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Generative AI and Memecoin Evolution: Bridging Technology and Culture

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Abstract: The advent of generative AI, particularly marked by the introduction of ChatGPT 3.5, has catalysed a profound transformation in the memecoin market. This study explores the impact of these AI advancements on both older and newer memecoins, leveraging price data, Google Trends insights, and key AI industry events. Our findings reveal a significant post-Singularity shift, with newer memecoins such as PEPE, WIF, and BONK exhibiting heightened sensitivity to AI trends compared to their older counterparts like DOGE, SHIB, and FLOKI. This increased responsiveness is attributed to the rapid integration of AI tools in content creation and community engagement, which has fuelled market dynamics and amplified cultural significance within digital communities. The study underscores the pivotal role of generative AI in driving the evolution of memecoins, heralding a new era of digital finance and cyberculture.

1. Introduction

The rapid advancement of artificial intelligence (AI) and blockchain technologies has ushered in a new digital era, fundamentally altering both technological and cultural landscapes. While the intersection of AI and blockchain has been the subject of increasing academic interest, a critical gap remains in understanding the specific impact of generative AI on the memecoin market. This study aims to bridge that gap by exploring how generative AI influences memecoin dynamics, particularly in the context of their market performance and cultural significance.

Despite the growing body of research on AI's role in various sectors, there is a notable lack of studies specifically addressing the effects of generative AI on digital assets like memecoins. Previous research has primarily focused on AI’s applications in trading algorithms, predictive analytics, and content creation, with little attention paid to its role in shaping the economic and cultural landscapes of memecoins. This study seeks to fill this research void by examining how generative AI, particularly since the introduction of OpenAI’s ChatGPT 3.5, has transformed the creation, dissemination, and valuation of memecoins.

In recent years, generative AI has significantly influenced the evolution of meme culture, adding new dimensions to its creation and propagation. Memes, defined as cultural symbols, concepts, or behaviours that spread rapidly across the internet and social media platforms, have traditionally been the product of human creativity. However, with the advent of advanced AI tools, meme creation has become more efficient and innovative, allowing users to generate humorous images and texts at an

unprecedented speed. This has increased the creativity within meme communities and enhanced the speed at which these cultural artefacts are disseminated. [1]

Moreover, integrating blockchain technology with meme culture has brought about a new economic dimension to memes, challenging traditional notions of value. In a market where traditional economic theories would suggest that the value of memes should be negligible, reality has shown otherwise. Memecoins like $DOGE, $SHIB, and $PEPE have emerged as major players in the cryptocurrency market, prompting reevaluating how these digital assets are valued. [2] The concept of "Attentionomics" suggests that the value of a token is directly correlated with its ability to attract attention, and in this context, generative AI plays a crucial role in enhancing the economic value of memes by boosting their visibility and engagement. [2]

Generative AI enriches community interactions and content production and gives rise to a new cultural phenomenon known as 'meme+AI' culture. This hybrid culture embodies the humorous, irreverent, and often anti-establishment ethos of traditional memes while incorporating the unique creative capabilities of AI. The fusion of AI and blockchain technologies is driving the development of memecoins and shaping a new cultural ecosystem that reflects the values and aesthetics of the digital age. [1]

Since the rise of generative AI, its impact on meme culture has been particularly pronounced in community-driven operations. Communities now extensively use AI to create texts, images, and memes, contributing to developing a unique Artificial General Intelligence (AGI) culture. This culture is valuable in ways that transcend traditional financial metrics like stock prices or NFT valuations. Previous NFTs, for instance, were primarily human-made and involved simple random combinations without the sophisticated AI-generated content we see today. The advancement of Web3 technologies further underscores the need for AI's participation alongside blockchain, demonstrating that blockchain alone is insufficient to drive the next wave of digital innovation. [1]

This study focuses on exploring the role of generative AI in the development and market performance of memecoins, with particular attention to the pivotal date of November 30, 2022. This date marks the introduction of ChatGPT 3.5 by OpenAI, which is considered a critical milestone in the evolution of generative AI. The research investigates how generative AI has influenced the prices and returns of memecoins, specifically focusing on those that emerged post-Singularity. By leveraging data from Google Trends and applying rigorous statistical analyses—including Pearson correlation coefficients, Spearman’s rho, and Kendall's tau-b—this study aims to quantify the relationship between generative AI trends and memecoin market dynamics.

Furthermore, this research delves into the broader cultural implications of generative AI by examining AI-generated content across various online platforms and communities. The objective is to provide concrete evidence of how generative AI has fostered the creation of a unique ‘meme+AI’ culture, enriching community interactions and content production. Through this exploration, the study highlights the transformative role of generative AI in shaping the future of digital culture, demonstrating how it bridges technological advancements with cultural evolution.

In conclusion, this research seeks to illuminate the value of generative AI in the memecoin market, exploring its impact not just through market performance but also through the lens of cultural significance. By contrasting the effects on older versus newer memecoins, this study aims to provide a comprehensive understanding of how generative AI is reshaping digital assets' economic and cultural landscapes.

2. Literature Review

Research on the intersection of artificial intelligence (AI) and the cryptocurrency market is still in its nascent stages. Much of the existing literature has focused on the applications of AI in trading

algorithms, market predictions, and automated decision-making processes. These studies have provided valuable insights into how AI can enhance the efficiency and accuracy of financial markets, particularly in high-frequency trading and predictive analytics. However, there is a notable gap in the literature concerning the specific impact of generative AI on the cryptocurrency market, especially regarding memecoins. Given the unique and emerging nature of AI's interaction with digital currencies, this gap is significant, where the novelty of memecoins as both cultural and economic assets presents unexplored research opportunities.

2.1. Generative AI in Content Creation and Meme Culture

Generative AI has primarily been explored within content creation and digital marketing. Early works, such as that by Singler (2020), provided an overview of AI's potential in automating meme creation. While forward-looking in its recognition of AI's role in meme culture, Singler's study is limited by its lack of empirical data and detailed analysis. The study offers a conceptual framework but fails to explore the broader implications of generative AI on meme culture and the cryptocurrency market, leaving a gap in understanding how these technologies interact at a deeper level. [3]

Priyadarshini et al. (2022) made a more significant contribution by analysing the influence of AI-generated memes on online activity during the COVID-19 lockdown. This research utilised AI techniques such as random forest and multi-layer perceptron algorithms to track meme activity, demonstrating a clear increase in internet meme activity during the lockdown period. While this study provides valuable insights into the role of AI in meme proliferation during a global crisis, it does not connect these findings to the cryptocurrency market, thereby overlooking the economic implications of these activities. The study's focus on social impact rather than financial impact further emphasise the existing gap in literature regarding AI’s economic influence on memecoins. [4]

2.2. Memecoins and Cultural Dynamics

The cultural significance of memecoins like Dogecoin, Shiba Inu, and PEPE is well-documented within the cryptocurrency community. Stencel (2023) provided an introductory exploration of memecoins, focusing on the cultural and social phenomena that drive their popularity. This study highlights the role of online communities and social media in propelling memecoins to mainstream recognition. However, Stencel's analysis does not address the influence of generative AI on these assets, a critical oversight given that many of these memecoins predate the advent of advanced generative AI technologies. Understanding how AI affects newer memecoins could offer deeper insights into their market dynamics and the evolving role of AI in digital asset valuation. [5]

Sharma et al. (2023) offer a more detailed examination of how generative AI can enhance meme culture. This study explores the potential of AI to create explanations for the semantic roles in visual memes, providing a framework for understanding how AI can enrich meme content and community interactions. Sharma et al.'s work contributes to the broader cultural ecosystem of memecoins by illustrating the transformative role of AI in content production. However, like other studies, it does not extend its analysis to the economic implications of AI's influence on the cryptocurrency market, leaving room for further exploration. [6]

2.3. Identifying the Research Gap

These key articles underscore meme culture's unique and evolving nature within the cryptocurrency community. While there is substantial research on the general impact of AI and meme culture, specific studies on the influence of generative AI on memecoins remain limited. The existing literature reveals a significant gap, particularly in understanding how generative AI shapes the

economic and cultural landscape of memecoins, especially following the introduction of advanced AI models like ChatGPT 3.5. This research seeks to address this gap by examining the correlation between generative AI trends and memecoin market dynamics and the broader cultural implications of this relationship.

