

Using Machine Learning to Predict the Sentiment of Tweets Related to Artificial Intelligence in the Workplace

Tabish Khan

B.Tech Student

*Department of Computer Engineering
Lingaya's Vidyapeeth Faridabad*

Bushra Rehman

B.Tech Student

*Department of Computer Engineering
Lingaya's Vidyapeeth Faridabad*

Shivani Gupta

Assistant Professor

*Department of Computer Engineering
Lingaya's Vidyapeeth Faridabad*

Abstract— The rise of AI at work has led to many people sharing their thoughts on social media, mostly on Twitter. The research aims to study the use of machine learning to discover and forecast how people in professional environments feel about AI. There was a collection, preparation, and cleaning of a substantial dataset of AI-related tweets using natural language processing techniques. Among the tasks was cleaning the text, turning it into word tokens, and putting it in a format that machine learning can use. Support Vector Machine (SVM), Logistic Regression, and Random Forest were constructed and tested to check how accurately they could identify the sentiment polarity in a piece of content. That particular model performed well in distinguishing different sentiments from each other. It seems that people are divided in their opinion. although some users appreciate the possibilities brought by AI efficiency and new inventions, there are still concerns about job security and ethics. They can help inform business leaders and policy makers by making it clearer how people see the impact of automation and intelligent systems.

Keywords— *Artificial Intelligence, Sentiment Analysis, Machine Learning, Twitter Data, Workplace Automation, Public Perception*

I. INTRODUCTION

AI is gaining more importance in renovating the way we work today. AI is helping companies automate daily tasks and make better decisions in many different industries. Though businesses usually see these changes as steps forward in improving productivity and innovation, public opinions on the issue continue to differ. Issues with job loss, questions of ethics, and the openness of algorithms in technology are regularly discussed [1], [2]. it is important to know how professionals view AI to develop informed policies and implement AI safely.

On social media sites like Twitter, it is easy to get a sense of public opinion happening right now. There is often a flood of unfiltered opinions about new technologies shared by users online, which researchers can analyse [3]. Statement analysis is a branch of NLP that analyses text to uncover its emotional viewpoint. Using machine learning, computer systems can analyse large sets of tweets to see if they reflect a favourable, unfavourable, or neutral view on different subjects [4].

Machine learning techniques will be used to study the opinions of the public on AI in the business sector, based on tweets. The specific objectives are:

- To figure out the main sentiments found in AI-related tweets from the workplace.
- To analyse the different ideas that continue to appear in such works.
- To measure how well various supervised learning algorithms do in identifying sentiment.

Here is how this paper is organised: After the introduction Section II summarises scientific research related to AI in the workplace and analysing opinions through AI. Section III

covers the way the research is carried out, such as data mining, processing, and model training. Section IV gives the outcomes and explains how the model was evaluated. Section V analyses the results and what they mean, Section VI offers the conclusion and Section VII gives the appendices followed by the references.

II. LITERATURE REVIEW

The rise of AI in the workplace has made it a popular topic for study among many scholars. Initial findings on AI revolved around giving companies better results, less spending, and stronger organization in their day-to-day activities [5]. Brynjolfsson and McAfee pointed out that AI significantly influences the way work is carried out, mostly in knowledge-based occupations [1]. They pointed out automation's benefits as well as its risks, referring to the reduction of some jobs and the formation of new jobs that ask for high-level digital skills from workers.

Besides studying the technical and economic issues, people are now addressing the social and ethical aspects of using AI. Their paper [2] outlines various concerns about algorithms, for example bias, responsibility, and visibility. They showed that having trust in AI systems is vital, especially when these systems are used in the workplace. Because of these concerns, there is increased interest in how the public responds to and utilises AI.

