

# Forecasting AI's Impact on Future Workforce and Industry



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Final Project Data Science





# SUMMARY

"This presentation synthesizes findings from a dataset of 200K news articles to predict how AI will reshape various industries and job functions. Our analysis reveals that technology and finance are the sectors most poised for AI integration, while areas like healthcare and energy show emerging potential. We also note the sectors where AI applications face challenges and suggest actionable steps for stakeholders."

# Methodology and Data Source



## Text Cleaning

- Removal of special characters and extraneous whitespace.
- Stripping out URLs, HTML tags, and email addresses.
- Elimination of duplicate articles

## Keyword Filtering

- Identified articles relevant to **artificial intelligence (AI)** using predefined keywords

## Word Count Thresholds

- Implemented additional criteria such as minimum word count for quality control.
- Min length= 200
- Max length = 2000

Initial Dataset: 200435

Before Cleaning:

```
0      LegalTech Artificial Intelligence Market 2019 ...
1      \nChildren With Autism Saw Their Learning and ...
2      \n\n\nCovid-19: un messaggio dai ricercatori i...
3      \nChild actor Claude Jarman Jr. looks back on ...
4      Two dead as AI Express flight skids off Kozhik...
      ...
200430  \n\n\nGoogle Cloud expands developer tools and...
200431  \n\nTwitter working on AI despite Musk call fo...
200432  'One AI Killer app will emerge...': Nothing fo...
200433  OpenAI Restores Access To ChatGPT In Italy Aft...
200434  Young Kolkata Girl Loses 90% Of Her Income As ...
Name: text, Length: 200435, dtype: object
```

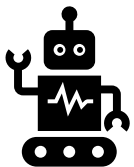
After Cleaning:

```
0      legaltech artificial intelligence market 2019 ..
1      children with autism saw their learning and so..
4      two dead as ai express flight skids off kozhik..
5      native stew bahamas ai art, photos, videos ai ..
6      from the bard to broadcaster stratford festiva..
      ...
196252  chatgpt is the most sought out tech skill in t..
196256  twitter working on ai despite musk call for gl..
196257  one ai killer app will emerge... nothing found..
196258  openai restores access to chatgpt in italy aft..
196259  young kolkata girl loses 90 of her income as a..
Name: cleaned_text, Length: 176906, dtype: object
```

Final Dataset: 176906

# Navigating AI Disruption Across Industries

- Utilization of **LDA** and **k-train** for **topic detection** highlights AI's influence across sectors.
- Technology and AI Innovations**, including ChatGPT and OpenAI, lead discussions in innovation.
- AI drives digital transformation in **Digital Media and Policy**, enhancing regulatory agility and digital literacy.
- AI revolutionizes **Healthcare and Life Sciences**, urging investments in clinical and healthcare innovations.
- Financial Services** experience AI-driven transformation, especially in stock markets and market analysis.
- AI technologies, such as recommendation systems, drive personalized experiences in **Media and Entertainment**. Topics like social media and media content in **Media and Entertainment** underscore the shift towards personalized digital experiences.



```
topic:5 | count:49530 | gray group platform press release solutions prnewswire customers generative statements
topic:4 | count:26104 | chatgpt openai people like says work just tech human companies
topic:6 | count:21298 | google chatgpt best users search microsoft tech like features video
topic:0 | count:20815 | share india digital subscribe policy tech read latest home email
topic:3 | count:15611 | health learning research science machine medical healthcare care clinical patients
topic:7 | count:12252 | ago weather hours video sports stories local app search file
topic:1 | count:11087 | market report global analysis growth research industry key forecast players
topic:2 | count:8127 | stock price stocks nasdaq market markets investment trading financial shares
topic:9 | count:7121 | music public facebook radio twitter search community schedule icon email
topic:8 | count:4924 | services products policy entertainment consumer releases industry resources general overview
```

# Sentimental Analysis

Sentiment analysis using **VADER** and **Yelp** datasets indicated differing insights. Yelp's data provided a nuanced understanding of industry-specific sentiments towards AI.

## Technology and AI Innovations

## Financial Services

- Technology and AI Innovations:** With a significantly high positive sentiment count (165,927), this sector appears ready for deeper AI integration. Companies should consider leveraging AI for product development, customer service automation, and operational efficiency.