2.4. Research Contribution and Novelty

Building on the foundational work of previous studies, this paper contributes to the literature by focusing explicitly on the role of generative AI in the development and market performance of memecoins. It leverages quantitative data from Google Trends and employs rigorous statistical analyses, including Pearson correlation coefficients, Spearman's rho, and Kendall's tau-b, to provide a comprehensive understanding of how generative AI influences the evolution of memecoins. Additionally, by contrasting the effects on older versus newer memecoins, this study aims to uncover how AI shapes both the economic and cultural landscapes of digital assets. Through this exploration, the research highlights the transformative potential of generative AI in redefining the value and impact of memecoins within the broader context of digital culture and blockchain technology.

3. Data and Methodology

3.1. Data Collection

The data collected for this research encompasses three primary categories: memecoin price data, Google Trends data for AI-related search terms, and major AI industry events.

Table 1: Memecoins Data

Full Name	Ticker	Data Range	Information
Dogecoin	DOGE	1 January 2021 - 31 May 2024	Dogecoin, created in December 2013 as a joke by software engineers Billy Markus and Jackson Palmer, was initially intended to be a fun and friendly internet currency. Despite its origins, Dogecoin has grown into a major player in the cryptocurrency market, largely driven by its active community and high-profile endorsements.
Shiba Inu	SHIB	1 January 2021 - 31 May 2024	Launched in August 2020, Shiba Inu is an Ethereum-based token that brands itself as the "Dogecoin Killer." It has gained popularity due to its vibrant community and the ShibaSwap decentralised exchange.
FLOKI	FLOKI	10 July 2021 - 31 May 2024	Named after Elon Musk's Shiba Inu dog, FLOKI was launched in June 2021. It aims to create a unique ecosystem combining memes and real utility, including projects like Valhalla, an NFT gaming metaverse.
Pepe	PEPE	17 April 2023 - 31 May 2024	Launched in April 2023, Pepe is a memecoin based on the popular internet meme character Pepe the Frog. It quickly gained traction in the crypto community due to its meme appeal and community-driven initiatives.
Dogwifhat	WIF	19 December 2023 – 31 May 2024	Dogwifhat is a newer memecoin, launched in December 2023. It has gained popularity due to its humorous branding and the engagement of the crypto community.
Bonk	BONK	30 December 2022 – 31 May 2024	Bonk is another recent addition to the memecoin market, launched in December 2022. It has quickly risen in popularity due to its strong community support and active social media presence.

Memecoin Data

For this study, we selected six memecoins based on their prominence and market capitalisation within the meme category on CoinMarketCap in table 1. As of May 31, 2024, these six memecoins were among the top 100 cryptocurrencies by market capitalisation, each with a market cap exceeding $1 billion. The selection of these specific memecoins—Dogecoin (DOGE), Shiba Inu (SHIB), FLOKI (FLOKI), Pepe (PEPE), Dogwifhat (WIF), and Bonk (BONK)—was strategic for several reasons:

1) **Representation of the Meme Market**: These memecoins are highly influential within the broader cryptocurrency market, particularly in the niche meme sector. By choosing these coins, we ensure that our analysis covers a comprehensive spectrum of the meme market, capturing the key trends and dynamics.

2) **Market Impact**: Each selected memecoin has demonstrated significant market activity and community engagement, making them ideal candidates for analysing the impact of generative AI.

3) **Variety in Launch Dates**: The chosen memecoins vary in their launch dates, with some, like Dogecoin, being established for over a decade, and others, like Dogwifhat and Pepe, being much newer. This allows us to perform a comparative analysis of how generative AI affects older versus newer memecoins, providing insights into the evolving nature of the meme market.

The price data for these memecoins was sourced from Yahoo Finance, a reliable and comprehensive platform that ensures accurate coverage of market movements. The data ranges for each coin are summarised in the table above.

Google Trends Data

To analyse public interest in various AI-related search terms, we gathered data from Google Trends. This dataset was chosen due to its ability to reflect real-time public interest and engagement, which are critical for understanding how trends in AI, particularly generative AI, might influence market behaviors such as those seen with memecoins. The search terms were categorised into two groups:

- **Traditional AI Technologies**: AI (Artificial Intelligence), Machine Learning, Deep Learning, Natural Language Processing.
- **Emerging Generative AI Technologies**: ChatGPT, AIGC (Artificial Intelligence Generated Content), AGI (Artificial General Intelligence), GPT (Generative Pre-trained Transformer).

Rationale for Using Google Trends: The use of Google Trends is particularly relevant because it allows us to track how public interest in AI, both traditional and generative, correlates with memecoin prices. The assumption here is that spikes in public interest may precede or coincide with significant price movements, thereby providing a proxy for the broader market sentiment influenced by AI developments.

Data Processing: The timeframe for data collection was from January 1, 2021, to May 31, 2024, with Google data recorded on a weekly basis. However, because memecoin price data is available daily, it was necessary to align the different data frequencies. To achieve this, we employed linear interpolation to convert the weekly Google Trends data into daily data points. This method was chosen because it maintains consistency in the temporal analysis, allowing us to accurately correlate AI trends with daily price fluctuations.

The data processing utilised several techniques and tools, including the Google Trends API for fetching public interest data, linear interpolation for data conversion, and Python libraries such as ‘pytrends’ and ‘pandas’ for data manipulation. Error handling and retry logic were implemented to ensure robust data fetching, particularly in managing transient errors through multiple attempts.

Major AI Events

In our analysis, we identified significant AI events that could potentially influence the memecoin market, focusing on major announcements and releases by leading AI entities such as OpenAI and Google. The events in table 2 selected for this study are not arbitrary; they were chosen based on their profound impact on the AI landscape and their potential to influence market sentiment.

The selected events include major advancements in generative AI technologies, such as the introduction of ChatGPT 3.5 by OpenAI on 30 November 2022, which marked a significant milestone in the evolution of generative AI. This event, among others, was chosen due to its role in dramatically increasing public and professional interest in AI, thereby potentially affecting market dynamics.

