

Original Article

Do Younger Users Trust AI More? A Study on Age and AI-Based Bot Perception

Aditya Punj

British School Jakarta, Jakarta, Indonesia.

Corresponding Author : adityapunj27@gmail.com

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Abstract - The increasing presence of AI-based bots in daily life is met with varying levels of trust across different demographics. While younger individuals are the primary users of AI-powered conversational agents, the extent to which age influences trust in these technologies remains underexplored. This study investigates how trust in AI-based bots varies between younger (10–20 years old) and older (40–50 years old) individuals. A quantitative survey was conducted across respondents assessing trust through four key parameters: understanding and baseline trust, trust in developers and algorithms, privacy and data security, and perceived impact on society. Data analysis, including t-tests, revealed significant differences in trust, particularly in the parameters of trust in developers and algorithms, and confidence in privacy and data security. Both these parameters indicated greater levels of trust in AI-based bots among the younger age group. These findings highlight the need for AI developers to enhance transparency and privacy measures to build trust among older users. Understanding these trust differentials is essential for improving AI adoption across age groups and ensuring ethical and effective AI deployment.

Keywords - AI-Based bots, Algorithms, Demographics, Privacy, Trust.

1. Introduction

1.1. Topic Introduction

Artificial Intelligence (AI), defined by John McCarthy as the “science and engineering of making intelligent machines,” has evolved significantly since its introduction in the mid-20th century [1]. After overcoming difficult periods such as the “AI winter” (1974–1980), the field has rapidly started to develop due to advances in computational power, internet access, and data availability [2]. AI-based bots are AI-powered conversational agents that utilize Natural Language Processing (NLP) and attempt to communicate like humans. Today, these bots are deeply embedded in everyday digital experiences. From voice assistants like Siri and Alexa to chatbots such as ChatGPT and Google Gemini, NLP systems provide users with a range of benefits due to their quick response times.

These bots have the potential to improve user productivity and provide better accessibility to knowledge. However, their widespread adoption depends on user trust. Unlike traditional rule-based systems, AI-based bots operate with a degree of autonomy, known as their “black-box” nature, often making their outputs less predictable and less explainable to end users [3].

However, their adoption depends critically on user trust. Unlike deterministic rule-based systems, AI-based bots are

often perceived as “black-box” models [3], producing outputs that may appear opaque, biased, or unpredictable. Trust in these systems is shaped not only by technical performance but also by concerns over algorithmic transparency, data privacy, developer accountability, and broader societal consequences such as job automation and ethical risks [4]. Recent surveys illustrate this tension: while 27% of Americans interact with AI daily, only 15% report feeling more excited than concerned about its increasing role in society [5].

These findings suggest that while AI adoption is growing, understanding and trust remain uneven, particularly across different demographic groups.

1.2. Background and Literature Review

Trust in AI-based bots is a multidimensional construct influenced by: (1) users’ understanding and baseline familiarity with AI, (2) trust in the developers and algorithmic processes, (3) comfort with data privacy and security practices, and (4) perceived societal impact, including ethical concerns, job automation, and social displacement [6]. These challenges are amplified in NLP systems due to their opaque architectures, susceptibility to bias, and need for extensive personal data [7][8]. While data access enables personalization and higher service quality, it simultaneously raises privacy risks, as illustrated by reports of voice assistants like Alexa recording user conversations without consent [7][9]



Although prior research has examined trust in AI within specialized domains such as healthcare, finance, or HR, comparatively fewer studies focus on general-purpose conversational bots encountered in everyday contexts. Even fewer studies have investigated demographic influences, such as age, despite clear evidence of generational differences in digital adoption [10].

For instance, 75.3% of individuals aged 18–25 report weekly AI use compared to only 50.3% of those aged 36–45 [11]. Similarly, younger demographics dominate ChatGPT usage, with 33.5% of users aged 25–34 compared to just 11.2% of those aged 45–54 [12].

Yet, whether higher exposure among younger users translates into higher levels of trust remains unclear. At the same time, older users are often more cautious in their decision-making [13], suggesting potentially lower trust in AI systems. While existing research identifies privacy, bias, and explainability as trust barriers [14], [15], there is a lack of empirical studies directly comparing how younger versus older populations perceive and trust general-purpose AI-based bots.

