues to improve and the number of applications become more widespread, the phenomenon of employment polarization may change. This polarization not only affects the middle -income workers but also the low-income works, yet leaving the high-income workers with the least vulnerability.

## **CHAPTER III**

### **THE COUNTERMEASURES TO THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EMPLOYMENT**

#### **3.1 Narrowing the Substitution Effects of Artificial Intelligence on Employment**

The entrepreneurial spirit in today's competitive world has become a ride of adventures and the personal characteristics of the entrepreneurs, with an ambition to break through the obstinacy of existing technology, diligently supply premium services by correctly incorporating industry chain, added product value with ample options of types to increase position and promote levels of employment.

On the contrary, it is essential to upgrade the quality and ability of works and workers with the establishment of a professional education system and skill training.

#### **3.2 Amplifying the Creative Effects of Artificial Intelligence on Employment**

We should find out and analyze the impact of artificial intelligence on employment structure and actively carry out artificial intelligence monitoring and evaluation of employment substitution.

Firstly, we should increase the pre-judgement of the applications of artificial intelligence technology and promote the it in a planned and organized manner. Within the overall framework full play to market functions and reorganization and rebuilding of jobs must be done.

Secondly, respect the law of industrial revolution, give focus on the upgrading and application of artificial intelligence. Also support innovation and entrepreneurship. With the help of artificial intelligence, we must try to improve the urban development planning and provide incubation and accelerated development guarantees for artificial intelligence in space.

Most importantly we must encourage and support the transfer of labor to the new form of artificial intelligence.

### **3.3 Cultivate Professionals in Artificial Intelligence**

In this rising phase of the development of artificial intelligence, we are actively building platforms to strengthen the introduction and training of artificial intelligence talents. As a response to these challenges, we must deepen the reform of the talent system and mechanism, making the complete use of existing talent. We must utilize the industrial platforms, encourage school-enterprise cooperation, support relevant universities to strengthen the construction of artificial intelligence- related disciplines. Also, in schools which support vocational structure, courses must be provided for the growth of artificial intelligence and the skills urgently needed by the industry.

Enterprises and industry service agencies to enhance the establishment of new type talent training and promotion plans, improve the mechanisms and create a huge number of experts in the field of artificial intelligence.

### **3.4 Improve Employment Service System**

Depending on existing HR administration organizations, for example, work data organizations and outsider work hunting and scouting, based on improving and consummating the work market data organization and administration framework, laying out big business enrollment positions and experts firmly connected with advanced mechanics and different innovations Professional data stage for quest for new employment and excellent workforce re-work to reinforce the assistance capacity of ability data stage. Where conceivable, nearby associations are urged to foster robots, man-made brainpower and different abilities and request planning work to shape a public information base. Normalize and further develop the work market administration abilities, fortify the assortment of data on the interest for low-and mid-end positions in endeavors and public administrations, and effectively and really interface the low-and mid-end work move occupations. Endeavors ought to be made to fortify vocation direction, to demonstrate future positions and new business headings for potential workers who are versatile to mechanical technology, and to call attention to new source for workers who are briefly inadmissible to new advancements. A powerful connecting arrangement of profession direction business data vocation acquaintance will be shaped with lessen Costs of moves and searches.



### **3.5 Play the Role of Market Regulation Mechanism**

In the process of artificial intelligence affecting social employment, the market has played a very good regulatory role. It is the normal operation of the market mechanism that transforms the damaging effects of artificial intelligence on social employment into long-term positive effects. Under the conditions of China's socialist market economy, in order to give full play to the role of the market, it is necessary to use both tangible and intangible hands to maintain sufficient flexibility in the labor employment system and labor market. The government should attach importance to and take active measures to carry out macro-control, encourage workers to maintain professional vitality, and use various forms to realize reemployment. Workers must change their employment concepts, and strive to continuously improve their own qualities through hard work to learn scientific and cultural knowledge and vocational technology, and reduce the risk of permanent unemployment. The replacement of social jobs by technology not only does not mean a "disaster" for workers, but also a great liberation of the labor force, which will ensure the rights of workers more fully, so there is no need to worry too much about the severity of unemployment.

## CHAPTER IV

### ANALYSIS OF THE CURRENT SITUATION OF INDUSTRIAL DEVELOPMENT DUE TO ARTIFICIAL INTELLIGENCE

The business covered by Artificial Intelligence is fairly wide, essentially including the base layer, development layer and application layer, covering a wide scope of headways and application circumstances. Value Waterhouse Coopers pointed out that by 2030, artificial intelligence will carry 14% improvement to overall Gross domestic product, which is identical to \$15.7 trillion. Here, \$6.6 trillion comes from effectiveness gains and \$9.1 trillion comes from related client/business markets. All together to study and condemn the headway of the phony knowledge industry as well as the impact of fake understanding on individuals, Stanford College, the top US school, continued to analyze artificial intelligence works out. Considering undeniable data, they reveal the continuous status of computer-based intelligence improvement.

#### 4.1 The Number of AI research papers increased by 400%

Starting around 1996, in the going with 20 years, the amount of computer-based intelligence papers has extended essentially, growing to over 400%. The quick development in the amount of researcher research papers exhibits that the amount of new taught property opportunities and licenses has in like manner advanced huge amounts at a time. In the Snare of Science stage, the entire data base contains 13735 papers from 1996 to 2017 in the field of computer programming with the expression 'Computerized reasoning'. It will in general be seen that the amount of investigation papers on artificial intelligence has grown rapidly, and the energy of dissemination has shown a nice example.