Each event is characterised by its contribution to advancing AI technology and influencing public perception. For instance, the release of GPT-4 by OpenAI or the announcement of Google's Bard are examples of developments that pushed the boundaries of what AI could achieve, potentially driving increased interest and investment in AI-related technologies, including memecoins. These events are critical to understanding the temporal effects of generative AI advancements on the cryptocurrency market. [7] [8] [9]

Table 2: List of lists the key AI events

Date	Event Description
30 Nov 2022	Introduction of ChatGPT 3.5 by OpenAI
6 Feb 2023	Google announces Bard
14 Mar 2023	Introduction of GPT-4 by OpenAI
21 Mar 2023	Public release of Bard by Google
24 Mar 2023	Release of ChatGPT Plugins by OpenAI
21 Sep 2023	Announcement of DALL-E 3 by OpenAI
4 Nov 2023	Launch of Grok by Elon Musk's xAI
7 Nov 2023	OpenAI announces GPT Builder, GPT-4 Turbo, Assistants API etc
17 Nov 2023	Sam Altman is fired as CEO of OpenAI
22 Nov 2023	Sam Altman is rehired as CEO of OpenAI
6 Dec 2023	Google DeepMind reveals Gemini
15 Feb 2024	OpenAI introduces SORA
15 Feb 2024	Gemini 1.5 release by Google DeepMind
13 May 2024	Release of ChatGPT 4.0 by OpenAI

Quantitative vs. Qualitative Data Analysis: The data collected is predominantly quantitative, allowing for statistical analysis of correlations between AI-related trends and memecoin price movements. However, qualitative aspects are also considered, particularly in analysing major AI events and their broader market implications. The combination of quantitative and qualitative data provides a comprehensive view of how generative AI influences the memecoin market.

By meticulously selecting and processing these datasets, our study is positioned to offer a nuanced understanding of the relationship between generative AI and memecoin market dynamics, providing both empirical evidence and context-driven insights.

3.2. Data Preprocessing and Methodology

To ensure the coherence and alignment of our data analysis, we first reindexed the weekly Google Trends data to match the daily timestamps of the memecoin price data. This step was essential to maintain temporal consistency between the datasets, enabling accurate correlation and time-series analysis. Specifically, we employed linear interpolation to convert weekly Google Trends data into daily data points, aligning them with the daily memecoin price data. This interpolation is represented mathematically as:

$$x_i = x_1 + \frac{(x_2 - x_1)}{t_2 - t_1} \times (t_i - t_1)$$

where:

- x_i is the interpolated value at day i,

• x_1 and x_2 are the Google Trends values at the surrounding weeks,
• t_i is the specific day for interpolation within the week.

This approach allowed us to create separate data frames for each memecoin, incorporating the daily closing prices of the memecoins along with the interpolated daily AI trend data. The structured format facilitated a detailed exploration of the relationship between AI trends and memecoin prices.

Correlation Computation

To examine the relationship between memecoin prices and AI-related search trends, we calculated three types of correlation coefficients: Pearson's correlation, Spearman's rho, and Kendall's tau-b. Each of these methods provides unique insights into the nature of the relationship, whether linear (Pearson), monotonic (Spearman), or ordinal (Kendall).

1) **Pearson Correlation Coefficient**:

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

where r measures the linear relationship between the variables x_i (memecoin prices) and y_i (AI-related search trends).

2) **Spearman's Rho**:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

where d_i is the difference between the ranks of corresponding variables, and n is the number of observations. This method is particularly useful when the relationship between variables is not strictly linear but monotonic.

3) **Kendall's Tau-b**:

$$\tau_b = \frac{n_c - n_d}{\sqrt{(n_c + n_d + n_x)(n_c + n_d + n_y)}}$$

where n_c and n_d are the numbers of concordant and discordant pairs, and n_x and n_y account for ties. Kendall's tau-b provides an ordinal measure of association between variables, robust to outliers and non-normal distributions.

For each correlation method, we computed p-values to assess the statistical significance of the observed correlations, ensuring that our results are robust and reliable.

Segmented Analysis

We divided the analysis into two segments based on the pivotal AI event on 30 November 2022 (referred to as the 'Singularity'). For older memecoins (DOGE, SHIB, FLOKI) created before this date, we performed a segmented correlation analysis for the periods before and after the Singularity. This segmentation allowed us to compare the influence of significant AI milestones on these memecoins. For newer memecoins (PEPE, WIF, BONK), we focused on a single-phase correlation analysis post-Singularity to understand the direct influence of AI trends on these coins.

The choice of these correlation methods is grounded in their ability to capture different types of relationships between variables. Pearson's correlation helps identify linear relationships, Spearman's rho captures monotonic relationships, and Kendall's tau-b is robust to non-parametric data. This multi-faceted approach ensures that our analysis is comprehensive, accounting for various potential relationships between generative AI trends and memecoin market performance.

Comparative Analysis

To evaluate the responsiveness of newer versus older memecoins to AI trends, we performed a comparative analysis by comparing the correlation coefficients of newly launched memecoins with

those of older memecoins for the post-event period. This analysis is crucial for determining whether newer memecoins exhibit greater sensitivity to AI trends than their older counterparts. The comparative analysis provides insights into how the evolving nature of generative AI may differentially impact various segments of the memecoin market.

Event Window Analysis

We conducted an event window analysis to examine the immediate impact of major AI events on memecoin prices. This analysis involves a 14-day window, spanning seven days before and seven days after each AI event. The event window analysis is mathematically represented as:

$$Maximum\ Price\ Increase(\%) = \frac{P_{high(t_{high})} - P_{low(t_{low})}}{P_{low(t_{low})}} \times 100\%$$

$$subject\ to\ the\ condition\ that\ t_{high} > t_{low}$$

where:

- $P_{high(t_{high})}$ is the highest price at the time t_{high}
- $P_{low(t_{low})}$ is the lowest price at the time t_{low}
- The condition $t_{high} > t_{low}$ ensures that the highest price is considered only after the lowest price in time.

We gain insights into market sensitivity and responsiveness to AI news by capturing the maximum price increase within this window. This approach is particularly valuable in understanding how quickly and significantly memecoin prices react to major AI developments, highlighting the role of generative AI in driving market behaviour.

Event window analysis is employed to isolate the impact of specific AI events on memecoin prices, helping to distinguish between general market movements and those specifically triggered by AI-related news. This method allows us to quantify the immediate market response to key AI developments, providing empirical evidence of the influence of generative AI on the memecoin market.

4. Analysis and Findings

4.1. Pre-Singularity Analysis of Older Memecoins (DOGE, SHIB, FLOKI)

Before the introduction of ChatGPT 3.5, the creation and dissemination of memecoin-related content were primarily driven by community efforts without significant reliance on generative AI. Memecoins like Dogecoin (DOGE), Shiba Inu (SHIB), and FLOKI saw largely organic content creation. Community members produced humorous images and memes that resonated with internet culture, helping to attract attention and engage users. This organic content played a crucial role in building community and belonging among investors and enthusiasts, fostering a vibrant crypto culture driven by user creativity and participation. During this period, AI tools, though available, were not sophisticated enough to significantly impact content creation, thus playing a limited role.

To understand the impact of AI trends on memecoin prices before the Singularity on 30 November 2022, we computed three types of correlation coefficients—Pearson's correlation, Spearman's rho, and Kendall’s tau-b—between memecoin prices and AI-related search terms. The results are summarised in table 3, table 4, and table 5 below.