This paper addresses that gap by investigating how trust in AI-based bots differs across age groups, using a structured, parameterized approach. It seeks to determine which dimensions of trust are significantly influenced by age.

1.3. Research Aim and Objectives

The aim of this study is to investigate how age influences trust in AI-based bots that utilize NLP. Specifically, it evaluates two age groups (10–20 and 40–50 years) using a cross-sectional survey approach.

The objectives are:

- To identify whether there are significant inter-age differences in trust across four dimensions: understanding, developer trust, privacy, and societal impact.
- To measure and compare the variability and consistency of trust responses using standard deviation and coefficient of variation analysis.
- To generate insights for AI designers, developers, and policymakers seeking to build more inclusive and trustworthy AI systems.

2. Methodology

2.1. Research Aim

This study adopted a quantitative survey-based approach to evaluate the influence of age on trust in AI-based bots, focusing on specific parameters of trust. The method was chosen for its efficiency in collecting structured, analyzable data from a diverse, geographically dispersed sample. This aligns with the research aim to explore inter-age group trust differences and perceptions of AI-enabled bots.

2.2. Sample

A purposive sampling technique was used to target participants from two distinct age cohorts to enable comparative analysis:

- Group A (Younger Group): Ages 10–20 (n = 19)
- Group B (Older Group): Ages 40–50 (n = 19)

The sample size of this research study consisted of 38 respondents who all currently live in various parts of the world.

Table 1. Participant demographic table

Age	10-20	19
	40-50	19
Education Qualification	High School	19
	Undergraduate	3
	Post graduate	15
	Phd	1
Employment Status	Employed	17
	Unemployed	21

2.3. Informed Consent

Before completing the survey, participants were presented with an informed consent statement outlining the purpose of the study, data confidentiality, and their rights as respondents. Consent was obtained from every respondent prior to participation. They were explicitly assured that all information they provided would remain confidential, that no personal or identifying data would be disclosed to any third party, and that their responses would be used solely for research purposes. Participants were informed that their involvement was entirely voluntary, that they could withdraw at any stage without consequence, and that no personal or sensitive information would be shared outside the research team. To the best of the researcher's knowledge, participation in the study carried no foreseeable risks. Additionally, respondents were reminded that if they experienced any discomfort, they retained the right to discontinue their participation immediately.

2.4. Tools Used

The research utilises a survey to collect information from a sample of people. The survey consisted of demographic questions. A total of 21 questions, broken down into four different parameters, answer the main research question.

The first parameter considered was the 'people's understanding and baseline trust' towards AI-based bots. Two questions focused on AI-based bot reliability were asked in this parameter, with one being: All output produced by AI-based bots needs human oversight and verification.

The second parameter considered was ‘trust in the developers and algorithms’ behind AI-based bots. Six questions were asked based on this parameter, with one of the questions being: AI-based bots can be relied upon for important tasks, such as seeking medical advice.

The third parameter considered was ‘privacy and data security’, assessing people’s ability to trust AI-based bots with private information. Four questions were asked based on this parameter, with one of the questions being: AI-based bots collect a lot of our personal information.

The final parameter was the ‘perceived impact of AI-based bots on society’, exploring the societal effects and concerns surrounding AI-based bots. Five questions were asked based on the final parameter, with one of the statements being: AI-based bots are leading to laziness and a lack of authenticity in work.

Each question and statement across all of the parameters had to be responded to using a Likert scale, with a higher value signifying greater trust in relation to that parameter. During the survey, a few statements were reverse-coded to deal with respondent bias.

Data analysis was carried out using the Google Sheets software. The following statistical tools were employed:

- **Independent T-tests:**
Used to compare the mean responses between the two age groups (10–20 vs 40–50) across each of the four trust parameters. This test helps determine whether the observed differences in trust levels are statistically significant.
- **P-value Analysis:**
Employed to evaluate the statistical significance of group differences. A threshold of $p < 0.05$ was used to determine whether the differences in trust between age groups were significant.
- **Standard Deviation:**
Used to assess the variability in responses within each age group. A higher standard deviation indicates a greater diversity of opinions, providing insights into consistency or polarization in trust perceptions.

These tools were collectively used to evaluate inter-age group differences in AI-based bot trust and were used to validate the research hypotheses.