With recent progress in natural language processing and machine learning, it is now possible to measure attitudes on technological change. Earlier, Pang and Lee worked on developing sentiment classification [4], and more recent authors have used these tools on Twitter to monitor and analyse opinions of the public in real time. As an example, Saif et al. [6] proved how it is possible to track recent trends and spot changes in sentiment during busy events. Yet, even though sentiment analysis is often used to understand people's opinions on politics, health, and consumer goods, there are not many studies focusing on people's attitudes toward AI at work.

This difference in opinion allows us to see how people experience AI in their professional field by using ongoing chatter on social media. Twitter posts offer a different way to study opinions, allowing for a constant stream of data from all parts of society. The utilization of sentiment analysis and machine learning helps this study make a novel contribution to research by looking at AI in the workplace and creating a method that can be scaled for capturing public opinion.

III. METHODOLOGY

A quantitative design and supervised machine learning are used in this research to analyses the sentiment of tweets about the use of AI in workplaces. The purpose is to determine if the way people feel about the topic is positive, negative, or neutral, using information extracted from Twitter posts. The reason the quantitative approach was picked was because it is

effective in studying large amounts of data and providing dependable insights into the mood of users.

A. Data Collection

Tweets Twitter API was used to pick out tweets with keywords and hashtags like “AI at work,” “artificial intelligence workplace,” “AI job impact,” and their related terms. To provide a current and sufficient view, the process of getting data took six full weeks. All tweets were limited to those in English, and posts or retweets with less than five words were taken out to enhance the quality of the data.

Around 10,000 tweets were collected in the end. Each tweet was deidentified, so that no user information could be found. The dataset was stored safely on a local computer, and not a single bit of personal information was included in line with research ethics [2].

B. Data Preprocessing

The text first went through cleaning and normalization so it could be properly studied. To do this, all text was turned to lowercase, URLs, hashtags, mentions, punctuation, and stop words were removed. Words in the data were reduced to their base forms through tokenization and lemmatization, which helped minimize unwanted noise [4]. The text was processed with TF-IDF to transform it into numbers that are needed for machine learning.

C. Sentiment Annotation and Classification

Two people labelled a part of the data manually, with classifications falling into three groups: positive, negative, and neutral. Strong reinter-rater trustability was established by using Cohen’s kappa, where a value over 0.8 indicated agreement.

Many supervised learning models were applied to the task of classification, including Support Vector Machines (SVM), Logistic Regression, and Random Forests. To train and cheque these models, a 80/20 split was used between the training and test datasets, and their performance was examined using accuracy, precision, recall, and F1-score. SVMs proved to be very useful, as reported by earlier studies on sentiment analysis [7].

D. Ethical Considerations

It followed ethical standards in the use of data collected online. Since all information published in the data was anonymous, the researchers did not have to receive IRB approval. Furthermore, things were done to ensure data was handled responsibly, including erasing identities and keeping the information safely stored. Researchers only used the data for academic reasons by design [2].

IV. RESULTS

The The analysis of the labelled tweet data through machine learning models gave helpful insights into the views expressed on Artificial Intelligence in the workplace. On a test set of 2,000 tweets, three different supervised classifiers - SVM, Logistic Regression, and Random Forest - were examined.

A. Model Performance

The SVM model performed best among the group, reaching an accuracy of 87.4% and a precision of 85.2%. It also achieved a recall of 86.0% and an F1-score of 85.6%. Random Forest came in at 81.2% accuracy, just edging out the 83.9% seen in Logistic Regression. As seen in other studies, SVM performs well when dealing with high-dimensional text data [4].

TABLE I.

PERFORMANCE METRICS OF MACHINE LEARNING MODELS FOR SENTIMENT CLASSIFICATION

Model	Accuracy	Precision	Recall	F1-Score
Support Vector Machine	87.4%	85.2%	86.0%	85.6%
Logistic Regression	83.9%	81.4%	82.0%	81.7%
Random Forest	81.2%	78.5%	79.1%	78.8%

B. Sentiment Distribution

Among 10,000 tweets analysed, the sentiment remained the following:

- Positive Sentiment: 41.3%
- Negative Sentiment: 36.5%
- Neutral Sentiment: 22.2%

The results point to people being generally positive about AI in the workplace, with some users particularly interested in its ability to boost productivity and introduce new innovations. Yet, the large amount of negative comments underlines that many people are worried about job security, ethics, and bias in some of the company’s algorithms, as has been found in previous studies [1], [2].