Table 3: Pre-Singularity Segment Analysis of Older Memecoins - Pearson

	DOGE (p-value)	SHIB (p-value)	FLOKI (p-value)
AI	-0.36 (0.00)	0.16 (0.00)	-0.29 (0.00)
Machine Learning	-0.43 (0.00)	0.14 (0.00)	-0.43 (0.00)
Deep Learning	-0.45 (0.00)	0.18 (0.00)	-0.39 (0.00)
Natural Language Processing	-0.39 (0.00)	0.16 (0.00)	-0.37 (0.00)
ChatGPT	-0.04 (0.28)	-0.04 (0.34)	-0.05 (0.24)
AIGC	-0.18 (0.00)	-0.11 (0.00)	-0.26 (0.00)
AGI	-0.15 (0.00)	0.11 (0.00)	0.32 (0.00)
GPT	-0.03 (0.50)	-0.02 (0.65)	-0.03 (0.57)

Table 4: Pre-Singularity Segment Analysis of Older Memecoins - Spearman's Rho

	DOGE (p-value)	SHIB (p-value)	FLOKI (p-value)
AI	-0.28 (0.00)	0.51 (0.00)	-0.25 (0.00)
Machine Learning	-0.25 (0.00)	0.47 (0.00)	-0.19 (0.00)
Deep Learning	-0.37 (0.00)	0.47 (0.00)	-0.10 (0.03)
Natural Language Processing	-0.28 (0.00)	0.43 (0.00)	-0.10 (0.03)
ChatGPT	-0.04 (0.25)	-0.05 (0.19)	-0.08 (0.08)
AIGC	-0.13 (0.00)	-0.02 (0.53)	-0.32 (0.00)
AGI	-0.17 (0.00)	0.07 (0.05)	0.53 (0.00)
GPT	-0.01 (0.70)	-0.02 (0.67)	-0.03 (0.54)

Table 5: Pre-Singularity Segment Analysis of Older Memecoins - Kendall's Tau-b

	DOGE (p-value)	SHIB (p-value)	FLOKI (p-value)
AI	-0.26 (0.00)	0.28 (0.00)	-0.23 (0.00)
Machine Learning	-0.19 (0.00)	0.30 (0.00)	-0.16 (0.00)
Deep Learning	-0.20 (0.00)	0.27 (0.00)	-0.08 (0.00)
Natural Language Processing	-0.16 (0.00)	0.30 (0.00)	-0.07 (0.02)
ChatGPT	-0.04 (0.25)	-0.04 (0.20)	-0.06 (0.08)
AIGC	-0.10 (0.00)	-0.02 (0.40)	-0.25 (0.00)
AGI	-0.10 (0.00)	0.06 (0.02)	0.38 (0.00)
GPT	-0.01 (0.70)	-0.01 (0.67)	-0.02 (0.54)

The results from the three correlation methods—Pearson, Spearman, and Kendall—demonstrate a consistent pattern across all three memecoins (DOGE, SHIB, and FLOKI). Dogecoin and FLOKI show significant negative correlations with traditional AI-related search terms (e.g., AI, Machine Learning, Deep Learning, and Natural Language Processing) across all correlation types. This suggests an inverse relationship between the increasing interest in AI technologies and the prices of these memecoins during the pre-Singularity period. The statistical significance of these correlations, indicated by p-values close to zero, underscores the robustness of these findings.

Conversely, Shiba Inu exhibits slight but significant positive correlations with the same AI-related search terms. This could indicate differing market dynamics or investor behaviours specific to Shiba Inu, possibly driven by unique community factors or distinct marketing strategies that align with broader technological interests.

Interestingly, the correlation analyses show that emerging generative AI technologies, such as ChatGPT and GPT, had minimal or non-significant impacts on the prices of these memecoins before the Singularity. This suggests that during this period, the broader trends in traditional AI had a more pronounced effect on the memecoin market than specific generative AI events or technologies.

Before the Singularity, the relationship between memecoins and both traditional AI technologies

and emerging generative AI technologies was generally weak, as demonstrated by the consistent patterns observed across Pearson, Spearman, and Kendall correlation analyses. This weak correlation can be attributed to several factors. Firstly, integrating AI into the cryptocurrency market was still in its early stages, with most content creation driven by human efforts rather than AI tools. Secondly, the broader adoption of AI technologies, especially generative AI, had not yet reached a critical mass within the memecoin communities. As a result, AI trends had a limited direct impact on memecoin prices, with market dynamics and investor behaviours being more influenced by traditional factors such as market sentiment, community activities, and macroeconomic conditions.

The consistency across all three correlation coefficients reinforces these findings' reliability, highlighting that AI's impact on the memecoin market was still emerging during this pre-Singularity period.

4.2. Post-Singularity Analysis of Older Memecoins (DOGE, SHIB, FLOKI)

Building on the pre-Singularity analysis, we now examine the post-Singularity period to understand how the launch of ChatGPT 3.5 transformed the landscape for older memecoins.

After the introduction of ChatGPT 3.5, generative AI tools became more accessible and sophisticated, leading to a surge in high-quality, AI-generated content. This content included advanced memes, videos, and interactive posts, which significantly boosted community engagement. The integration of AI tools enabled users to produce creative outputs that were previously time-consuming or difficult to achieve, reinforcing the unique cyberculture discussed in the introduction. This shift enriched the meme culture within these communities and facilitated the dissemination of content on a larger scale, enhancing the overall visibility and appeal of these memecoins.

By analysing the period after 30 November 2022, we examined the changes in correlation coefficients between memecoin prices and AI search trends. This segmented analysis highlights the increased influence of AI trends on memecoin performance post-Singularity. The results are summarised in Tables 6, 7, and 8 below.

Table 6: Post-Singularity Segment Analysis of Older Memecoins - Pearson

	DOGE (p-value)	SHIB (p-value)	FLOKI (p-value)
AI	0.44 (0.00)	0.42 (0.00)	0.54 (0.00)
Machine Learning	0.46 (0.00)	0.46 (0.00)	0.45 (0.00)
Deep Learning	0.52 (0.00)	0.53 (0.00)	0.52 (0.00)
Natural Language Processing	0.23 (0.00)	0.27 (0.00)	0.20 (0.00)
ChatGPT	0.41 (0.00)	0.45 (0.00)	0.54 (0.00)
AIGC	0.16 (0.00)	0.24 (0.00)	0.28 (0.00)
AGI	0.39 (0.00)	0.39 (0.00)	0.34 (0.00)
GPT	0.51 (0.00)	0.57 (0.00)	0.62 (0.00)

Table 7: Post-Singularity Segment Analysis of Older Memecoins - Spearman’s Rho

	DOGE (p-value)	SHIB (p-value)	FLOKI (p-value)
AI	0.40 (0.00)	0.29 (0.00)	0.63 (0.00)
Machine Learning	0.52 (0.00)	0.48 (0.00)	0.45 (0.00)
Deep Learning	0.57 (0.00)	0.59 (0.00)	0.68 (0.00)
Natural Language Processing	0.31 (0.00)	0.34 (0.00)	0.25 (0.00)
ChatGPT	0.37 (0.00)	0.32 (0.00)	0.67 (0.00)
AIGC	0.18 (0.00)	0.35 (0.00)	0.55 (0.00)
AGI	0.44 (0.00)	0.51 (0.00)	0.54 (0.00)
GPT	0.45 (0.00)	0.58 (0.00)	0.81 (0.00)

