**Paper: "The Influence of Demographics on Prompting Style and Perceived AI Gender (not only)"**

**Methodology**

The research involves quantitative and qualitative analyses on the survey dataset collected from 472 participants. The analyses aim to:

1. **Demographic Analysis:** Examine participants’ demographic characteristics (Age, Nationality).
2. **Perceived AI Gender Analysis:** Investigate if demographics influence the perceived AI gender.
3. **Prompting Style Analysis:** Evaluate prompting styles through qualitative analyses (open-ended questions).
4. **Adjective Analysis:** Understand how participants describe AI, based on demographics.

**FEATURE SELECTION**

Using feature selection methods can significantly enhance your analysis by identifying which demographic and textual variables most influence participants' satisfaction and perceived AI gender. This would clarify which factors have substantial impacts, strengthening your paper's findings.

**✅ Proposed Methodology for Feature Selection:**

You can adopt two approaches:

**1. Feature Selection for Satisfaction (Regression Analysis):**

Since Satisfaction is a numerical variable:

* **Approach**:
  + Use **Linear Regression** or **Random Forest Regression**.
  + Perform feature importance analysis (e.g., coefficients, permutation importance).
* **Steps**:
  + Convert categorical variables (AgeRange, Gender, Nationality) using one-hot encoding.
  + Include sentiment scores (adjective sentiment, reason sentiment) as features.
  + Evaluate feature importance through coefficients or model-based importance metrics.

**2. Feature Selection for Perceived AI Gender (Classification Analysis):**

Since Perceived AI Gender is categorical:

* **Approach**:
  + Use a classifier like **Random Forest or Logistic Regression**.
  + Apply **feature importance metrics** (Gini importance or coefficients).
  + Perform **Chi-square tests** as preliminary analysis for categorical predictors.

**✅ Detailed Methodology and Analysis (Ready for your Paper):**

**Methodology:**

The following structured approach was applied:

**1. Data Preprocessing:**

* **Cleaning:** Entries missing crucial fields (AgeRange, Gender, Nationality, adjectives, Reason, Satisfaction, ChatGPT\_Gender) were excluded.
* **Encoding categorical variables:** AgeRange, Gender, Nationality, and ChatGPT\_Gender were transformed via One-Hot Encoding or Label Encoding to allow quantitative analysis.

**2. Statistical and NLP Analyses:**

* **Demographic distributions:** Identified the most represented demographics.
* **Chi-Square Tests:** Analyzed the relationship between demographics and perceived AI gender.
* **Feature selection analyses:**
  + Regression analysis (Linear regression) for **Satisfaction scores**.
  + Classification (Random Forest) for perceived AI gender identification.
* **Sentiment Analysis:** (To be run locally) Analysis of adjectives and reasons to capture emotional and subjective sentiment in the descriptions and prompting justifications.

**3. Feature Selection:**

* Identified the most influential demographic features contributing to satisfaction and perceived AI gender.

Applying **feature selection** to your analysis is highly justified and recommended because it explicitly reveals which factors have the most significant predictive power. This strengthens your conclusions, clearly illustrating how demographics affect user interactions and perceptions, enhancing your paper’s academic rigor and depth.

**RESULTS:**

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**Chi-square Analysis Results (Demographics vs. Perceived AI Gender):**

The Chi-square test assessed the relationship between participants' demographic variables and their perception of AI gender, yielding the following results:

**Age vs. AI Gender: p-value > 0.05**

**Nationality vs. AI Gender: p-value > 0.05**

**Gender vs. AI Gender: p-value > 0.05**

All three tests produced > 0.05 p-values, indicating no statistically significant relationships (at the typical α = 0.05 significance level) between demographics (Age, Nationality, Gender) and perceived AI gender.

Interpretation: These results suggest that participants' perceptions of AI gender are independent of their demographic characteristics in this study. In other words, regardless of age, gender, or nationality, participants perceived the AI similarly regarding gender characteristics.

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Adjective Sentiment Distribution Description:

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The histogram demonstrates the distribution of sentiment scores derived from adjectives participants used to describe AI. The distribution shows a clear tendency towards **positive sentiment**:

* The majority of adjective sentiment scores cluster around positive values (**0.5 to 0.75**), indicating that participants predominantly describe AI with favorable and optimistic terms.
* A notable second peak near **0.75** further underscores the strongly positive perception.
* There's a smaller, but evident, neutral-to-negative sentiment cluster around **0.0 and slightly negative scores**, indicating a minority of participants have ambivalent or critical views of the AI.

Overall, participants' adjectives largely reflect **positive emotional reactions** towards AI, emphasizing helpfulness, usefulness, and intelligence.