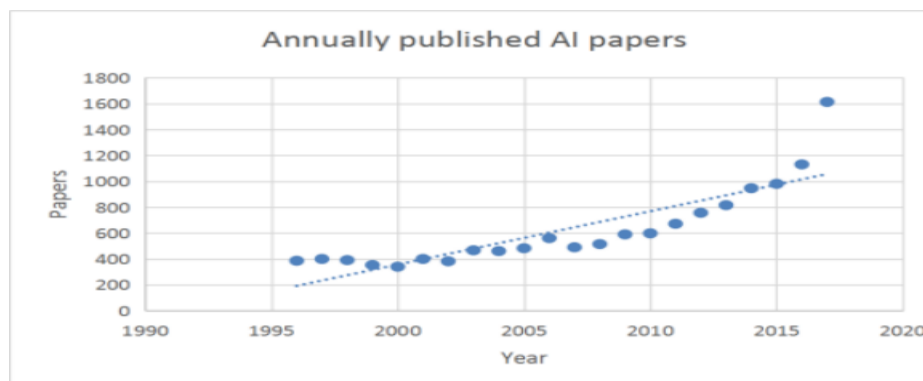


Figure 4.1. Increase in the number of AI research papers chart

Source: 2019 IEEE 4th International Conference on Cloud Computing and Big Data Analytics

## 4.2 The AI Venture Capital has surged 6 times since 2000

Venture Capital (English: Venture Capital, truncated as VC), otherwise called funding venture, which is a type of private value speculation. As indicated by research information from Stanford University, since the year 2000, investor (VC) has contributed six times more in venture of AI new companies every year. Figure 4.2 exhaustively mirrors the complete yearly venture of VC in AI new businesses at all funding stages in the United States. All things considered; funding is put resources into new businesses with high innovation. The fast expansion in how much speculation shows that investor (VC) has a firm trust in the improvement of AI new businesses and are incredibly hopeful about their advancement possibilities. For Crunchbase, VentureSource and Sand Hill Econometrics, which are utilized to decide how much VC yearly interest in new businesses, these new companies assume a significant part in specific key regions.

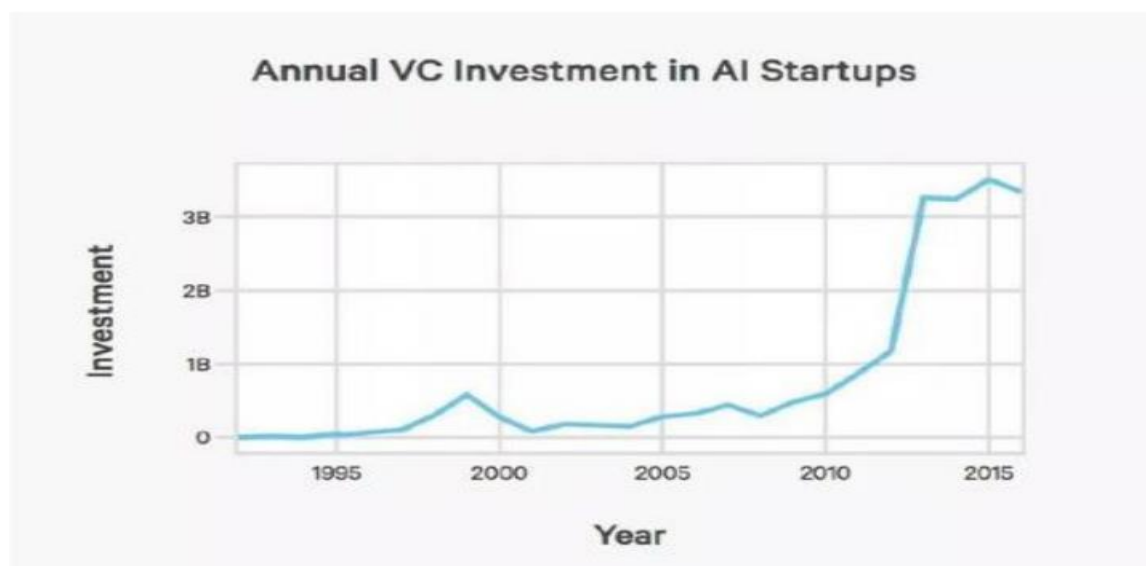


Figure 4.2. AI venture capital growth chart  
Source: Crunchbase, VentureSource and Sand Hill Econometrics

### 4.3 AI Start-Ups Surge 14 times

Figure 3 uncovers the development circumstance of AI new businesses in the United States lately. Beginning around 2000, the quantity of Artificial intelligence new businesses with capital help in the United States has expanded by almost multiple times. Crunchbase, an endeavor administration information base organization that covers the biology of new companies and venture organizations. VentureSource is the most reliable, thorough worldwide information base on organizations supported by investment and private value. Sand Hill Econometrics provides for VentureSource assessed values for rounds of subsidizing for privately owned businesses. Each of the three have quantitatively examined the quantity of AI new businesses. As of now, Amazon, Google, Facebook and IBM are driving the way in man-made consciousness. These goliath organizations gather more usable information and spread out in the field of man-made brainpower.