Table 8: Post-Singularity Segment Analysis of Older Memecoins - Kendall's Tau-b

	DOGE (p-value)	SHIB (p-value)	FLOKI (p-value)
AI	0.27 (0.00)	0.19 (0.00)	0.47 (0.00)
Machine Learning	0.34 (0.00)	0.34 (0.00)	0.30 (0.00)
Deep Learning	0.38 (0.00)	0.42 (0.00)	0.48 (0.00)
Natural Language Processing	0.21 (0.00)	0.23 (0.00)	0.16 (0.00)
ChatGPT	0.23 (0.00)	0.21 (0.00)	0.49 (0.00)
AIGC	0.13 (0.00)	0.25 (0.00)	0.39 (0.00)
AGI	0.28 (0.00)	0.35 (0.00)	0.37 (0.00)
GPT	0.29 (0.00)	0.41 (0.00)	0.63 (0.00)

The analysis across Pearson, Spearman, and Kendall's tau-b coefficients reveals consistent and significant positive correlations between memecoin prices and AI-related search terms in the post-Singularity period. This marks a clear departure from the pre-Singularity findings, where the correlations were either negative or weakly positive. The consistency across all three types of correlation coefficients underscores the robustness of these results.

Specifically, the post-Singularity analysis indicates that broader AI fields such as AI, Machine Learning, and Deep Learning exhibit strong positive correlations with memecoin prices, with FLOKI showing the strongest correlations across all AI-related terms. The increased correlations with emerging generative AI technologies such as ChatGPT and GPT suggest a growing sensitivity and responsiveness of the memecoin market to developments in these specific AI areas.

This significant shift in correlations from the pre-Singularity period highlights the transformative impact of generative AI on the memecoin market. The launch of ChatGPT 3.5 and the subsequent proliferation of AI-generated content have redefined the dynamics within these communities. AI tools have become integral to content creation and community engagement, driving visibility and value in ways that were impossible before.

However, the correlation with some AI terms like Natural Language Processing, AIGC, and AGI is not as strong as with others. This may be because these technologies do not directly contribute to promoting the meme culture within the community; they are more frequently used in AI-related projects such as NEAR Protocol and Internet Computer, which have different focuses and use cases. [10]

Moreover, the statistical significance of these correlations (all p-values are close to zero) further confirms that the market's perception of AI's influence on memecoins has evolved. This evolution is likely driven by the widespread adoption of AI technologies, enhanced media coverage, and a broader public recognition of AI's potential. The revolutionary nature of generative AI, epitomised by tools like ChatGPT 3.5, has moved the market into a new phase where AI's role is not just recognised but actively valued in the economic and cultural context of memecoins.

In the post-Singularity period, the clear and significant positive correlations between memecoin prices and AI-related terms across Pearson, Spearman, and Kendall's tau-b analyses highlight a fundamental shift in the memecoin market's dynamics. Unlike the pre-Singularity period, where AI trends had a limited and often inverse impact, the post-Singularity period shows that AI, particularly generative AI, has become a key driver of market behaviour. This underscores the profound influence of generative AI on the economic and cultural landscape of memecoins, marking a new era in digital and cyberculture.

4.3. Post-Singularity Analysis of Newer Memecoins (PEPE, WIF, BONK)

Newer memecoins such as PEPE, Dogwifhat (WIF), and Bonk (BONK) emerged in an environment where generative AI was already well-established. The immediate incorporation of AI

tools in their marketing and community engagement strategies was pivotal in their rapid rise. These coins leveraged generative AI to create compelling content, from memes to promotional videos, significantly boosting their visibility and attracting a wider audience. AI tools enabled these communities to produce high-quality, engaging content at a scale and speed previously unattainable, reinforcing the unique cyberculture discussed in the introduction.

We conducted a single-phase analysis focusing on the period following the creation of these memecoins to understand the direct influence of AI trends on their market performance. As shown in Tables 9, 10, and 11, the results are consistent across Pearson, Spearman, and Kendall's tau-b correlation analyses.

Table 9: Post-Singularity Segment Analysis of Newer Memecoins - Pearson

	PEPE (p-value)	WIF (p-value)	BONK (p-value)
AI	0.70 (0.00)	0.58 (0.00)	0.63 (0.00)
Machine Learning	0.39 (0.00)	0.24 (0.00)	0.46 (0.00)
Deep Learning	0.45 (0.00)	0.35 (0.00)	0.52 (0.00)
Natural Language Processing	0.11 (0.02)	0.10 (0.21)	0.14 (0.00)
ChatGPT	0.63 (0.00)	0.66 (0.00)	0.59 (0.00)
AIGC	0.24 (0.00)	0.35 (0.00)	0.11 (0.01)
AGI	0.24 (0.00)	0.01 (0.94)	0.33 (0.00)
GPT	0.72 (0.00)	0.76 (0.00)	0.55 (0.00)

Table 10: Post-Singularity Segment Analysis of Newer Memecoins - Spearman's Rho

	PEPE (p-value)	WIF (p-value)	BONK (p-value)
AI	0.60 (0.00)	0.61 (0.00)	0.64 (0.00)
Machine Learning	0.33 (0.00)	0.02 (0.76)	0.58 (0.00)
Deep Learning	0.41 (0.00)	0.24 (0.00)	0.65 (0.00)
Natural Language Processing	0.11 (0.02)	0.10 (0.18)	0.26 (0.00)
ChatGPT	0.47 (0.00)	0.71 (0.00)	0.62 (0.00)
AIGC	0.35 (0.00)	0.33 (0.00)	0.05 (0.23)
AGI	0.14 (0.00)	0.07 (0.40)	0.55 (0.00)
GPT	0.52 (0.00)	0.81 (0.00)	0.55 (0.00)

Table 11: Post-Singularity Segment Analysis of Newer Memecoins - Kendall's Tau-b

	PEPE (p-value)	WIF (p-value)	BONK (p-value)
AI	0.48 (0.00)	0.43 (0.00)	0.46 (0.00)
Machine Learning	0.23 (0.00)	-0.06 (0.23)	0.43 (0.00)
Deep Learning	0.29 (0.00)	0.11 (0.03)	0.50 (0.00)
Natural Language Processing	0.08 (0.03)	0.04 (0.41)	0.20 (0.00)
ChatGPT	0.35 (0.00)	0.52 (0.00)	0.46 (0.00)
AIGC	0.27 (0.00)	0.18 (0.00)	0.05 (0.15)
AGI	0.10 (0.00)	0.05 (0.37)	0.40 (0.00)
GPT	0.40 (0.00)	0.60 (0.00)	0.42 (0.00)

The analysis across Pearson, Spearman, and Kendall's tau-b correlation coefficients consistently demonstrates a strong and statistically significant positive relationship between the prices of newer memecoins (PEPE, WIF, BONK) and AI-related search terms in the post-Singularity period. These findings suggest that generative AI, along with other AI-related technologies, has become a pivotal factor in driving the market performance of these newer memecoins.