- Financial Services:** Exhibiting a strong positive sentiment count of (22,299), financial institutions could benefit from AI in areas like fraud detection, customer financial advising, and algorithmic trading.

- Manufacturing and Industrial Automation:** Given the positive sentiment count(15252), manufacturing companies can look into AI for predictive maintenance.

- Energy and Sustainability:** AI can play a key role in optimizing energy consumption, predictive maintenance of energy grids, and enhancing renewable energy technologies (positive sentiment: 6727).

## Manufacturing and Industrial Automation

## Energy and Sustainability

The sentiment analysis suggests apprehension across sectors about AI's impact. Jobs at risk are those involving repetitive tasks, This includes roles in:

**Data Analysis and Entry:** AI algorithms excel at quickly analyzing large datasets and performing routine data entry tasks.

Positive sentiment in Technology and AI Innovations signals readiness for AI integration, with 165,927 mentions suggesting its potential in managing big data and assuming data-related roles.

**Customer Support:** AI-powered chatbots and virtual assistants can handle basic customer service queries

In Media and Entertainment, with 13,125 positive sentiment mentions, AI applications like chatbots are likely to be embraced to handle the high volume of customer interactions seen in digital media consumption and online services.

## JOBS IMPACTED BY AI

**Manufacturing:** AI can control automation in production lines, reducing the need for human intervention in mundane tasks.

The Manufacturing and Industrial Automation sector's strong positive sentiment (15,212) suggests an optimistic outlook for AI in automating production lines. This could mean a reduction in the demand for human labor in repetitive tasks on assembly lines.

**Financial Sector:** Jobs related to data prediction, such as stock trading, can be significantly impacted as AI provides more accurate forecasts based on historical data.

Financial Services also exhibit a positive sentiment (22,299), which may reflect the financial industry's confidence in AI for data prediction tasks like stock trading. AI's ability to provide accurate historical data analysis could lead to a shift in jobs focused on predictive financial roles.



# Entity identification

Top Organizations	Top people	Top Locations
Microsoft	Sam Altman	US
Google	Joe Biden	India
Gray Television Inc	Pichai	China
Media Group Inc	Taylor	New York
FCC	Van Susteren	Japan
IBM	Satya Nadella	Texas
Intel	Mark Zuckerberg	California
Samsung	Matt Obrien	Washington
NPR	Putin	France
GPT	Martin	Florida

- Employing spaCy's Named Entity Recognition (NER) capabilities, a leading NLP tool, we meticulously parsed a vast dataset of AI-centric articles.
- Our objective was to pinpoint and quantify the most frequently mentioned organizations, individuals, and locations pivotal to AI's ongoing advancement and influence.
- The table shows the top 10 organizations, people, and locations extracted for reference.