- Amazon has put resources into man-made brainpower for more than 20 years, getting in excess of 5 PB of site page information, in excess of 500,000 JPEG pictures and comparing JSON meta-information. In excess of 250 million information is caught consistently in the realm of radio, magazines and online news. Almost 100M pictures and recordings are caught consistently. Amazon Reverberation series speakers have involved over 70% of the voice associate market.
- Google has the world's biggest data set, zeroing in on applications and item advancement. Google Brain has a group of in excess of 1,300 scientists and has a 23.8% offer of the voice aide market. The size of the Google Earth data set is assessed to be 3017 TB or around 3 PB, what's more, Google Street View has roughly 20 PB of Street View photographs. Furthermore, Google has a profound learning AI research project, Google Brain, which covers AI, normal language getting it, what's more, advanced mechanics.
- Facebook processes 2.5 PB of content and more than 500 terabytes of information each day. Facebook Artificial Intelligence Scientists produce 30 million photographs per day and sweep about 105 terabytes of information at regular intervals. It has a 62,000 square foot server farm that can hold up to 500 racks. Decipher 2 billion client posts in excess of 40 dialects consistently, and 80 million clients need to utilize these interpretations consistently.
- IBM plans to make a MIT-IBM Watson Artificial Insight Lab with a 10-year, \$240 million speculation. IBM has in excess of 2,000 AI workers around the world, and Watson clients range five landmasses and more than 25 nations. IBM put \$1 billion in the Watson project, remembering \$100 million for funding.

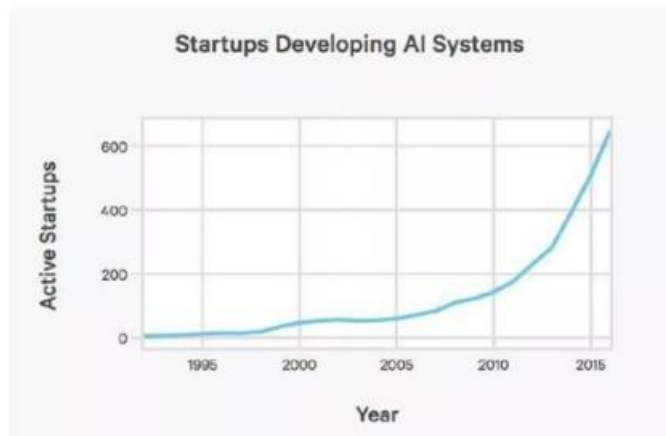


Figure 4.3. AI start-up growth chart

Source: Crunchbase, VentureSource and Sand Hill Econometrics

#### 4.4. New AI Application Skills Become the Core Skills of Job Search

Figure 4 mirrors the center abilities that are generally required for the present place of employment. As indicated by insights on the web-based work search stage Monster.com: profound learning, machine learning and regular language handling (NLP) have turn into the three most significant abilities for work hunting. Particularly for NLP, NLP has for quite some time been anticipated to turn into the most required abilities for new AI applications, and application engineers should dominate the NLP abilities. In expansion, the most famous abilities incorporate AI innovation, Python, Java, C++, Spark, MATLAB and Hadoop. As indicated by Monster.com' s compensation insights, US information researchers, man-made brainpower advisors, and AI bosses could procure \$127,000. Numerous signs demonstrate that advanced worldwide organizations require work searchers to dominate specific AI abilities.

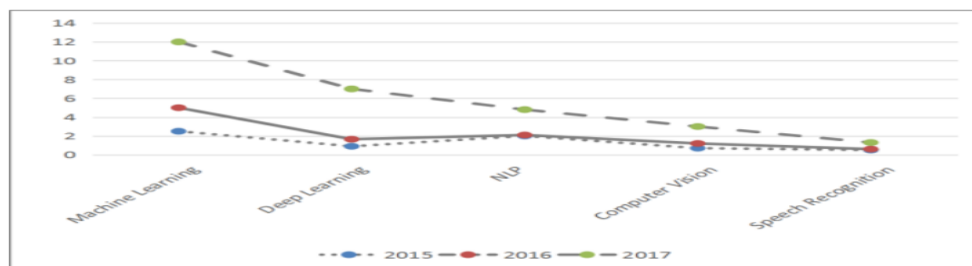


Figure 4.4. Core of job search AI application skills map

Source: 2019 IEEE 4th International Conference on Cloud Computing and Big Data Analytics

#### 4.5 The Number of Robot Imports Has Increased to 2.5 Times

Figure 5 mirrors the quantity of modern robots imported into North America and the world as of late. From 2000 to 2015, in this time region, the import volume of robots has expanded from 100,000 units to 250,000 units, and robot imports have expanded to 2.5 times. Particularly after 2009, the import volume of robots has expanded quickly [8]. From a worldwide point of view, International Data Corporation (IDC) predicts that robot utilization will keep on speeding up in five years, coming to \$230.7 billion by 2021, with a accumulate yearly development rate (CAGR) of 22.8%.