C. Thematic Interpretation

Looking more closely at terms that appear most often in every sentiment category highlights some trends.

- The majority of the tweets showing a **positive** view used words such as “efficiency,” “innovation,” “faster,” and “smart tools.”
- Words like “job loss,” “replaced,” “bias,” and “unfair” were mentioned the most in the **negative** tweets.
- Most neutral tweets dealt with sharing announcements, news, or fact-based information, making use of words like “launch,” “update,” and “AI model.”

The research shows that people’s views include excitement about AI’s future and worries over how it will affect their jobs. The combination of hope and skepticism points to the difficulty involved in adopting AI as a system that affects both people and technology.

V. DISCUSSION

The findings from the study reflect the thoughts of the public on the inclusion of AI in business settings. More than 41% of the tweets describing positive feelings shows that most people are optimistic about AI’s effects on making work more productive and simple. However, the high number of concerns (36.5%) arising from automation, job displacement, and ethical governance suggests that these are topics that keep coming up in discussions about AI ethics and labour economics [1], [2].

The high accuracy (87.4%) of the SVM model proves its worth in natural language processing, mainly for tasks involving the analysis of sentiment. The previous research by Pang and Lee [4] is in agreement with this finding, recognizing that SVM handles high-dimensional data well. Furthermore, this analysis reveals that people’s views are connected to how AI stories present it both as a source of development and as threatening for workers.

Unlike previous studies, which usually focused on general or consumer topics, this one aims at workplace discussions, which is still understudied [7]. Earlier, Java et al. [3] argued that Twitter can highlight trends in social topics. This research adds that it can also point out emerging concerns in the

workforce, helping both organizations and policy experts to deal with them.

A. Limitations

There are still some limitations to the findings of the study, even though they are meaningful. It relies on Twitter, which may not accurately represent the opinions of professionals in some formal or worldwide scenarios, mainly where Twitter is not used as much. On a similar note, sentiment analysis methods are effective but may fail to spot complex things like sarcasm or ambivalence, as these methods often group emotions just into three groups.

At the same time, using English on Twitter meant that only English opinions are captured, which may introduce cultural bias in the analysis of feelings. Finally, the training of the classifier relied on manual labelling, which means it can still have inaccurate results for unusual expressions of sentiment.

B. Future Research

More research could be done by accessing LinkedIn, Reddit, or employee forums, which would give a better understanding of workplace AI sentiment on different platforms. Furthermore, studying these issues in many languages would give a broader understanding. If we increase the sentiment categories or choose to use BERT, results can be more specific emotional descriptions and better classification accuracy.

Moreover, looking at the topic over a longer period could highlight how sentiments change with the progress of AI policies, technologies, and changes in workplaces. When it is possible to use demographic information in a safe and correct manner, this could give clearer insights on how groups of workers feel about AI.

VI. CONCLUSION

This work examined people's views on the use of Artificial Intelligence at work through the use of supervised machine learning applied to a big dataset from Twitter. There were a lot of different viewpoints, as shown by analysis, with 41.3% showing support, 36.5% sharing their worries, and 22.2% displaying neutral opinion. It brings out a situation marked by two opposing trends: Some think that AI can increase both efficiency and innovation, but others are concerned about its impact on jobs and ethics.

Using a Support Vector Machine, it was shown that machine learning can identify the feelings of the public in social media messages with great precision (87.4% of the messages were correctly categorized). Using thematic analysis, it was possible to see that AI in the workplace is discussed with both positive and negative views, depending on what people hope for and fear. They add to the discussion over AI's impact on jobs and illustrate that public opinion helps guide future rules for technology. [1], [2].