# Diverse AI Sentiment Across Industries

## Organizations

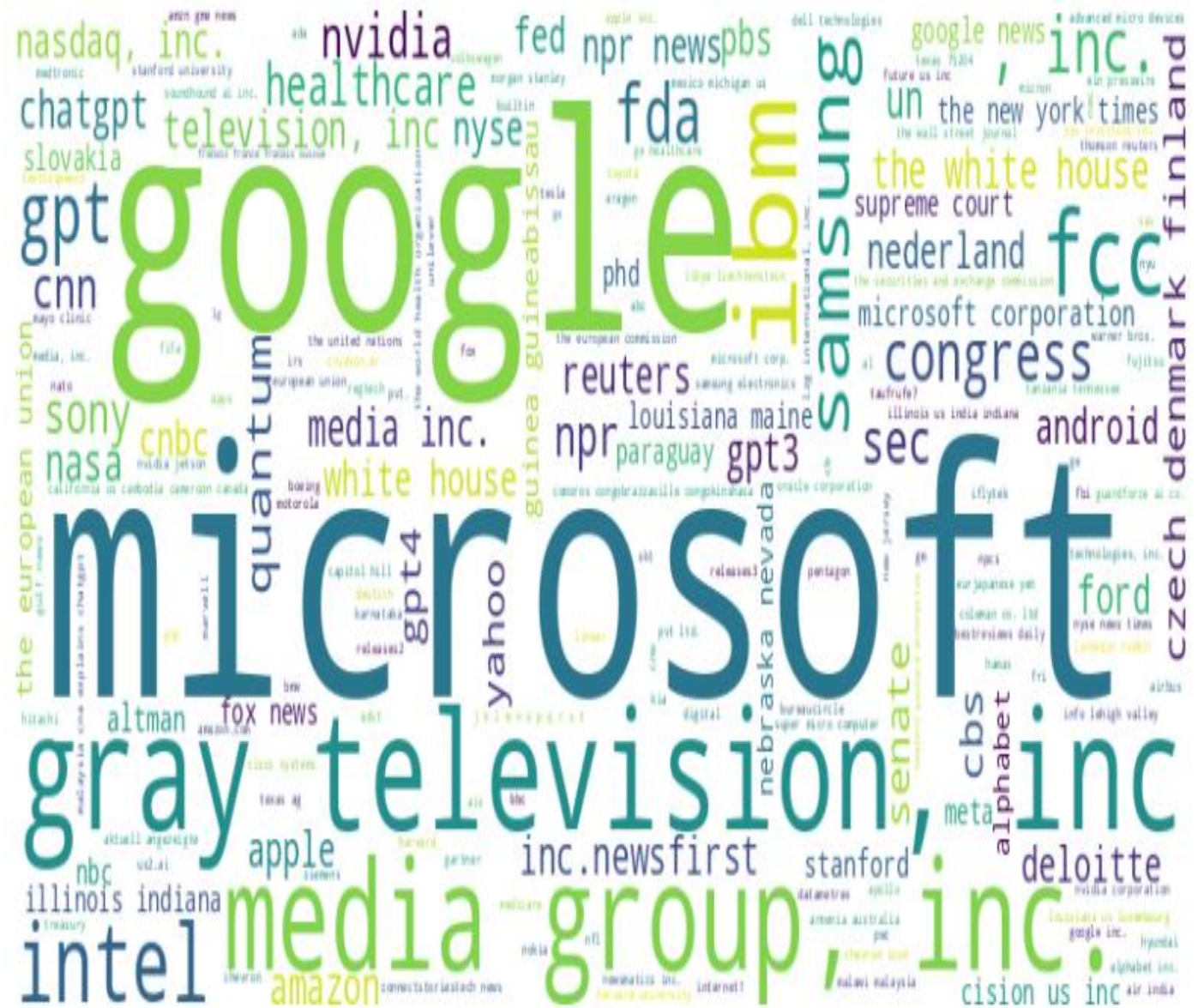
- **Confidence in Tech Leaders:** Industry titans such as **Microsoft and Google** show a predominantly positive sentiment in our analysis. This reflects market confidence in their AI capabilities and suggests these companies are setting benchmarks for AI adoption.
- **Media Industry's AI Integration:** Positive sentiment towards entities like Gray Television and **Media Group, Inc.** highlights the successful adoption of AI technologies in enhancing media operations and content delivery.
- **Regulatory Balance:** The **Federal Communications Commission (FCC)** demonstrates a balanced sentiment profile. Businesses should note the cautious optimism, which indicates a regulatory environment open to constructive AI advancements.

