**Mobile Usage and Visual Search Analysis**

**Project Description**

**Overview**

This project investigates the relationship between high mobile usage and the speed of visual search target identification, considering interactions with other independent variables (IVs) such as gender and age. The study is driven by the hypothesis that increased mobile phone use reduces the time to find a target in visual searches, particularly among younger users.

**Mathematics and Statistics**

To analyze the data, Two-Way ANOVA and Kruskal-Wallis tests were applied to uncover any significant effects of the independent variables on the dependent variable, which is the time taken to identify a visual target. Additional tests such as the Shapiro-Wilk test, histograms, Q-Q plots, and variance ratio checks were used to assess normality and variance homogeneity.

**Implementation**

The analysis was conducted using Python in Google Colab, employing libraries like Pandas for data handling, Seaborn and Matplotlib for visualization, and SciPy and Statsmodels for statistical testing. Data transformations, such as log transformation, were used to meet the assumptions necessary for ANOVA.

**Outcomes**

The findings revealed significant differences in reaction times across different age groups via Kruskal-Wallis tests. However, daily average mobile usage did not significantly influence these times. Further post-hoc analysis with Bonferroni correction highlighted notable differences between all age groups. Despite initial expectations, the ANOVA on ranked data, adapted for the non-normal distribution of the data, did not show any significant main or interaction effects.

**Challenges and Resolutions**

A major challenge was the non-normality of the data. This was addressed by implementing log transformation and resorting to non-parametric tests like Kruskal-Wallis, as well as using the Aligned Rank Transform for ANOVA.

**Data Sources**

* **Primary Data:** Collected from surveys on mobile usage and visual search tasks.

**Installation and Usage**

1. **Clone the repository:**

bash

Copy code

git clone https://github.com/yourusername/Mobile-Usage-Visual-Search-Analysis.git

cd Mobile-Usage-Visual-Search-Analysis

1. **Set up the environment:**
   * Create and activate a virtual environment:

bash

Copy code

python -m venv venv

source venv/bin/activate # On Windows use `venv\Scripts\activate`

1. **Install the required dependencies:**

bash

Copy code

pip install -r requirements.txt

1. **Run the Jupyter Notebook:**

bash

Copy code

jupyter notebook ELEMENT\_1\_TASK\_1.ipynb

**Contributing**

We welcome contributions to improve this project. To contribute, please follow these steps:

1. Fork the repository.
2. Create a new branch (git checkout -b feature-branch).
3. Make your changes and commit them (git commit -m 'Add new feature').
4. Push to the branch (git push origin feature-branch).
5. Create a new Pull Request.

**License**

This project is licensed under the MIT License. See the LICENSE file for details.

**Contact**

For any questions or feedback, please contact:

* **Emmanuel Nwonye**
* Email: e.nwonye0320231@arts.ac.uk
* LinkedIn: [linkedin.com/in/emmanuel-nwonye-40a024183](https://www.linkedin.com/in/emmanuel-nwonye-40a024183/)