2.5. Data Collection Procedure

Data collection took place using a quantitative approach. Surveys were handed out to a sample recruited via purposive sampling via Google Forms. The surveys were standardised across the sample, and consent was taken from each respondent in the sample. Questions were standardised to avoid any bias in responses, and a survey-based method was chosen as it would be a quick way to obtain information from

people who are directly using or impacted by AI-based bots. Other methods considered were physically interviewing people of different age groups regarding their experience of using AI-based bots. However, this would be a more time-consuming approach, and any qualitative data collected would be difficult to analyse. Hence, a quantitative survey-based approach was chosen.

2.6. Hypotheses

Based on the research aim to analyze age-based differences in trust toward AI-based bots, the following hypotheses were formulated:

- **Primary Hypothesis (H1):**
There is a significant difference in overall trust in AI-based bots between younger individuals (10–20 years old) and older individuals (40–50 years old).
- **Secondary Hypotheses:**
 - H2:** There is a significant difference in understanding and baseline trust in AI-based bots between younger and older individuals.
 - H3:** There is a significant difference in trust in developers and algorithms between younger and older individuals.
 - H4:** There is a significant difference in comfort levels regarding privacy and data security between younger and older individuals.
 - H5:** There is a significant difference in the perceived societal impact of AI-based bots between younger and older individuals.

3. Results and Discussions

3.1. Participant Familiarity and AI Usage Context

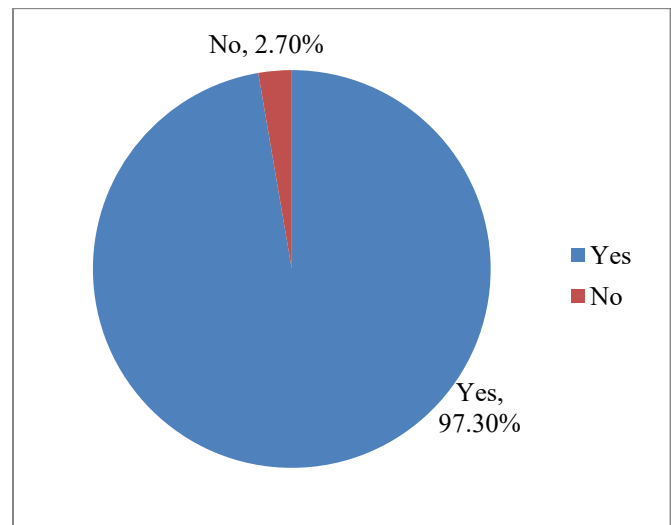


Fig. 1 Graphical representation of usage of AI-based bots by people (N=38)

