AB Testing: Comparison of Maximum Bidding vs Average Bidding

This project contains the statistical analysis of an **A/B test** conducted to compare the **Maximum Bidding** and **Average Bidding** methods used in Facebook advertising.

📌Project Purpose

The goal is to determine whether there is a statistically significant difference between the **Purchase** averages of the **test group (Average Bidding)** and the **control group (Maximum Bidding)** after a one-month A/B test.

Purchase is the primary success metric for bombabomba.com, so all analyses focus on this metric.

📂Dataset

The dataset is provided in `ab_testing.xlsx` with two separate sheets: - **Control Group** – Maximum Bidding - **Test Group** – Average Bidding

Variables: - **Impression** – Number of ad impressions - **Click** – Number of ad clicks - **Purchase** – Number of purchases after clicking the ad - **Earning** – Revenue earned from purchases

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🧪Methods Used

The following statistical tests were applied:

1. Normality Tests (Shapiro-Wilk)

- Both groups: $p > 0.05$ → **Normal distribution assumption satisfied.**

2. Variance Homogeneity (Levene Test)

- $p > 0.05$ → **Variances are homogeneous.**

3. Independent Samples T-Test

A parametric test was used because assumptions were met.

- **H0:** No difference between the mean Purchase values of the two groups.
- **p-value = 0.3493 > 0.05**
- **H0 cannot be rejected.**

Conclusion: Average Bidding does not provide a statistically significant improvement over Maximum Bidding.

📊Results & Recommendations

🔧No statistically significant difference in average purchases.

🔧Average Bidding performs at least as well as Maximum Bidding.

Recommendations

- If Average Bidding offers operational or cost advantages, it may still be preferred.
- Additional A/B tests can be conducted for different user segments (e.g., new users, device types).
- Additional metrics such as CTR or Earning can be analyzed for a broader view.

🗜️Libraries Used

```
pandas
numpy
matplotlib
scipy.stats
```

📦File Structure

```
├── ab_testing.py / ipynb
├── ab_testing.xlsx
└── README.md
```

🏷️Badges

Python Status License

🔧Installation & Usage

✂️Clone the repository

```
git clone https://github.com/yourusername/ab-testing-bidding-methods.git
cd ab-testing-bidding-methods
```

✒️(Optional) Create a virtual environment

```
python -m venv venv
source venv/bin/activate   # MacOS / Linux
venv/Scripts/activate      # Windows
```

🛏️Install required libraries

```
pip install -r requirements.txt
```

🚀Run the script or notebook

```
python ab_testing.py
```

Or open the `.ipynb` file in Jupyter Notebook.

📜License

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📧Contact

Feel free to reach out for questions or suggestions.