## People

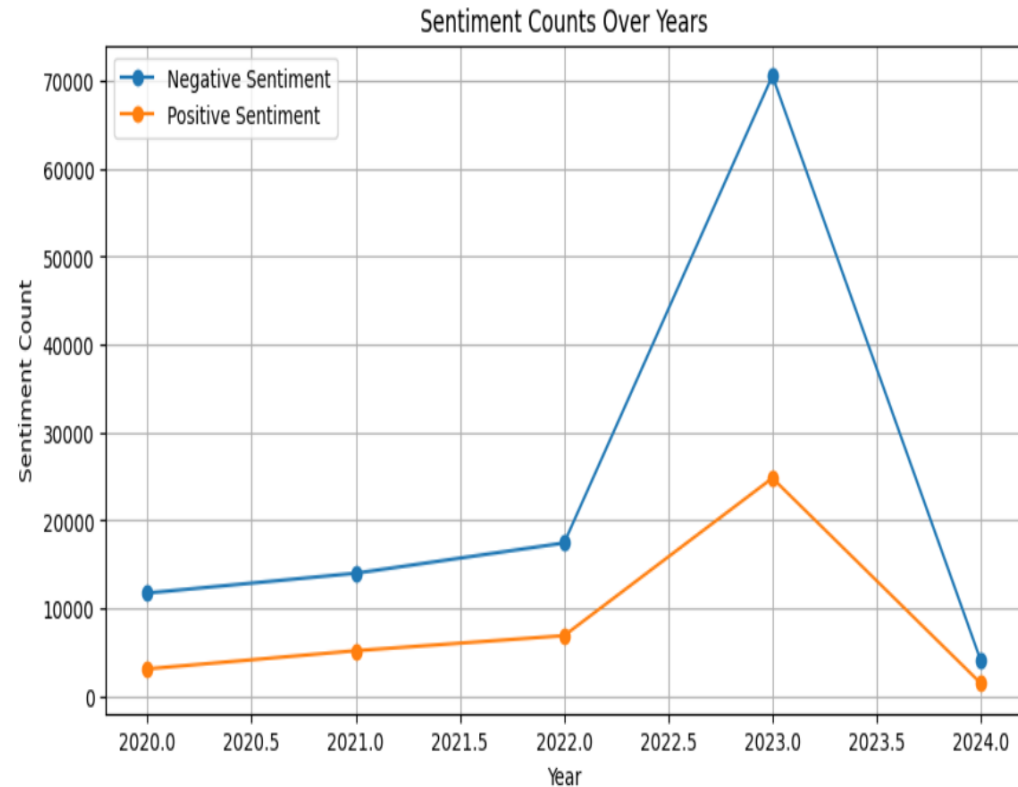
- **Focus on AI Ethics:** The negative sentiment associated with entities like **Sam Altman** underscores the heightened public attention on AI ethics. It underscores the importance for businesses to integrate ethical AI practices as a core part of their strategy.
- **Public Figures and AI Strategy Perception:** Notable figures like **Joe Biden** and **Satya Nadella** attract significant negative sentiment, possibly mirroring public scrutiny over AI regulation and corporate AI strategies. This calls for a strategic approach in public communications and policy engagement.



- The word cloud highlights **entities investing in AI**, with size indicating frequency of mention.
- Major players like **Microsoft and Google** show aggressive investment and strong positioning in AI.
- Companies such as **Intel, Samsung**, and emerging players like GPT demonstrate active engagement in AI across industries.
- Media corporations like Gray Television and Media Group Inc. indicate AI's growing role in digital media and content creation.
- Inclusion of regulatory bodies like FCC reflects increasing focus on AI governance and ethics.
- Diversity of represented companies underscores cross-sectoral movement towards AI innovation.