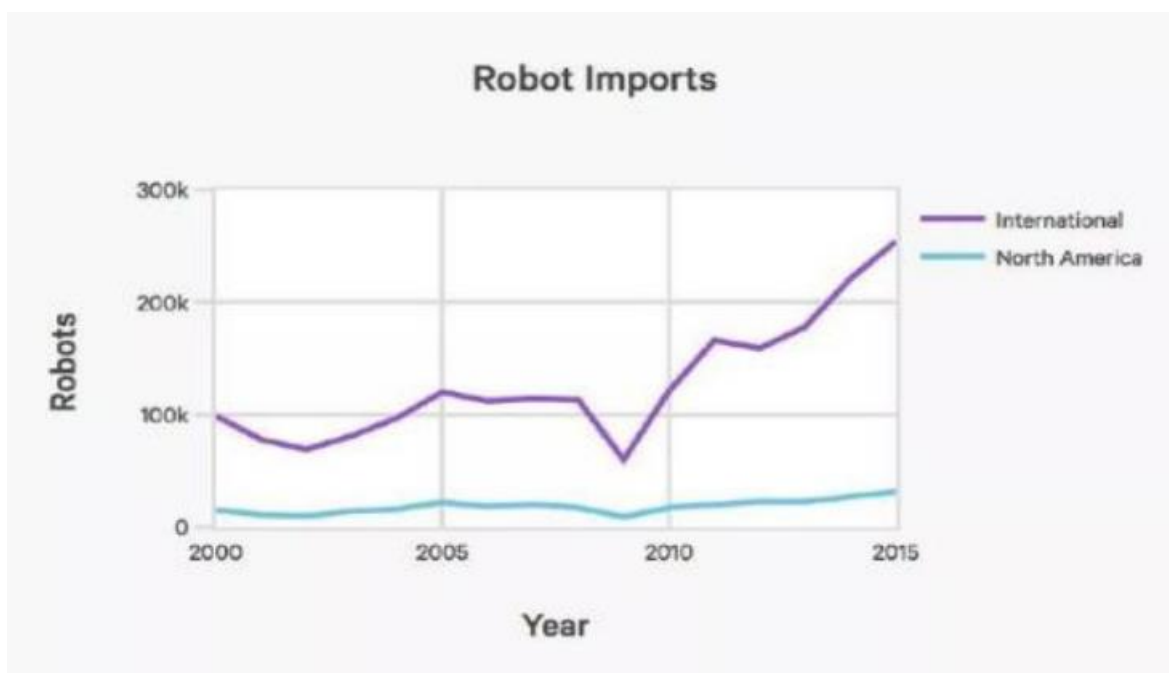


Figure 4.5. Robot import quantity growth chart

Source: International Federation of Robotics, World Robotics Project

## **CHAPTER V**

### **SEQUENTIAL OPTIMIZATION NAIVE BAYESIAN**

Specialists have as of recently broken-down job-hopping designs in the Silicon Valley region, and they have secured higher paces of position jumping for college-educated men in Silicon Valley's computer industry contrasted with computer bunches situated out of the state. Notwithstanding, there are presently not many examinations or distributed research papers that dissect work jumping designs for an enormous scope. Consistently, a large number of understudies graduate and enter the labor force while at the same time, a great many workers change their positions. With this as a primary concern, we can see that it is fundamental for organizations to conclude who they will employ. The expectation of job-hopping is vital for bosses to figure out the gig status of their workers; to realize who are bound to remain longer in the organization. How might they have the option to foresee a representative's occupation bouncing example in view of their set of experiences data? For most utilizations of AI and profound learning procedures, the information is finished, and that implies there are no highlights with missing qualities. The profound learning procedures are typically used to gain the examples from the information, and thusly make precise forecasts from it. Notwithstanding, whenever there are a ton of highlights with missing qualities, it very well may be hard to apply the profound learning. More significantly, knowing what the missing is additionally significant highlight values are in sure applications. For instance, some workers decide not to deliver their GPA data, when it would be helpful for HR to have an assessment of their GPA. To tackle this issue, we propose a book structure, SONB (Sequential Optimization of Naive Bayesian), which can naturally gauge missing qualities in the info information. Likewise, the SONB structure can be without any problem reached out to assess questionable element values in the information rather than basically leaving them clear.

## **5.1 METHODOLOGY**

### **5.1.1 Data Preprocessing**

For testing the calculation, a sum of 20,185,365 worker profiles were given by a mysterious tech organization. The profile incorporated the representative's position data like time, organization name, area, and so on and their instructive foundation like college joined in, major of study, degree(s) procured. This crude information was cleaned cautiously with the end goal that the representative's present place of employment is barred for preparing, this was done to work out the complete time the worker remained in a position.

This information was then partitioned into preparing and testing data, 70% and 30% individually. To ascertain the exhibition of our strategy and a few other benchmarking devices. The vast majority of the representative's information contained missing fields like their certificate, organization data and GPA. In these cases, an exceptional worth 0 was utilized to address the missing elements. A few qualities separated from the profiles didn't contain legitimate organizing, so they decided to channel them in the event that it couldn't be handled.

### **5.1.2 Feature Calculation**

Given table describes the features that were calculated from input data. The first two features (StartYear and StartMonth) are comparatively easy to extract from the data. The record was ignored if StartYear or StartMonth was not provided. For the third feature, the highest GPA earned for employees with multiple degrees was considered. Cases having when an employee's GPA information contained ambiguous special characters (such as unusually placed semicolons and periods) were ignored. Also, employee GPAs with a value larger than 4.0 was ignored. The format of xx/4.0 so long as the numerator is in the range of 0.0 and 4.0 was accepted. All unprocessed GPA feature values were labelled as 0. The GPA feature value is labelled was 1 when it was in the range of 0.0 and 1.0, 2 when it was in the range of 1.0 and 2.0, and so forth up to 4.



Feature Name	Description	Value Range
StartYear	The year of joining a position	1970-2016
StartMonth	The month when joining a position	1-12
GPA	Employee's cumulative GPA	0-4
Degree	Highest degree earned by employee	0-4
University	University employee graduated from	0-3
Major	Major of employee's highest degree	0-5
Title	Employee's title for their job position	0-6
Company	Company with the position	0-21
Location	Location of the position	0-10

TABLE 1. Features Used in SONB

Integration of data:

- Degree: Converted into following types:
  1. Bachelor
  2. Master
  3. MBA
  4. Ph.D.
  0. When data cannot be converted to any of the types
- University:
  1. Graduated from top 10 universities
  2. Graduated from top 30 universities
  3. Graduated from top 50 universities
  0. If data missing or not of the above types

- Major:
  1. Computer Science
  2. Management
  3. Finance
  4. Marketing
  5. Recruiter
  6. Administrator
  0. Otherwise
  
- For company feature we label them based on their fortune 500 ranking and 0 otherwise.
  