In the Pearson correlation analysis, all three memecoins exhibit robust correlations with "AI," with PEPE showing a particularly strong correlation of 0.70 (p-value = 0.00). WIF and BONK also display significant positive correlations of 0.58 (p-value = 0.00) and 0.63 (p-value = 0.00). The high

correlation with GPT for all three memecoins—0.72 (p-value = 0.00) for PEPE, 0.76 (p-value = 0.00) for WIF, and 0.55 (p-value = 0.00) for BONK—underscores the critical influence of generative AI technologies on these assets. These findings are reinforced by Spearman's Rho analysis, which shows similarly strong correlations, particularly with emerging AI technologies. For instance, WIF's Spearman correlation with GPT reaches 0.81 (p-value = 0.00), indicating a high sensitivity of this memecoin to developments in generative AI.

The Kendall's Tau-b coefficients further confirm these trends, showing consistently positive correlations across all three memecoins. PEPE's correlation with "AI" stands at 0.48 (p-value = 0.00), while WIF and BONK show correlations of 0.43 (p-value = 0.00) and 0.46 (p-value = 0.00), respectively. These results demonstrate that the positive relationship between AI interest and memecoin prices is significant and consistent across different statistical methods.

However, it is worth noting that not all AI-related terms exhibit strong correlations. For example, the correlations with "Natural Language Processing" are notably weaker, particularly for WIF, which shows a near-negligible Pearson correlation of 0.10 (p-value = 0.21) and an even weaker Kendall's Tau-b correlation of 0.04 (p-value = 0.41). Similarly, correlations with "AIGC" and "AGI" are less pronounced compared to other AI terms, suggesting that these specific technologies might be less directly relevant to the market performance of these memecoins.

In conclusion, the analysis clearly indicates that newer memecoins are significantly influenced by trends in AI, particularly generative AI technologies such as GPT and ChatGPT. The consistency and strength of the correlations across Pearson, Spearman, and Kendall's tau-b analyses reinforce the notion that generative AI has become a critical driver of market behavior for these assets. This contrasts with the more mixed results observed in the older memecoins, highlighting the transformative impact of generative AI on the newer generation of memecoins. The relatively weaker correlations with certain AI-related terms also suggest that while AI is a key factor, not all aspects of AI have an equal impact, pointing to the importance of generative AI in shaping the future of these digital assets.

4.4. Comparison of Newer and Older Memecoins

The comparison between newer memecoins and older ones reveals significant differences in their correlations with AI-related trends, particularly in the post-Singularity period. These differences are statistically significant and reflect deeper market dynamics and investor behaviours unique to the memecoin sector.

Newer memecoins like PEPE, WIF, and BONK exhibit markedly higher correlations with AI-related search terms than their older counterparts, DOGE, SHIB, and FLOKI. For example, PEPE and BONK have Pearson correlations of 0.70 and 0.63 with "AI," respectively, compared to 0.44 for DOGE and 0.42 for SHIB. This pattern is consistent across other AI-related terms such as "ChatGPT" and "GPT," where newer memecoins show stronger correlations. For instance, WIF's correlation with GPT stands at 0.76, significantly higher than the 0.51 correlation observed for DOGE.

Several factors contribute to the stronger correlations observed in newer memecoins. First, the market for newer memecoins is inherently more speculative and driven by trends. Investors in these coins are often more responsive to technological innovations, particularly those related to AI, which are perceived as cutting-edge and potentially lucrative. The rapid adoption and integration of generative AI tools in the marketing and community engagement strategies of newer memecoins have also amplified their visibility and appeal. This has resulted in a feedback loop where these coins' success and market performance are increasingly tied to AI developments, leading to stronger correlations with AI-related search terms.

In contrast, older memecoins like DOGE and SHIB were established before the widespread

adoption of generative AI. Their communities and market positions were built on more organic, grassroots efforts, with less reliance on advanced AI tools. While these coins have undoubtedly benefited from the broader adoption of AI, their market dynamics are less directly tied to AI trends compared to newer memecoins. The correlations for older coins with terms like "AI" and "GPT" are still positive and significant in the post-Singularity period, but they are generally weaker than those observed for newer coins. This suggests that while older memecoins are influenced by AI trends, their market movements are more insulated from short-term technological shifts, likely due to their established user base and market recognition. [11]

Another important factor is the volatility associated with newer memecoins. These assets tend to have smaller market capitalisations, making them more susceptible to rapid price changes in response to news and trends. The high volatility amplifies the impact of AI-related developments on these coins, resulting in stronger correlations with AI search trends. In contrast, older memecoins, with their larger market capitalisations and more stable investor base, exhibit less volatility and, consequently, weaker correlations with the same AI-related terms.

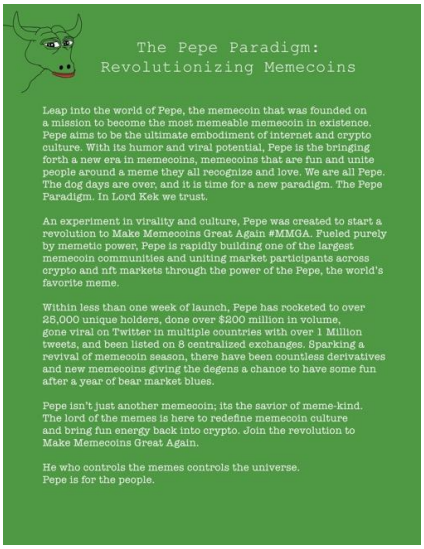
In summary, the stronger correlations between newer memecoins and AI-related trends highlight the evolving nature of the memecoin market, where generative AI has become a key driver of market dynamics. The heightened responsiveness of newer memecoins to AI developments reflects their integration of these technologies into their core strategies and the speculative nature of their investor base. Meanwhile, older memecoins, while still influenced by AI trends, are less dependent on these factors, leading to comparatively weaker correlations. This distinction underscores the transformative impact of AI on the memecoin landscape, particularly in shaping the future trajectory of newer digital assets.

4.5. Case Study: The Impact of Generative AI on PEPE

The integration of generative AI has undeniably played a transformative role in the development and success of newer memecoins, with PEPE serving as a prime example. This section examines how AI technologies have facilitated content creation, community engagement, and social media propagation within the PEPE community on platforms like Twitter and Telegram, directly influencing market behaviour.

PEPE emerged in a post-Singularity environment where generative AI was already well-established, significantly accelerating its rise. Although the PEPE meme existed long before the introduction of the PEPE coin, symbolising a key aspect of internet and cyberculture, the creation of the PEPE coin represented a novel way to monetise and capitalise on the cultural value embedded in these internet memes. The advanced capabilities of generative AI greatly facilitated this transformation of internet culture into digital assets. By tapping into the widespread recognition and appeal of the PEPE meme, the coin quickly garnered attention and engagement from a broad audience.

The Pepe Paradigm in Figure 1 is an illustrative description highlighting the mission, cultural significance, and rapid success of the PEPE memecoin. It presents PEPE as the ultimate embodiment of internet and crypto culture, emphasising its humour and viral potential. The text portrays PEPE as a unifying force within the meme and cryptocurrency communities, aiming to create a new era of memecoins that are fun and widely recognised. The Pepe Paradigm suggests that PEPE is ushering in a new era for memecoins, moving beyond the ‘dog days’ and introducing innovative cultural elements into the crypto space. This innovative approach prominently includes the use of generative AI.