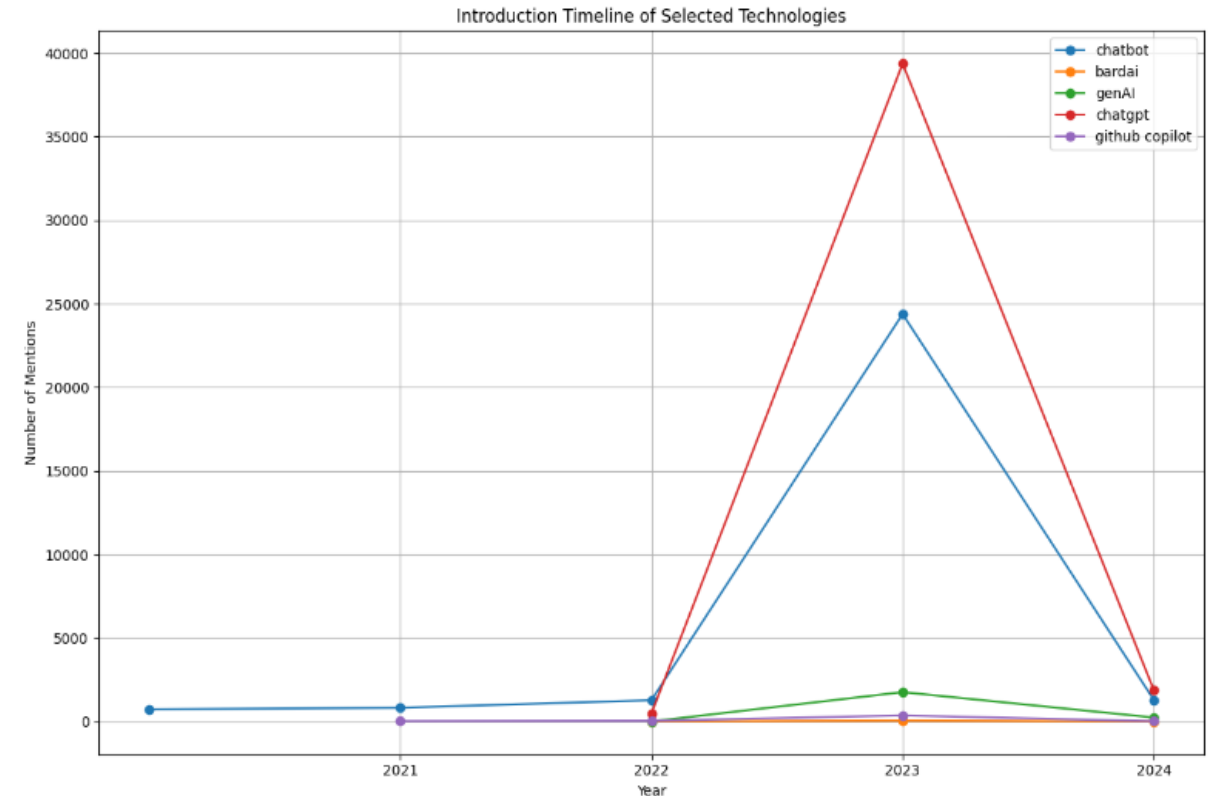


## Sentiment Trends Over Years



- Both positive and negative sentiments show an increasing trend over time.
- A notable peak in positive sentiment occurs around mid-2023, possibly due to significant events related to AI technology or its applications.
- Positive sentiment sharply declines by 2024, indicating a shift in public opinion, emergence of challenges, or market saturation.
- Negative sentiment displays a gradual rise without the volatility seen in the positive trend, suggesting consistent concerns or criticisms that have slowly become more prevalent over time.

## Sentiment Analysis timeline for new technologies



- Surge in mentions of 'chatbot', 'genAI', 'chatgpt', and 'github copilot' around 2023.
- Consistent mentions of chatbots indicate the growing impact on customer service.
- Peak in 'genAI' suggests emerging influence on creative, data analysis, and programming sectors.
- Rapid rise and fall of 'chatgpt' mention hints at evolving trends in education and content creation.

## Businesses

- **Invest in Strategic AI Integration:** Focus on sectors with high positive sentiment towards AI, such as technology and financial services, to leverage AI for automation, customer insights, and competitive advantage.
- **Develop Ethical AI Frameworks:** Address areas with notable negative sentiment, such as AI ethics and data privacy, by adopting transparent and responsible AI practices.

## Academic Institutions

- **Revamp Curricula:** Integrate AI, machine learning, and ethics into curricula across disciplines to prepare students for an AI-driven future.
- **Foster Industry Collaborations:** Partner with businesses to offer hands-on AI projects, ensuring students gain practical experience and insights into current AI challenges and opportunities.

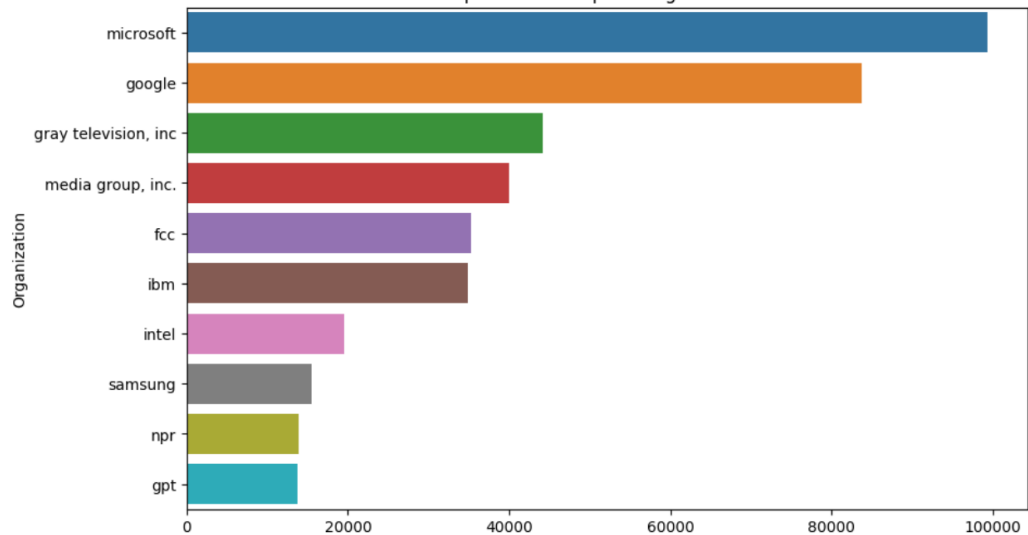
## Government and Policy Makers

- **Promote AI Research and Development:** Support sectors showing positive AI sentiment with grants and incentives for research in emerging AI technologies.
- **Implement AI Governance Policies:** Develop policies that ensure AI technologies are used ethically and responsibly, paying special attention to sectors with mixed sentiments, like healthcare and media.