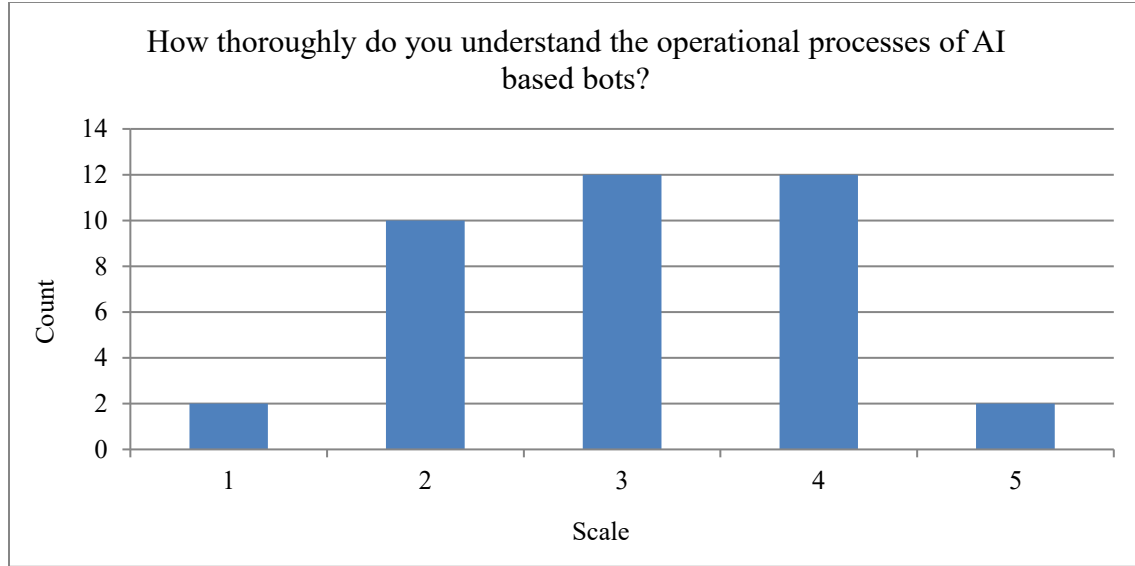


Fig. 2 Graphical representation of people's self-evaluated knowledge on AI-based bots, with 1 denoting no familiarity and 5 denoting a comprehensive understanding of AI-based bots (N=38)

The purpose of this section is to examine how trust in AI-based bots varies between younger (10–20) and older (40–50) individuals across four key parameters: understanding and initial trust, trust in developers and algorithms, data privacy, and perceived societal impact. The data, drawn from 38 respondents equally split between the two age groups, was analyzed using independent t-tests to determine statistical significance.

As illustrated in Figure 1, an overwhelming majority of participants (97.3%) report using AI-based bots in their daily lives. This widespread usage highlights that participant responses are based on firsthand interaction, rather than hypothetical scenarios, which strengthens the validity and applicability of the findings.

Furthermore, Figure 2 shows that most respondents have at least a moderate level of familiarity with AI systems. A combined total of 24 participants rated their understanding at a 3 or 4 out of 5, indicating a solid foundational grasp of AI-based bots and their role in society. While not experts, the majority were equipped with sufficient experiential knowledge to assess trust.

This general understanding was consistent across both age groups and may explain why the “understanding and initial trust” parameter did not show significant differences in the results. It also loosely suggests the idea that trust in AI could be increasingly shaped by lived digital experience rather than theoretical or technical expertise.

3.2. Parameter-Based Analysis

Table 2. Independent t-test analysis of Age Group 1 and Age Group 2(N=38)

Group	Age group 1 (10-20) (M)	Age group 2 (40-50) (M)	SD	SD	t	p
Understanding and initial trust towards AI-based bots	5.58	5.84	1.04	0.92	-0.82	0.42
Trust in developers and NLP algorithms	19.16	16.52	8.81	9.93	2.65	0.01
Trust with privacy	9.84	8.47	8.70	3.49	1.71	0.04
Impact on the future	12.37	13.16	7.36	3.14	-1.06	0.30

3.2.1. Understanding and Initial Trust

The first parameter, Understanding and Initial Trust, assessed participants' foundational perceptions of AI-based bots, including whether they believed such systems required human oversight and how confident they felt during early interactions. The statistical analysis indicated no significant

difference between the younger (M = 5.58, SD = 1.04) and older (M = 5.84, SD = 0.92) age groups ($t = -0.82, p = 0.42$). This finding led to the rejection of Hypothesis H2, suggesting that generational differences do not notably influence initial impressions of AI bots.

This result aligns with the consistent level of AI familiarity observed in Figure 2, where both groups demonstrated a median understanding of 3 to 4 on a 5-point scale. The lack of a significant variation may be attributed to the universal digital exposure that spans generations, especially as AI tools like chatbots and voice assistants become embedded in everyday services. It also underscores the idea that baseline trust in AI is more closely linked to lived user exposure to AI-based bots rather than age-specific attitudes [16]. Thus, developers aiming to build trust should focus less on age-based customization in early user interactions and more on usability, clarity, and responsiveness.

3.2.2. Trust in Developers and NLP Algorithms

The second parameter examined participants' confidence in the developers and algorithms behind AI-based bots, focusing on their perceived reliability. This parameter revealed a statistically significant difference between the age groups, with the younger cohort (10–20) displaying higher trust ($M = 19.16$, $SD = 8.81$) than the older group (40–50) ($M = 16.52$, $SD = 9.93$), $t = 2.65$, $p = 0.01$. The p-value below the threshold of 0.05 allows us to retain Hypothesis H3, confirming that age plays a role in shaping trust in the technological foundations of AI systems.

A possible explanation for this pattern is familiarity bias, as younger users may be more comfortable trusting technological systems without fully questioning their inner workings. However, this is unlikely as younger users have been shown to demonstrate strong awareness of the risks of technology (Hundley & Shyles, 2010). In contrast, older users might adopt more cautious attitudes, due to concerns over algorithmic bias, lack of transparency, or the ethical motivations of developers – factors well-documented in trust-related AI research [6].