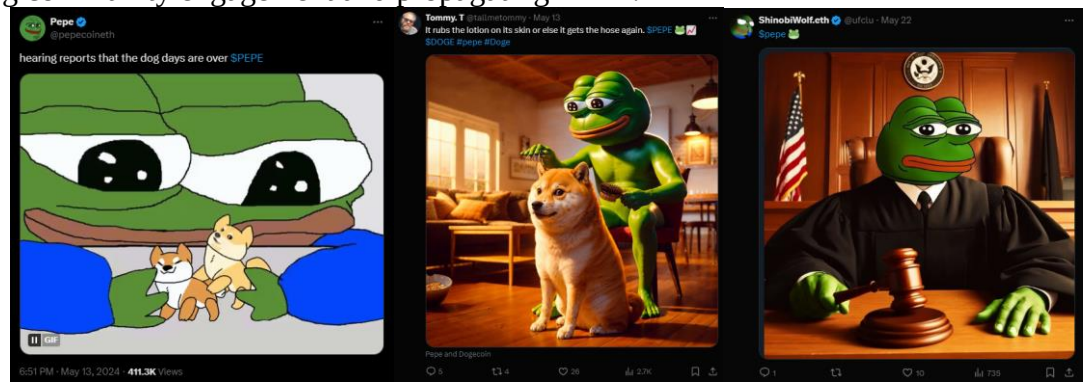


Source: https://x.com/pepecoineth/status/1648820078689886208 on 19 Apr 2023

Figure 1: The $pepe paradigm

The use of AI tools enabled the Pepe community to produce high-quality, engaging content at a scale and speed that was previously unattainable, reinforcing the unique cyber culture discussed in the introduction. By creating engaging stories around memecoins, AI enhances community cohesion and drives collective engagement. For example, AI-generated narratives about PEPE's creation and future potential have helped build a strong sense of community on Telegram and Twitter. These narratives create a shared vision and purpose, encouraging members to stay engaged and support the memecoin.

The use of AI-generated content is clearly reflected in the community's activities on social media. The following examples from Twitter illustrate the significant role that AI-generated content plays in fostering community engagement and propagating PEPE.



Source: https://x.com/pepecoineth/status/1790077492566368554 on 13 May 2024

Figure 2: PEPE's Twitter

The left one in figure 2 is symbolically positioning PEPE as the successor to popular dog-themed coins like Dogecoin. The rest two are replies, which are likely results from AI-generated content. These examples demonstrate how the PEPE community effectively uses AI-generated content to maintain an active and engaging presence on social media. Integrating AI tools has enabled the community to create diverse and impactful content, reinforcing the coin's cultural significance and ensuring sustained engagement and growth. Using generative AI to create these images highlights the seamless blend of technology and culture in the evolution of memecoins like PEPE.

PEPE Maker Integration

Most of these generative AI assets are created using OpenAI's ChatGPT, leveraging GPT-4 and DALL Ɛ models. The OpenAI platform includes a ‘Pepe Maker’ plugin, launched in early 2024, which has significantly enhanced the creative process for PEPE memes.

The PEPE Maker plugin allows users to describe, upload, link, and remix content to create rare PEPE memes. This tool has greatly increased the variety and creativity of PEPE memes available online, enabling the community to generate memes in various styles, such as:

- Iconic Historical Photos: Users can recreate famous historical scenes featuring PEPE.
- Random Sticker Packs: The plugin generates packs of PEPE stickers, each with unique and creative designs.
- Detailed Paintings: Users can create intricate, artistic renderings of PEPE, enhancing the aesthetic appeal of the memes.

Since its launch, the PEPE Maker in figure 3 plugin has been widely adopted by the PEPE community, significantly boosting the creativity and diversity of meme content. This has strengthened community bonds and increased the memecoin’s visibility and appeal across various social media channels.

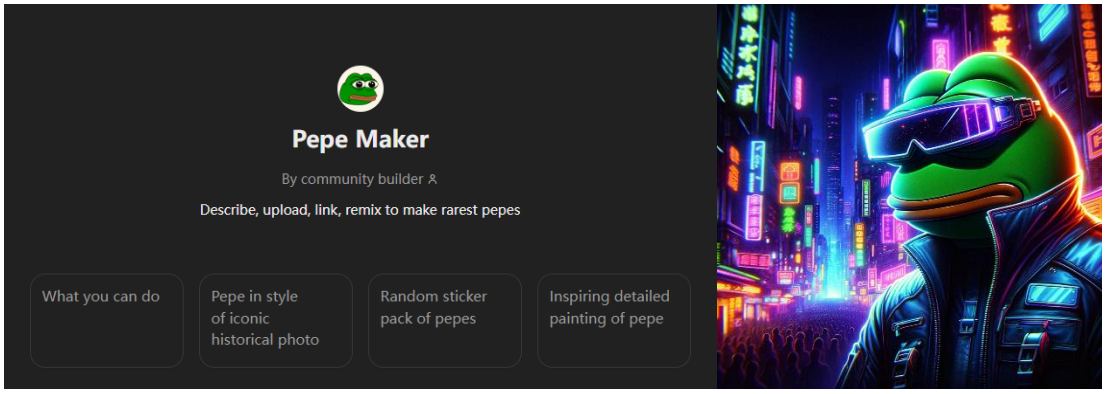


Figure 3: PEPE Maker and Outputs

The user can start by describing the type of image I wanted to create. For instance, I inputted the description:

"Pepe the Frog in a cyberpunk setting, with neon lights, futuristic cityscape, and Pepe wearing a high-tech visor and jacket.", "size": "1024x1024"

The plugin’s interface was straightforward, allowing me to specify image size and style details. Upon submitting my description, the plugin utilised the DALL Ɛ model to generate a vibrant and detailed image of Pepe in the specified setting. The result was a visually striking depiction of Pepe the Frog in a cyberpunk environment, complete with neon lights and a futuristic cityscape. The Pepe Maker also offers options to further customise the generated content or even create short comics featuring the chosen theme. This functionality provides endless possibilities for creative expression and community engagement.

In conclusion, the case of PEPE demonstrates how generative AI has become a crucial factor in shaping market behavior and community dynamics within the memecoin ecosystem. By enabling the rapid production of high-quality, engaging content, AI has allowed PEPE to tap into the cultural zeitgeist and maintain a strong, active presence in the highly competitive world of memecoins. The success of PEPE underscores the importance of generative AI in the future of digital culture and the ongoing evolution of internet-based communities.

4.6. Event-Based Analysis

We conducted an event-based analysis focusing on key post-Singularity developments to evaluate

the impact of significant AI milestones on the memecoin markets. These events, such as the introduction of ChatGPT 3.5, the release of GPT-4, and other major announcements by OpenAI and Google, marked substantial advancements in the AI sector and were instrumental in driving market behaviours.

We employed an event window analysis method, capturing the maximum price increase of memecoins within a 14-day window surrounding each AI event. This approach allowed us to gain insights into the market's responsiveness to major AI news and understand how different memecoins reacted to these developments.

The analysis compared the price reactions of newer memecoins (PEPE, WIF, BONK) with those of older memecoins (DOGE, SHIB, FLOKI) in response to these AI events. This comparison aimed to determine whether newer memecoins exhibited greater sensitivity to AI trends compared to their older counterparts, which could indicate different levels of integration with AI technologies or varying investor demographics.