- Finally, we calculate the number of months for which the employee stays in that position and this is only considered as the output for job-hopping pattern prediction.

### **5.1.3 Sequential Optimization of Naive Bayesian Algorithm**

There are two steps in the SONB algorithm. In the first step it learns from the raw data and estimates any missing feature values. In the second step it learns from the completed data to make a prediction.

#### **1. Sequential Optimization of Naive Bayesian Algorithm**

Let's assume  $X$  to represent all feature values,  $X_i$  represent all our 10 features and  $Y_j$  represent our output.

In the Bayesian theory, it introduces a way to calculate the posterior probability by using the prior probability and overall likelihood:

$$P(Y_j | X) = \frac{P(X | Y_j) * P(Y_j)}{\sum P(Y_j) * P(X | Y_j)} \quad (1)$$

The machine learning algorithm learns function  $f$  to map  $X$  to  $Y$ , class  $Y_j$  predicts whose probability is maximum compared to other classes. Suppose there exists feature values in  $X$  that are missing or not reliable, which were considered as 0. SONB sequentially optimizes each feature value before making any predictions. It follows the following algorithm.

SONB algorithm for feature value completion:

*while(TRUE)*

*For each feature  $X$  which label is 0*

*Estimate  $P(X_i)$  for each class  $i$  of  $X$ .*

*For each attribute value  $a_k$  of other features and output  $Y$ .*

*Estimate  $P(a_k | X_i)$ .*

*Assign label  $i$  ( $i > 0$ ) to this feature which probability  $P(X_i) * \prod P(a_k | X_i)$  is maximum.*

*Quit the loop if nothing is updated.*

*Save data that all feature values are completed.*

Sources: Algorithm from Job-hopping Patterns

## 2. SONB on Completed Data

Now all the data has been filled if there would have been any missing or unreliable feature values. Based on this completed data, SONB uses the Naïve Bayesian algorithm to train a model. The prediction is from the model learned from the formulated complete data.

### 3. Accuracy Evaluation and Baseline Model

For checking the accuracy of the model, we calculate the absolute difference of the predicted and real total months of employee staying in a position. The model is developed from the training data and tested on the testing data for accuracy.

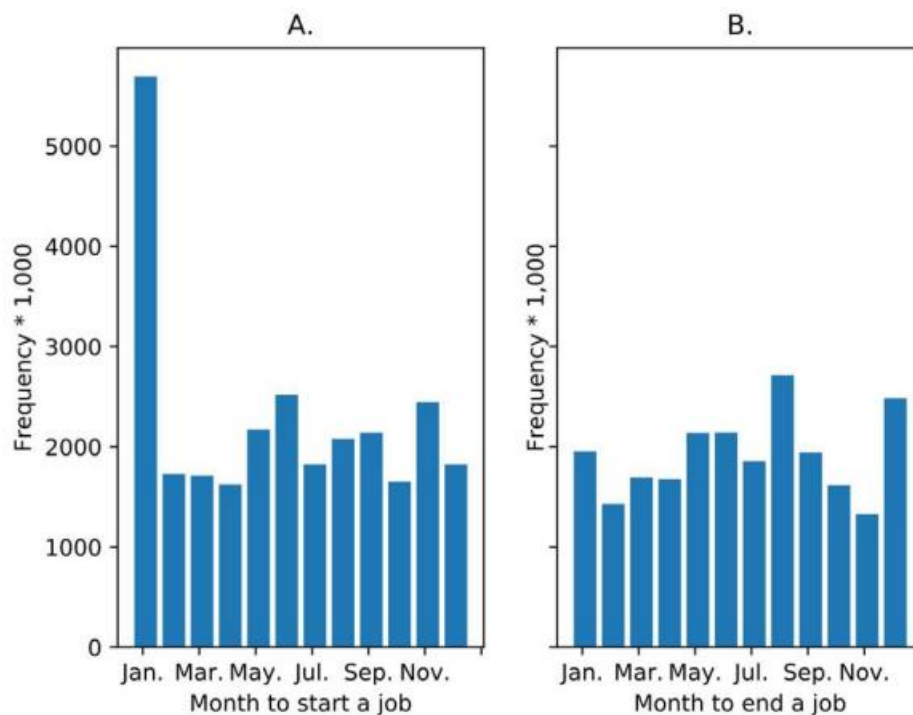
We have applied the AI calculation Convolutional Neural Network (CNN) to our information for examination. All info information is standardized to the scope of 0 and 1 so it will be more straightforward for the CNN to prepare the model. For the CNN, two convolution layers are added. The main layer works out 32 highlights for every 5 by 5 fixes, and the second layer ascertains 64 elements for every 5 by 5 fixes followed by max pooling.

## 5.2 RESULTS

We performed a detail analysis for job-hopping patterns on a huge dataset of company employees and now we will demonstrate the findings of the dataset and show the performance of our machine learning method for this prediction.