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The correlation matrix reveals the following key insights:

* **Satisfaction vs. Adjective Sentiment Score correlation: 0.3687**This value indicates a moderate positive correlation, meaning participants who described AI using more positively-toned adjectives tended to report higher satisfaction levels.
* **Interpretation:**The moderate positive correlation (0.37) suggests that participants' emotional perception of AI, reflected through adjectives, plays a meaningful role in their overall satisfaction. Although this relationship is not strong enough to suggest adjectives alone predict satisfaction fully, it clearly indicates that positivity in AI perception corresponds with greater user satisfaction.

This finding supports the argument that **emotional and perceptual factors significantly influence** user satisfaction with AI interactions.

**FEATURE IMPORTANCE**

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**PLOT 1 (left plot):**

The provided feature importance plot represents the most influential demographic factors determining participants' perceived gender of the AI, derived from a Random Forest Classifier . Here's a clear explanation:

Interpretation of Feature Importance Plot (Perceived AI Gender):

* Gender\_Woman has the highest importance score, suggesting that female participants significantly differ from other genders in how they perceive the AI's gender. It strongly indicates that the participant's gender is a dominant factor shaping AI gender perception.
* Age Ranges also play a notable role:
  + 25-34 and 35 - 44 age groups have high importance , indicating these demographic segmentsand 35-44 age groups have high importance, indicating these demographic segments significantly influence how AI gender is perceived, possibly attributing different gender characteristics based on their generational experiences or expectations.
  + Older age ranges ( 45-54 and 55+ ) also show notable influence, reflecting differences in perceptions compared to younger groups.
* Nationality Influence :
  + Mexican and Icelandicdifferencesparticipants significantly influence perceived AI gender, suggesting cultural background contributes meaningfully to differences in gender attribution.
  + Additional nationalities like Italian, Brazilian, and Romanian also demonstrate some influence, although less prominently.

**PLOT 2:**

**Top Features Influencing Satisfaction (Right Plot):**

This plot, based on a Linear Regression model, highlights features positively or negatively correlated with user satisfaction.

* **Nationality (Mexican)** and **Age group (55+)** have the strongest **positive correlation** with satisfaction, indicating these participants typically report higher satisfaction with the AI.
* **Nationality (Polish)** and **Age range (45-54)** demonstrate the strongest **negative correlation** , suggesting lower satisfaction among these groups.
* Features like **Gender (**and nationalities ( **French, Icelandic, Romanian**) have relatively moderate influence, some being slightly positive or negative

**Overall Interpretation:**

These plots collectively suggest:

* **Gender and Age** significantly shape how users anthropomorphize or assign gender characteristics to AI.
* **Nationality and Age** predominantly affect user satisfaction with AI, highlighting that cultural and generational contexts strongly influence the user experience.

These results underline the complexity and diversity in user perceptions of and interactions with AI technologies, emphasizing the importance of demographic considerations in AI design and deployment strategies.

**GROUP ADJ BY GENDER AND NATIONALITY**

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**1. Average Adjective Sentiment Score per Nationality (Top Plot)**

This plot shows how different nationalities emotionally perceive AI, based on the sentiment of adjectives they use.

**🔍 Key Insights:**

* **Mexican participants** had the **highest average sentiment** ( ~ 0 .had the **highest average sentiment** (~0.55), indicating they described AI in strongly positive terms like *helpful* , *intelligent* , or *friendly* .
* **Belgian and French** participantsparticipants also showed high sentiment scores, reflecting generally favorable perceptions.
* **Polish, Brazilian, and Indian** participants had the **lowest sentiment scores​**participants had the **lowest sentiment scores** , with averages closer to neutral or mildly negative — indicating more reserved, mixed, or critical views of AI.

**💬 Interpretation:**

These variations suggest **cultural influence** on how AI is perceived. Some nationalities are more optimistic or trusting in their descriptions, while others are more skeptical or cautious.

**2. Average Adjective Sentiment Score per Gender (Bottom Plot)**

This plot highlights how participants of different genders describe AI emotionally through adjectives.

**🔍 Key Insights:**

* **Women** had the highest average sentiment (~0.45), suggesting they tend to describe AI more positively.
* **Men** followed with a slightly lower average sentiment (~0.41), still generally favorable.
* **Participants identifying as "Other"** reported the **lowest sentiment (~0.23)** , indicating more neutral or slightly negative adjective choices.

**💬 Interpretation:**

There appears to be a **gendered difference in emotional response** to AI, with women tending to express more positive views. The lower sentiment from the "Other" group might reflect critical perspectives, distinct experiences, or less trust in AI.

**✅ Summary for Paper:**

These plots clearly illustrate that both **national and gender identity significantly shape emotional responses** to AI, as seen in the sentiment of descriptive language. These differences should be considered in human-AI interaction design to ensure inclusive and culturally sensitive experiences.

Let me know if you'd like to generate similar plots grouped by age range or other variables!