It is essential for employers, policymakers, and tech experts who want to ensure AI is used in accordance with the desires and issues of the workforce. On the other hand, challenges with the scope of available data and language issues offer scope for further research. It is recommended that researchers approach their research by using multiple languages, platforms, and long-term methods to include different and shifting perspectives. Using BERT or GPT-type classifiers can sharpen the analysis of emotions in future studies.

VII. FUTURE SCOPE

What we have found in this research opens up many interesting areas to study further in schools and in daily life. As the use of AI increases in today's workplaces, it will be essential to understand how people feel about it. Sentiment analysis using machine learning can assist policymakers,

corporate executives, and labour unions in coming up with strategies that work well and are also accepted by the public.

Sentiment monitoring that follows public comments on AI in workplaces is another major usage of this technology. Drawing attention to such concerns enables HR and ethics groups to address them easily and quickly. Additionally, companies using AI in their recruitment, time tracking, or for automation can use sentiment data to determine employee responses and help ease the process as changes are introduced.

In the future, researchers can add deep learning BERT, RoBERTa, or GPT-based transformers to the analysis framework they use. They can deal with complex expressions, sarcasm, and terms used in different circumstances, a problem commonly found in standard supervised models. Besides polarity, using emotion detection would make it possible to learn more about how emotion influences user responses to AI.

It would be helpful to use datasets with many languages and traditions, so studies on opinions can be done in different countries. This would make it easier for more people to use AI in their jobs and support the creation of technology governance that is fair to all. Researchers can also look at attitudes over time in response to important events like new AI policies, dramatic layoffs, or new technology.

Further work by researchers can make AI in workplaces more ethics-based, accessible to the public, and designed for human advantages.

VIII. APPENDICES

A. Sample Tweet Entries and Preprocessing Overview

As a way to be transparent, we have listed a sample of anonymous tweet entries discussing the topic. All tweets used have been pre-cleaned with methods such as tokenization, removing stop words, and normalization.

TABLE II. SAMPLE TWEETS WITH CORRESPONDING CLEANED TEXT FOR SENTIMENT ANALYSIS

Tweet ID	Original Tweet Text	Cleaned Text
001	"AI tools are changing my workflow for the better!"	ai tools changing workflow better
002	"I'm worried my job might be automated soon. #AI"	worried job might automate soon
003	"Another AI update—does anyone else feel overwhelmed?"	another ai update anyone else feel overwhelmed
004	"Great to see how AI improves our productivity."	great see ai improves productivity
005	"Still sceptical about trusting machines at work."	sceptical trusting machines work

B. Sentiment Annotation Criteria

To train the model, tweets in the dataset were manually labeled according to a simple and straightforward rubric. Annotators were instructed as follows:

- Positive: Tweet shows encouragement, excitement, or hope about the use of AI at work.
- Negative: This tweet shows that the author is worried, doubtful, concerned, or critical about AI affecting the workforce or ethics.
- Neutral: Tweet focuses on sharing just the key information without any opinions.

It helped ensure that supervised machine learning models were able to recognize sentiment patterns consistently.

C. Evaluation Metrics Definition

To see how well sentiment classification models are working, the following evaluation methods were applied:

- Accuracy: How many of the test set have been classified correctly.
- Precision: Proportion of correctly predicted positives to all predicted positives.
- Recall: Portion of correctly predicted positive cases among all true positive cases.
- F1-Score: Using the harmonic mean, the model tries to maintain an equal balance between precision and recall.

The reason these metrics were selected is because they are used time and time again in the fields of natural language processing and classification.

D. Ethical Review Summary

Study rules consistent with social media research ethics were followed in this research. All the tweets used in the study could be accessed on Twitter and did not have any personal data attached. Any sensitive information included was blocked out, and efforts were not made to connect tweets with their senders. It was determined through

review within the study that the content and techniques used would carry limited ethical risk.

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