### A. Findings of Job Starting and Ending Time

We started by examining the beginning and finishing times for all representatives in the dataset, which is displayed in Fig. 1. As we can see from the beginning a long time of all workers in Fig. 1A, a critical number of representatives start their positions in the months of January and June. The justification for this could be on the grounds that understudies graduating in these months are starting to enter the labor force. Fig. 1B shows the most continuous months for workers to find employment elsewhere, being August, trailed by December. November is the month that the most un-number of representatives find employment elsewhere. Likewise, it is additionally fascinating to see an example of occupation finishing times given their beginning times. We positioned this in view of their recurrence, and rundown the best two as follows: 589,265 representatives started their positions in January and left in December; 557,149 representatives started their positions in June what's more, left in August.

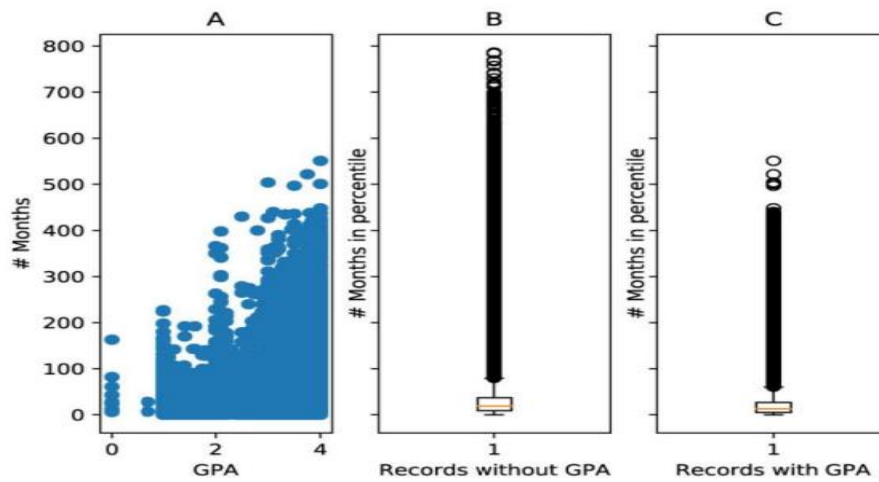


### 5.2.1 Time of job and job-hopping patterns

#### AI on Job-Hopping Forecasting: AI on Job-Hopping

### B. Impact of GPA on Job-hopping Pattern

In this part, we delineate the relationship of occupation jumping furthermore, the GPA of every worker. Fig. 2 shows the consequence of the all-out number of working a long time for a worker in a task position as for their GPA. Fig. 2A shows the aggregate number of working a very long time for a worker in a position and their GPA (utilizing a 4.0 measurement) for the representatives who decided to give it. The most elevated GPA is utilized for representatives who have more than one degree. From this figure, we have the accompanying discoveries: Above all else, most representatives have a GPA more noteworthy than 1.0, which could be because of the way that workers who have a GPA that is under 1.0 have decided not to give it. Also, there is an example that workers who have higher GPAs tend to work longer at a particular employment position. What's more, we additionally determined the complete number of working a long time for representatives with and without giving GPA data, which displayed in the crate plot of Fig. 2B and Fig. 2C separately. The 25, 50, 75, and 100 percentiles of representatives with GPAs are 5, 13, 27, and 551 working months separately. In the meantime, the 25, 50, 75, and 100 percentiles of representatives without GPAs are 9, 19, 37, and 786 working months separately.

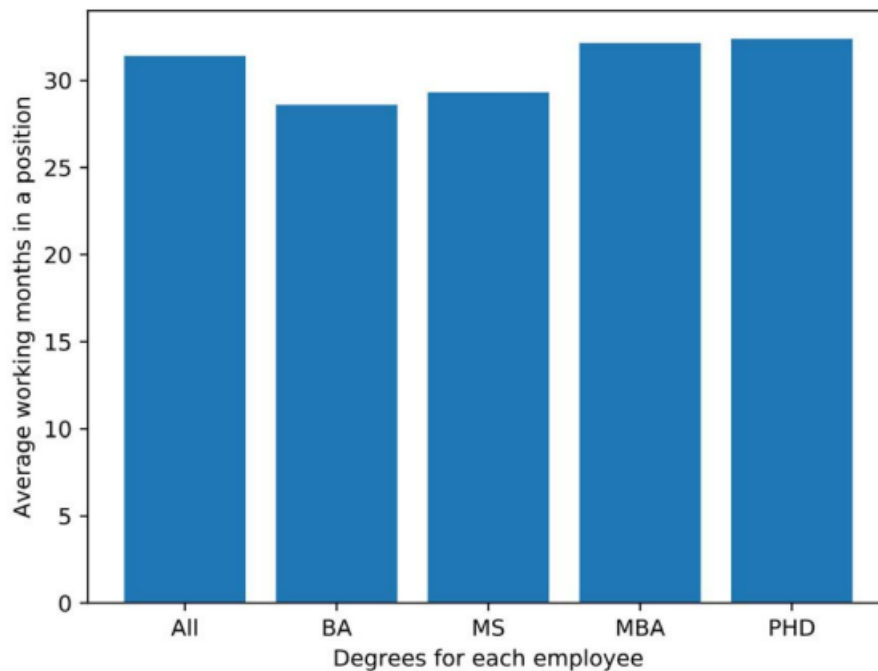


5.2.2 GPA and job-hopping pattern

AI on Job-Hopping Forecasting: AI on Job-Hopping

### C. Impact of Degree Information on Job-hopping Patterns

We determined the average working months for employees with various degrees, and the outcome is displayed in Fig. 3. From this figure, we can see that worker with an MBA or PH.D. remain in a position generally longer those without one, and workers with a B.A. change occupation most often overall contrasted with employees with different degrees.