Additionally, the standard deviation and variability in responses were notable. While younger participants showed a broad range of opinions, the older group's trust levels were more clustered but generally lower. These findings suggest that while both groups are uncertain to varying degrees, younger individuals are more willing to place conditional trust in the developers and the algorithms that drive AI-based bots. This insight emphasizes the importance of developer transparency and communication strategies that cater to different levels of skepticism across generations.

3.2.3. Trust with Privacy

The third parameter explored participants' comfort with the privacy and data security practices of AI-based bots, including how willingly they shared personal information and their trust in AI's ability to safeguard sensitive data. This dimension revealed another statistically significant difference between the age groups, with younger participants ($M = 9.84$, $SD = 8.70$) expressing greater trust in AI's privacy protections

than older participants ($M = 8.47$, $SD = 3.49$), $t = 1.71$, $p = 0.04$. This result supports the retention of Hypothesis H4, reinforcing the claim that age is a factor influencing trust in how AI systems handle privacy.

This outcome resonates with existing research showing that younger users often prioritize convenience over privacy, particularly in digital environments they perceive as beneficial or efficient [6].

Notably, the Coefficient of Variation (CV) for this parameter was highest among the 10–20 age group (113%), indicating a greater internal diversity of opinion. While many younger users appear comfortable with AI accessing their data, a substantial subset expresses concern, highlighting an internal generational split. It has been previously noted that adolescents use largely varying metrics to evaluate trustworthiness [17]. This finding shows that age-based trust is not the same for all youth and that AI designers need to balance personalized experiences with clear and strong data privacy protections to meet different user needs.

3.2.4. Perceived Societal Impact

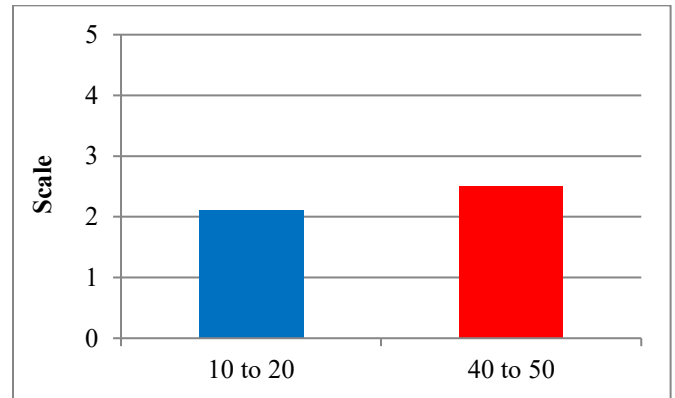


Fig. 3 Participants' agreement to the statement "AI-based bots do not pose a threat to jobs" (N=38)

The final parameter assessed participants' perceptions of the broader social implications of AI-based bots, including their influence on job security, authenticity in human work, and societal dependency on automated systems. The statistical results showed no significant difference between age groups, with the younger cohort ($M = 12.37$, $SD = 7.36$) and older cohort ($M = 13.16$, $SD = 3.14$) yielding a t-value of -1.06 and a p-value of 0.30. As this value exceeds the threshold for statistical significance, Hypothesis H5 is rejected, indicating that age does not significantly affect perceptions of AI-based bots' societal impact.

While the overall parameter did not yield statistically distinct results, individual item responses provided important information. As illustrated in Figure 3, younger participants were more likely to express concern about the impact of AI-

based bots on job opportunities. This aligns with existing research suggesting that Gen Z is aware of automation's role in transforming labor markets [18].

Furthermore, the coefficient of variation for this parameter was significantly higher in the 10–20 age group (59.50%) compared to the 40–50 group (23.86%), indicating more diverse opinions among younger respondents.

While mean values alone may not reveal significant age-related differences, internal diversity within age groups, especially among youth, could offer rich insights. Future research is needed to explore intra-generational trust variability. Furthermore, policymakers must consider employment concerns when crafting AI governance and employment transition strategies.