Table 12: Maximum price increase within a 14-day window surrounding the event date

Date	Event	DOGE (%)	SHIB (%)	FLOKI (%)	WIF (%)	PEPE (%)	BONK (%)
2022-11-30	Introduction of ChatGPT 3.5 by OpenAI	31.15	-	22.22	-	-	-
2023-02-06	Google announces Bard on their blog	8.86	25.00	28.00	-	-	-
2023-03-14	Introduction of GPT-4 by OpenAI	16.80	10.00	24.24	-	-	-
2023-03-21	Public release of Bard, announced on Google's blog	10.80	10.00	13.89	-	-	-
2023-03-24	Release of ChatGPT Plugins by OpenAI	8.29	10.00	8.11	-	-	-
2023-09-21	Announcement of DALL-E 3 by OpenAI	1.94	14.29	6.67	-	-	-
2023-11-04	Launch of Grok by Elon Musk's xAI	15.41	12.50	3.33	-	-	200.00
2023-11-07	OpenAI's announcement of GPT Builder, GPT-4 Turbo, Assistants API, and more at DevDay	15.41	12.50	13.33	-	-	200.00
2023-11-17	Sam Altman is fired as CEO of OpenAI	19.11	12.50	20.00	-	-	150.00
2023-11-22	Sam Altman is rehired as CEO of OpenAI	13.03	12.50	17.24	-	-	66.67
2023-12-06	Google DeepMind reveals Gemini	26.31	25.00	31.25	-	100.00	225.00
2024-02-15	OpenAI introduces SORA / Gemini 1.5 release, enhancing multimodal understanding	12.03	11.11	20.69	100.02	-	40.00
2024-05-13	Release of ChatGPT 4.0 by OpenAI	17.32	18.18	27.22	12.23	37.50	30.43

The data in Table 12 indicates that the memecoin markets are highly reactive to major AI announcements and developments. Significant price movements were observed across both newer and older coins, though the magnitude and consistency of these responses varied, reflecting the speculative nature of these assets and the high level of investor attention to technological

advancements.

The event-based analysis shows that newer and older memecoins exhibit significant price responses to AI-related events. However, newer memecoins tend to show more extreme volatility and sensitivity, likely due to their smaller market capitalisations, higher speculative interest, and closer integration with AI-driven narratives. These findings underscore the influential role of AI in shaping the economic and cultural landscape of memecoins in the post-Singularity era, particularly highlighting how generative AI has become a central driver of market behavior for newer digital assets.

5. Discussion and Conclusion

Our analyses underscore the profound impact of generative AI on the memecoin market. In the post-Singularity period, marked by the launch of ChatGPT 3.5 and subsequent AI advancements, we observe a noticeable increase in the correlation between AI trends and memecoin prices. This shift indicates that AI has become a critical driver of market dynamics, reshaping how these digital assets are perceived and traded.

Newer memecoins like PEPE, WIF, and BONK exhibit heightened sensitivity to AI trends compared to older memecoins like DOGE, SHIB, and FLOKI. Several factors contribute to this difference. Firstly, newer memecoins attract a more tech-savvy and speculative investor base that is highly responsive to technological advancements. This demographic is more attuned to AI developments, leading to rapid and pronounced market reactions to AI-related news. Additionally, the smaller market capitalisations of these newer coins result in higher volatility, making them more susceptible to dramatic price swings based on news and investor sentiment. The smaller market cap implies higher risk and potential reward, amplifying their sensitivity to AI advancements.

The integration of generative AI tools in the marketing and community strategies of newer memecoins has also been more immediate and extensive. These tools have enabled the production of high-quality, engaging content at a scale and speed previously unattainable. This includes advanced memes, promotional videos, and interactive posts, significantly boosting community engagement. For instance, AI-generated narratives about PEPE's creation and future potential have played a key role in building a strong sense of community on platforms like Telegram and Twitter. This AI-driven content fosters a sense of shared identity and purpose within memecoin communities, enhancing cohesion and driving collective engagement.

Generative AI has reshaped memecoin culture by facilitating the creation of diverse and engaging content, which in turn reinforces the cultural significance of these coins. The PEPE community, for example, has effectively used AI-generated content to maintain an active and vibrant presence on social media, ensuring sustained engagement and growth. This heightened sensitivity of newer memecoins to AI developments highlights the transformative role of AI in influencing market dynamics. The rapid adoption of AI technologies has transitioned the memecoin market from its early stages of AI integration into a more mature phase, where AI's potential is widely recognised and valued. This transformation marks a new digital and cyber culture era, with AI acting as a significant driver of market activity.

This study provides a comprehensive analysis of the impact of generative AI on the memecoin market, particularly focusing on the periods before and after the introduction of ChatGPT 3.5, referred to as Singularity. The key findings indicate a significant shift in market dynamics post-Singularity, with memecoins exhibiting higher sensitivity to AI-related trends and events. The increased accessibility and sophistication of AI tools have enabled communities to produce engaging and high-quality content, thereby enhancing community cohesion and visibility.

The implications of these findings suggest that as AI technologies continue to evolve, they will

play an increasingly pivotal role in shaping the cryptocurrency market. Generative AI has influenced content creation and driven market activity, highlighting its potential to transform digital finance. For the future, it is crucial to monitor ongoing developments in AI and their impact on various sectors, including cryptocurrencies.

Further research is suggested to delve deeper into the intersection of AI and blockchain technologies. Future studies could explore the long-term effects of AI on market stability, the role of AI in enhancing security and transparency in blockchain transactions, and the potential for AI to facilitate the creation of more sustainable and resilient cryptocurrency ecosystems.

6. Limitations and Future Work

While this study provides valuable insights into the impact of generative AI on the memecoin market, it is important to acknowledge its limitations. One significant limitation is the data display issues from sources such as Yahoo Finance. These sources struggled to display the prices of certain coins like SHIB, PEPE, and BONK during some periods. This issue primarily stems from the low prices of these coins, resulting in values with excessive leading zeros, which affected the comprehensiveness of our data analysis. Consequently, this limitation impacts the ability to assess price movements accurately for all events and time frames within the scope of our study.

Additionally, the inherent volatility of memecoin markets poses a significant challenge. The speculative nature of these markets means that prices can be highly unpredictable, influenced by a wide range of factors beyond AI developments. This volatility may skew the results, making it difficult to isolate the specific impact of AI trends on memecoin prices.

These limitations suggest several areas for improvement in future research. Enhanced data collection methods and more robust data sources could mitigate accuracy issues. Future studies should consider utilising alternative financial data platforms or blockchain explorers to obtain more precise price data. Furthermore, employing more sophisticated analytical techniques could help account for market volatility, providing a clearer understanding of the interplay between AI advancements and cryptocurrency market dynamics.

Additionally, future research could explore the impact of AI-generated content on other sectors of the cryptocurrency market, such as decentralised finance (DeFi) and non-fungible tokens (NFTs). Investigating the long-term cultural implications of generative AI on digital communities and their economic behaviours could also yield valuable insights. Finally, interdisciplinary studies combining AI technology, behavioural economics, and cultural studies could offer a more holistic view of how AI shapes and is shaped by digital financial ecosystems.

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