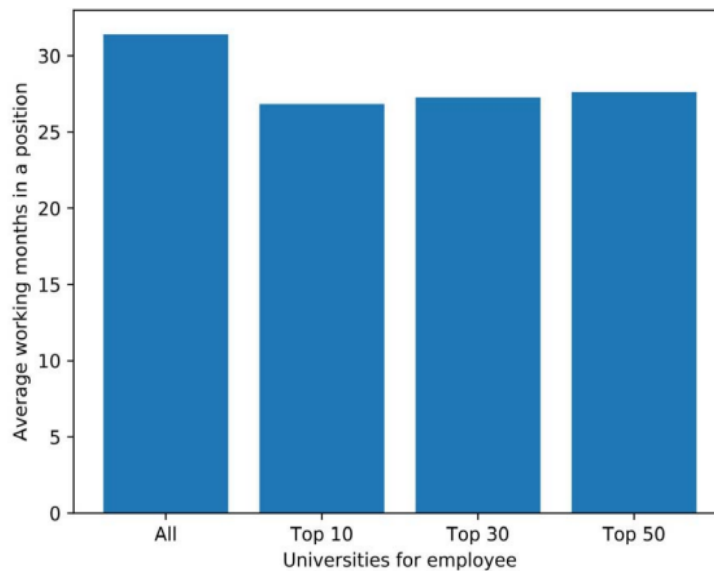
5.2.3 Degree and job-hopping pattern

AI on Job-Hopping Forecasting: AI on Job-Hopping

## D. Impact of University Information on Job-hopping Pattern

We assembled data on the main 50 colleges from the following site for our examination:

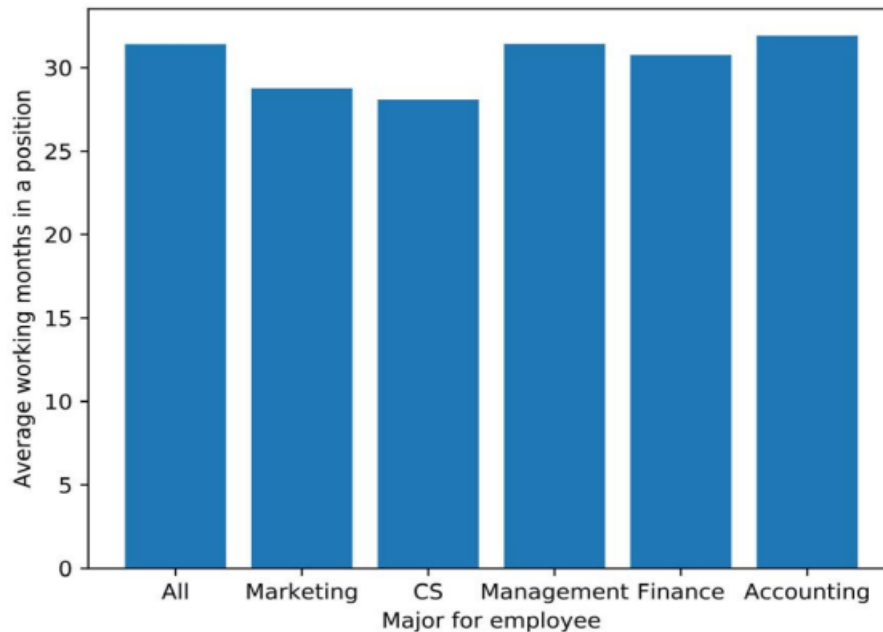
(<http://www.thebestcolleges.org/rankings/top-50/>). Fig. 4 shows the typical number of months for remaining in a position for all employees, workers from top 10 colleges, top 30 colleges, and top 50 colleges. It tends to be found from the above figure that representatives from the main 50 colleges tend to change their positions more much of the time on normal than those moving on from different colleges, and the typical time working at an organization continuously diminishes for employees who graduated at better college.



5.2.4 University and job-hopping pattern  
AI on Job-Hopping Forecasting: AI on Job-Hopping

### E. Impact of Major Information on Job-hopping Pattern

Fig. 5 shows the typical working months for representatives reading up various majors for their certifications. We can see from the figure that workers in software engineering and advertising have an example of changing their work all the more habitually. Data on representatives from different majors was remembered for the given dataset, however the information for every one of them is excluded here.