3.3. Practical Trust Boundaries

Along with analyzing general trust parameters, the study also investigated how participants perceive the applicability and reliability of AI-based bots in high-stakes scenarios. This was explored using specific Likert-scale statements, one of which asked respondents whether AI-based bots could be relied upon for important tasks such as seeking medical advice. This item was included under the “Trust in Developers

and NLP Algorithms” parameter. Specifically, it acts as a question to determine where users draw the line between casual and consequential AI-based bot use.

Across both age groups, the average trust scores for this question were significantly lower than the overall mean for trust in developers and algorithms (3.19 for the younger group and 2.75 for the older group). This result suggests that, although younger individuals generally express higher trust in AI, both age cohorts display hesitancy when it comes to critical decision-making contexts, especially in areas such as health. It aligns with prior research indicating that users' trust in AI systems is highly reliant on the nature of the task, showing comfort with routine automation but skepticism toward high-stakes applications [15].

These findings imply that user trust is conditional: while an enhanced user experience may promote trust in everyday contexts, tasks involving significant consequences, such as health and safety, require greater transparency. This insight reinforces the need for AI developers and system designers to clearly communicate limitations and maintain human-in-the-loop structures for critical tasks – regardless of the demographic being targeted. A society-in-the-loop system, as proposed by Rahwan [19], could possibly be considered.

3.4. Trends

Table 3. Coefficient of variation based on age groups and parameters

Group	Coefficient of Variation (%) (10-20)	Coefficient of Variation (%) (40-50)
Understanding and Baseline Trust	18.64	15.75
Trust in Developers and Algorithms	45.98	60.11
Trust with Privacy and Data Security	88.41	41.20
Perceived Impact on Society	59.50	23.86

A consistent pattern across the data was the high variability in trust among younger respondents. The Coefficient of Variation (CV) was highest in the 10–20 age group across three of the four parameters, most notably in trust with privacy (CV = 113%). This implies that while younger individuals on average report greater trust, they also display a more diverse range of opinions.

Due to the significant coefficient of variation present, further research could continue to explore the influence of age on the parameters of “trust in developers and algorithms” and “privacy and data security” while utilising a larger sample size, until a stable coefficient of variation is achieved.

Collectively, these patterns indicate that trust in AI is not uniform across age groups or task domains, but is instead shaped by a complex interplay of familiarity, perceived developer credibility, privacy confidence, and task sensitivity.

4. Conclusion

The aim of the study was to understand the effect of age on trust in AI-based bots. The data collected through the research suggests that, on average, people between the ages of 10-20 displayed more trust in AI-based bots than people between the ages of 40-50. This is in line with previous studies that show that ‘Gen-Z’ people display the most trust in AI [20]. However, people between the ages of 10 and 20 are more concerned about the impact of AI-based bots on the future, especially in terms of job opportunities. This finding highlights that another key to fostering public trust in AI-based bots is to develop them in a way that creates more opportunities for the public, while mitigating their threats to the livelihoods of the youth. Moreover, the variability of opinions highlights the inconsistent attitude of younger people in trusting AI-based bots, especially in trusting them with privacy, supporting previous studies' findings that ‘Gen-Z’ people are either quite care-free in trusting AI with their data

or very knowledgeable and proactive in protecting their data from AI [21].

Due to the significant coefficient of variation present, further research could continue to explore the influence of age on the parameters of “trust in developers and algorithms” and “privacy and data security” while utilising a larger sample size, until a stable coefficient of variation is achieved. Since trust is shaped by environmental and cultural factors, future research could narrow the focus to specific demographic groups, for example, studying the impact of age on AI trust within 3rd-generation or later Singaporean citizens. Given the potential inaccuracies in self-reported data, future research should validate findings using mixed-method approaches (e.g., behavioral experiments, longitudinal studies) to enhance reliability.

Through this study, the effect of individual parameters on people’s trust in AI-based bots can be better understood. People’s lack of trust in AI-based bots limits the growth of this technology. However, through this research, developers will be better able to understand and bridge the factors that limit people’s trust in AI-based bots. Furthermore, this research will enhance our understanding of the age-related challenges in using AI-based bots. It will also provide insights to prevent AI-based bots from perpetuating the age divide commonly associated with new technologies. Overall, this research will help in providing a standardized measure of trust in AI-based bots across age groups that could be understood to create ethically suitable and, overall, more successful AI-based bots, because the trustworthiness of AI-based bots plays a critical role in determining people’s adoption of them.

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