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# **Technical Document: API-Driven Data Processing Pipeline**

## **Introduction**

This document provides an in-depth explanation of a Python script designed to interact with a set of APIs for data processing. The script focuses on three primary operations: imputing missing values, verifying the existence of a specific date column, and converting the format of the identified date column to a standardized datetime format. These operations are facilitated through API calls, leveraging the power of external services for data refinement.

## **Problem Statement**

* **Handling Missing Data**: Efficiently impute missing values in datasets to ensure data integrity and quality.
* **Data Standardization**: Verify the presence of critical date columns and standardize their formats to facilitate seamless data analysis and processing.
* **Integration with External Services**: Seamlessly interact with APIs to leverage specialized data processing capabilities.

## **Solution Approach**

* **API-Driven Architecture**: Utilize external APIs for missing value imputation, date column verification, and date format conversion.
* **Modular Programming**: Implement each functionality as a separate, reusable function to enhance maintainability and scalability.
* **Error Handling and Logging**: Incorporate robust error handling mechanisms to ensure the script's reliability and provide insightful logs for debugging purposes.

## **Functionality of Code**

### 1. **get\_api\_response(endpoint, data=None)**

* **Purpose**: Fetches API response for the given endpoint.
* **Parameters**:
* endpoint: API endpoint URL.
* data: Optional data to be sent with the request.
* **Returns**: API response in JSON format.

### 2. **impute\_missing\_values(dataset)**

* **Purpose**: Imputes missing values in the dataset using the API.
* **Parameters**:
* dataset: Input dataset (Pandas DataFrame).
* **Returns**: Dataset with imputed missing values (Pandas DataFrame).

### 3. **verify\_date\_column(dataset, date\_column\_name)**

* **Purpose**: Verifies the presence of a designated date column in the dataset via API.
* **Parameters**:
* dataset: Input dataset (Pandas DataFrame).
* date\_column\_name: Name of the date column to verify.
* **Returns**: Boolean indicating the existence of the date column.

### 4. **convert\_date\_format(dataset, date\_column\_name)**

* **Purpose**: Converts the identified date column to a standardized datetime format using the API.
* **Parameters**:
* dataset: Input dataset (Pandas DataFrame).
* date\_column\_name: Name of the date column to convert.
* **Returns**: Dataset with the date column converted to the standard format (Pandas DataFrame).

## **Input and Output Format**

* **Inputs**:
* **Dataset**: Pandas DataFrame
* **Date Column Name**: String
* **Outputs**:
* **Processed Dataset**: Pandas DataFrame
* **Verification Result**: Boolean

## **Conclusion**

This script effectively demonstrates a structured approach to leveraging external APIs for enhancing data quality and standardization. By modularizing each functionality and incorporating robust error handling, the script ensures scalability, maintainability, and reliability. This solution can be seamlessly integrated into larger data processing pipelines, contributing to more accurate and efficient data analysis workflows.

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