#### 5.2.5 Major and job-hopping pattern

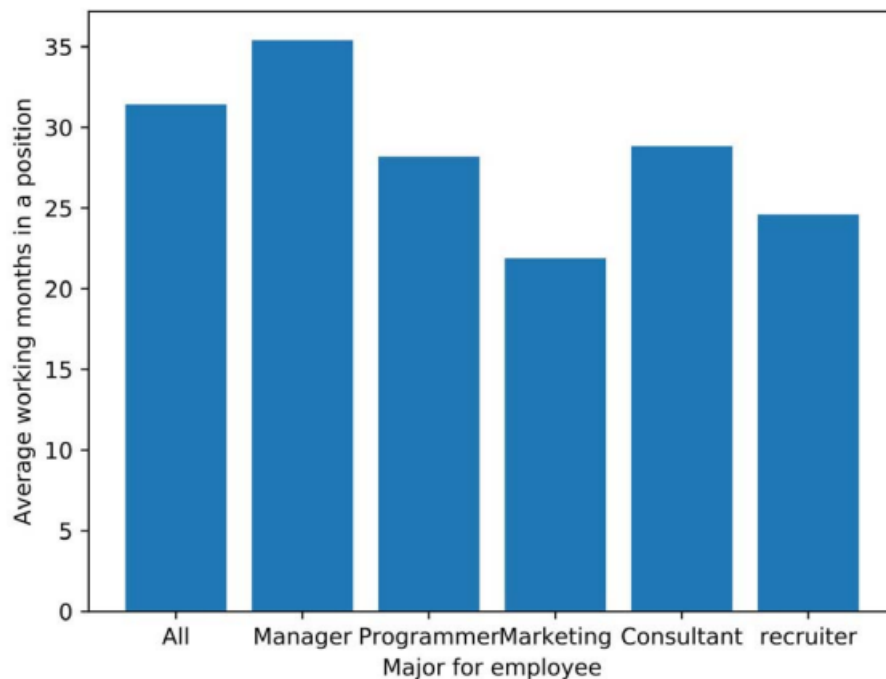
AI on Job-Hopping Forecasting: AI on Job-Hopping



## F. Impact of Job Title Information on Job-Hopping Pattern

Fig. 6 shows the occupation jumping design for representatives with different work titles. By and large, workers with a promoting title change their positions most often, trailed by scouts.

Employees with the board level positions stay in a position somewhat longer than the typical worker.



5.2.6 Job title and job-hopping pattern  
AI on Job-Hopping Forecasting: AI on Job-Hopping

### **5.3 CONCLUSION OF JOB-HOPPING USING SONB**

All in all, we first time investigate various variables for work bouncing examples, and have a few fascinating discoveries which can be exceptionally valuable for workers and managers. For model, representatives with Ph.D. or then again MBA degrees will generally remain longer in a position contrasted with different degrees and representatives graduating in the field of CS and promoting will more often than not change occupations all the more every now and again. Moreover, we propose another system, SONB (Sequentially Optimized Naive Bayesian calculation), which consecutively enhances the Naive Bayesian calculation and can be utilized to naturally appraise missing component values in datasets. This can be extremely valuable in the forecast of job-hopping designs, in light of the fact that a ton of representatives give to some extent fragmented profiles, and having the missing data is significant for the enrollment cycle. At last, we apply the new SONB structure to the gig bouncing example forecast, what's more, show that it accomplishes similar execution with state-of-the-craftsmanship profound learning procedures, and even works on the precision of the strategies by handling crude information. This shows the capability of our new system for work bouncing design forecast and combination with profound learning procedures.

intelligence.

## **CHAPTER VI**

### **CONCLUSION**

There are as yet numerous limitations on the advancement artificial intelligence of innovation. As of now, it can supplant a portion of the more hazardous and monotonous physical work. Later on, man-made reasoning won't totally supplant human business, and will help out people, so laborers can zero in more on scholarly work. The circumstance of man-made reasoning's full-scale and enormous scope substitution of human positions won't occur in a unified way. Simultaneously, with the advancement of man-made reasoning, the enterprises it drives will likewise make an enormous number of new positions for individuals, like the help business and more imaginative positions. Man-made reasoning has additionally worked on the nature of business and the work insight, and changed the work structure. Later on, there will be more noteworthy interest for laborers in scholarly work. Basic physical and mental work might be supplanted by computerized reasoning. Be that as it may, the difficulties and open doors brought by man-made brainpower ought to in any case be effectively tended to. For occupations impacted and affected by man-made brainpower, convenient coordinate their cooperation in new positions, for example, the arising administration industry occupations brought by the man-made reasoning climate. Individuals need to further develop their insight stores and advancement capacities, and apply creative reasoning to their work. Through the development of ability preparing frameworks and different strategies, train more intelligent specialists, and give full play to human one-of-a-kind imagination in their work. Better adjust to new business strategies in the new climate. The turn of events and use of man-made consciousness innovation is relentless, and it will definitely advance the advancement of human modern progress to a more significant level. Beginning from China's current financial and modern advancement and business, we should assume the part of man-made brainpower, further develop business structure, and increment modern seriousness.

## **APPENDIX A FREQUENTLY ASKED QUESTIONS**

### **Q1. Is Artificial Intelligence destroying jobs?**

- ➔ According to studies, one third of the jobs will be automated, causing a dramatic effect on the market over the next 20 years. While, in one of the other studies it has been analyzed that the automation of jobs shows how this could create new opportunities and change the distribution of jobs in various sectors.

### **Q2. How does AI help employment?**

- ➔ The self-driving technology powered by Artificial Intelligence has a high potential to improve the living and work life of employees. This is done by automating all the routine tedious jobs, eliminating human errors thus creating a better work life balance.

### **Q3. What kind of jobs may be affected by Artificial Intelligence?**

- ➔ Various jobs such as customer service executives, receptionists, proofreading, courier and retail services might get affected. All these may be replaced by chatbots and robots.

### **Q4. How can Artificial Intelligence help in the recruitment process?**

- ➔ Artificial Intelligence can help to ease the recruiting process by building a software to take the interviews. Also, it is used in the most initial phase of shortlisting the candidates based on their resumes. This will make the process smoother and very authenticated.

### **Q.5 What can be the counter measures taken by companies to overcome the impact of Artificial Intelligence on jobs?**

- ➔ To overcome the impact of Artificial Intelligence on jobs, all the employees should continuously be provided training of the developing technologies so that no one lacks behind and everyone is employed.

## APPENDIX B PLAGIARISM REPORT



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