**Congratulations on clearing the Quiz Assessment Round.**

**Step 1**: Please review the problem statement shared below,

**Problem Statement: AI-Driven Media Investment Plan Across Channels for E-commerce**

**Introduction:**

Welcome to our Hackathon! This event challenges you to develop an AI-driven media

investment plan for e-commerce businesses. Your task is to re-allocate the budget across

various paid media channels to optimize customer acquisition and conversion rates. By

analyzing the performance of each channel throughout different phases of the customer

journey, you will use machine learning to identify trends and patterns. Based on this analysis,

you will allocate the budget to various paid media channels to maximize conversion.

**Why This Solution Needs to Be Built:**

In the ever-evolving landscape of digital marketing, e-commerce businesses must continually

optimize their media investments to stay competitive. Understanding how different ad channels

perform at various stages of the customer journey is crucial for effective budget allocation. An

AI-driven solution can provide deeper insights into customer behavior, allowing businesses to

make data-driven decisions that enhance customer acquisition and increase conversion rates.

This, in turn, will lead to improved ROI on marketing spend and higher revenue.

**Challenge Description:**

Your mission is to create a solution that achieves the following:

1. Analyze Customer Journey Data:

* Collect and process data related to customer interactions across various channels. This data will include customer IDs, channel sources (e.g., google-paid, google-organic, paid-meta, email, direct, etc.), ad campaign types, timestamps and the type (e.g., purchase, landing) of each touchpoint.

1. Analyze Ad Spend Data:

* Analyze data on ad spend, which includes the date, channel, campaign type, amount spent, impressions, clicks, conversion, and revenue.

1. Use Machine Learning to Identify Trends and Patterns:

* Apply machine learning techniques to identify trends and patterns in how different channels perform at different stages of the customer journey.
* Identify the influence of various channels in the downstream path of the customer journey.
* Understand which channels are most effective for starting conversion journey and which are best for closing conversions.

1. Allocate Budgets Based on Insights:

* Based on the analysis, create a media investment plan that reallocates budgets across various channels to maximize customer acquisition and conversion rates.
* The goal is to optimize ad spend to achieve the maximum conversions.

**Constraints:**

* Total Allocated budget: $200,000
* All paid media channels should have at least 10% of the total allocated budget
* All campaign types under each paid media channel should have some budget allocation.

**Deliverables:**

Participants are required to submit the following:

1. Working Prototype:

* A functional prototype of the AI-driven media investment plan solution that demonstrates its ability to ingest, analyze, and reallocate budgets based on customer journey, channel influence, and conversion data.
* The expected output should include cumulated budgets and estimated conversions for each paid channel and their campaign types for next 30 days.

1. Detailed Documentation on the Process:

* A comprehensive guide detailing how the tool works, including the methodologies and algorithms used for analysis and budget allocation,
* This should cover data ingestion, data preprocessing, machine learning models used, and budget reallocation logic.

1. Detailed Documentation on the Tech Stack:

* Information about the technologies and tools used in developing the prototype, including any libraries, frameworks, and programming languages.
* This should also include installation and setup instructions for replicating the development environment.

**Evaluation Criteria:**

The submissions will be evaluated based on the following criteria:

1. Functionality:

* How effectively the tool ingests, analyzes data, and reallocates budgets.
* The completeness and correctness of the features implemented.

1. Accuracy:

* The precision of the machine learning models in identifying trends and patterns.
* The accuracy of budget allocation is based on the insights derived from the data.

1. Usability:

* The ease of use and user-friendliness of the tool.
* The quality of the user interface and user experience.

1. Impact on ROI and Revenue:

* How well the reallocated budgets improve customer acquisition, conversion rates, and overall revenue.

1. Documentation Quality:

* The clarity, detail, and comprehensiveness of the provided documentation.
* The ease with which another developer can understand and use the tool based on the documentation.

We will test your tool with different datasets to verify its performance and determine the winner.

**Data Set Resource**

* Link:<https://drive.google.com/file/d/1dqqremJs1mAaWzZrd5cbElBcqAXsfvoY/view?usp=sharing>

**Step 2:** Submit your solution based on the below mentioned format and instructions

**Submission Format:**

1. Submission File:

* **Format**: Jupyter Notebook (.ipynb) or Google Colab (.ipynb)
* **Filename**: teamname\_projectname.ipynb

1. Documentation:

* Introduction:
  + Brief overview of the problem and the solution approach.
* Libraries and Versions
  + List all libraries used along with their versions.

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| --- |
| # Libraries Used %pip install pandas==1.3.3 %pip install scikit-learn==0.24.2 |

* Input Section
  + New Budget as Input
  + Select and read one dataset
* Approach and Methodology

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| ### Approach and Methodology  \*\*Data Processing\*\*: Describe any data cleaning and preprocessing steps taken with the input data.  \*\*Algorithm\*\*: Explain the algorithm used for budget allocation, including any mathematical formulas, logic or ML Model.  \*\*Assumptions\*\*: List any assumptions made during the process. |

* Algorithm Implementation:
  + Code implementation of the data cleaning, preprocessing, and algorithm.
* Results:
  + Present the results obtained from the algorithm, including any visualizations or tables if necessary.

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| ### Results  \*\*Input\*\*: 1000 USD  \*\*Output\*\*:  - Facebook: 400 USD  - Google Ads: 300 USD  - Bing/Microsoft Ads: 300 USD  #### Visualizations ![Bar Chart of Budget Allocation](path\_to\_chart.png) |

* Conclusion
  + Summarize the findings and potential improvements or future work.
* References
  + List any references or sources used.

**Submission Instructions:**

1. Ensure the notebook runs without errors from start to finish.
2. Upload the completed notebook to Mettl.
3. Include any additional files (e.g., images for visualizations) if necessary.

All deliverables must be submitted via the Mettl platform comprising all the required documents and code in the zipped file format.

**Note:**

Participants are allowed to make multiple submissions throughout the hackathon period. However, once the submission deadline has passed, only the latest submitted version of your project will be considered for evaluation by the judges.

Please ensure that your final submission is complete and represents your best work, as it will be the only version reviewed for judging and prize consideration.

We are excited to see the innovative solutions you come up with and wish you the best of luck in this Hackathon!