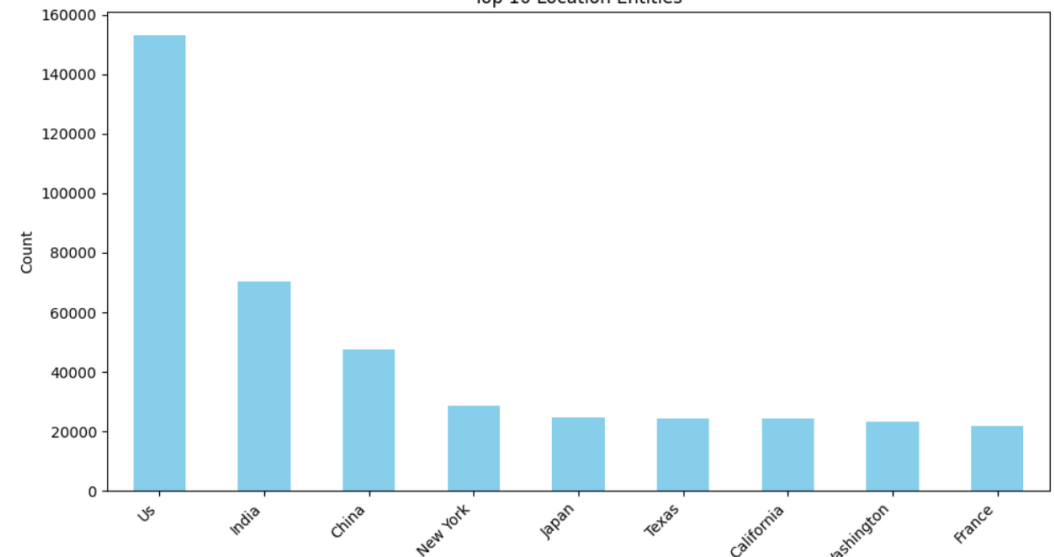
**Actionable  
Recommendations  
for Navigating the AI  
Revolution**

# APPENDIX

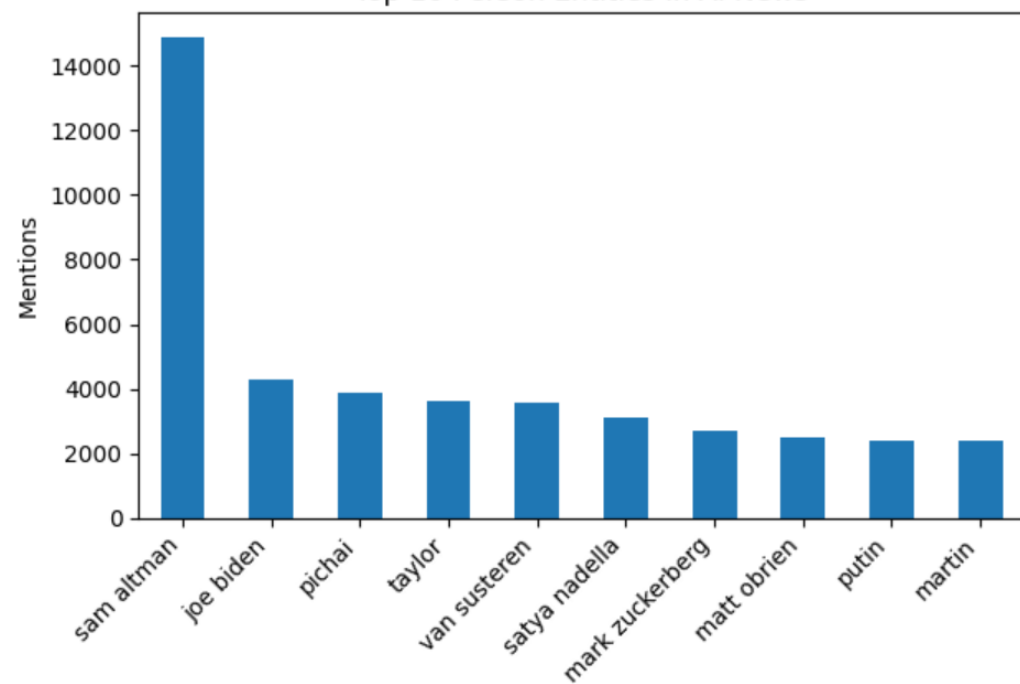
Top 10 Most Frequent Organizations



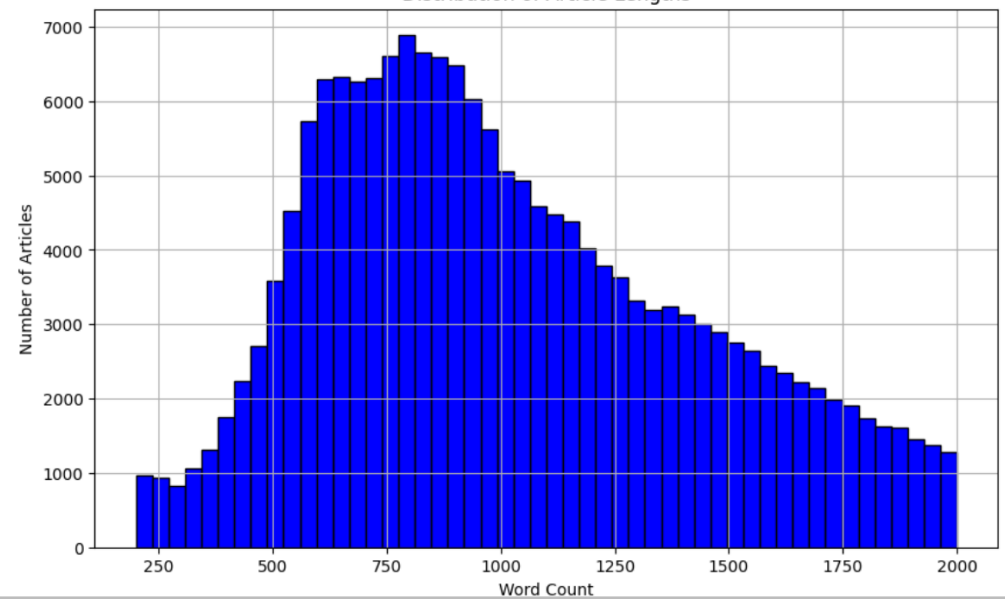
Top 10 Location Entities



Top 10 Person Entities in AI News



Distribution of Article Lengths



# AI Failures and Areas of Improvement



The "Failure Mentions Word Cloud" provides a visual representation of the areas where AI technology has encountered failures.

## 1. Natural Language Processing (NLP):

Despite potential, NLP faces challenges in understanding context and nuanced language.

Recommendation: Invest in sophisticated models and context-aware algorithms to improve NLP accuracy.

## 2. Ethical AI:

Concerns about ethical implications of AI deployment are prominent.

Recommendation: Establish ethical guidelines and review boards to ensure AI projects align with societal values.

## 3. Healthcare:

AI in healthcare has potential but faces trust and accuracy challenges.

Recommendation: Prioritize development of reliable AI diagnostic tools and enhance data privacy measures.



# Empowering Individuals in an AI-Driven World



**Upskill for the AI Era:** Prioritize training in critical thinking, problem-solving, and creative competencies alongside technical AI skills



**Revamp Education:** Advocate for curricula that balance STEM with arts, fostering innovation and emotional intelligence



**Diversification:** Invest in sectors where human skills are irreplaceable by AI, such as creative industries and complex decision-making fields



**Human-AI Collaboration:** Cultivate roles for human oversight of AI systems to ensure they augment rather than replace human work



**Policy & Governance:** Work with regulators to create AI usage guidelines that protect jobs while encouraging ethical AI growth



**Entrepreneurial Support:** Nurture an ecosystem for startups focused on ethical, human-centric AI applications. **Social Adaptation:** Prepare for new job landscapes with adaptive policies and support systems for workforce transitions