

Hydration Essentials: Classifying Water Bottle Images

Milestone1: Project Initialization and Planning Phase

"Hydration Essentials: Classifying Water Bottle Images" is a project that uses computer vision and machine learning techniques to classify images of water bottles into different categories based on their features and characteristics. The project aims to streamline and automate the process of categorizing water bottles for e-commerce platforms, inventory management, and quality control purposes. By training a model on a diverse dataset of water bottle images, including variations in size, shape, material, and color, the project can quickly and accurately classify new images, providing valuable insights for manufacturers, retailers, and consumers.

Activity1: Define Problem Statement

Problem Statement: The manual classification of water bottle images in our project is a time-consuming and physically exhausting task. This process requires significant human effort to inspect, categorize, and label each image accurately. As a result, productivity is hindered, and the repetitive nature of the task leads to physical fatigue. To enhance efficiency and reduce the physical strain on team members, an automated solution for classifying water bottle images is needed. This solution should leverage advanced image recognition and machine learning techniques to accurately and swiftly classify images, thereby streamlining the workflow and alleviating the burden of manual classification.

Ref.template: <https://github.com/RajivDalal/hydration-essentials/blob/main/1%20-%20Project%20Initialization%20and%20Planning%20phase/Define%20Problem%20Statements.pdf>

Activity2: Project Proposal (Proposed Solution)

The proposed project, "Hydration Essentials: Classifying Water Bottle Images," aims to leverage deep learning for more accurate applicant credibility predictions. We will be able to know fundamental concepts and techniques of Convolutional Neural Networks and gain a broad understanding of image data. Learning how to preprocess/clean the data using different data preprocessing techniques and how to build a web application using the Flask framework.

Ref.template: [https://github.com/RajivDalal/hydration-essentials/blob/main/1%20-%20Project%20Initialization%20and%20Planning%20phase/Project%20Proposal%20\(Proposed%20Solution\)%20report.pdf](https://github.com/RajivDalal/hydration-essentials/blob/main/1%20-%20Project%20Initialization%20and%20Planning%20phase/Project%20Proposal%20(Proposed%20Solution)%20report.pdf)

Activity3: Initial Project Planning

Initial project planning involves outlining key objectives, defining scope, and identifying different water bottle images. It encompasses setting timelines, allocating resources, and determining the overall project strategy. During this phase, the team establishes a clear understanding of the dataset, formulates goals for analysis, and plans the workflow for data processing. Effective initial planning lays the foundation for a systematic and well-executed project, ensuring successful outcomes.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/1%20-%20Project%20Initialization%20and%20Planning%20phase/Project%20Planning.pdf>

Milestone2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase involves executing a plan together by using data from Kaggle, ensuring data quality through verification and addressing missing values. Preprocessing tasks include cleaning, encoding, and organizing the dataset for subsequent exploratory analysis and machine learning model development.

Activity1: Data Collection Plan, Raw Data Sources Identified, Data Quality Report

The dataset for "Hydration Essentials: Classifying Water Bottle Images" is sourced from Kaggle. It includes images of different water levels in bottles. Data quality is ensured through thorough verification, addressing missing values, and maintaining adherence to ethical guidelines, establishing a reliable foundation for predictive modeling.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/2%20-%20Data%20Collection%20and%20Preprocessing%20Phase/Raw%20Data%20Sources%20And%20Data%20Quality%20Report.pdf>

Activity2: Data Quality Report

The dataset for "Hydration Essentials: Classifying Water Bottle Images" is sourced from Kaggle. It includes images of different water levels in bottles. Data quality is ensured through thorough verification, addressing missing values, and maintaining adherence to ethical guidelines, establishing a reliable foundation for predictive modeling.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/2%20-%20Data%20Collection%20and%20Preprocessing%20Phase/Data%20Quality%20Report%20template.pdf>

Activity3: Data Exploration and Preprocessing

Data Exploration involves analyzing the pictures of water bottles to understand levels. Preprocessing includes handling missing values, scaling, and encoding categorical variables. These crucial steps enhance data quality, ensuring the reliability and effectiveness of subsequent analyses.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/2%20-%20Data%20Collection%20and%20Preprocessing%20Phase/Data%20Preprocessing%20template.pdf>

Milestone3: Model Development Phase

The Model Development Phase entails crafting a predictive model for images of different water levels in bottles. It encompasses strategic feature selection, evaluating and selecting models (CNN with batch normalization and Adam, CNN with Adam optimizer and 2 fully connected layers, CNN with Adam optimizer, CNN with SGD), initiating training with code, and rigorously validating and assessing model performance for informed decision-making in the lending process.

Activity1:Model Selection Report

The Model Selection Report details the rationale behind choosing CNN (batch normalization and

adam), CNN (adam optimizer 2 fully connected layers), CNN (with optimizer adam), and CNN (with SGD). It considers each model's strengths in handling complex relationships, interpretability, adaptability, and overall predictive performance, ensuring an informed choice aligned with project objectives.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/3%20-%20Model%20Development%20Phase/Model%20Selection%20Report%20template.pdf>

Activity2: Initial Model Training Code, Model Validation and Evaluation Report

The Initial Model Training Code employs selected algorithms on the loan approval dataset, setting the foundation for predictive modeling. The subsequent Model Validation and Evaluation Report rigorously assesses model performance, employing metrics like accuracy and precision to ensure reliability and effectiveness in predicting loan outcomes.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/3%20-%20Model%20Development%20Phase/Initial%20Model%20Training%20Code%2C%20Model%20Validation%20and%20Evaluation%20Report.pdf>

Milestone4: Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining deep learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Ref.template:<https://github.com/RajivDalal/hydration-essentials/blob/main/4%20-%20Model%20Optimization%20and%20Tuning%20Phase/Model%20Optimization%20and%20Tuning%20Phase%20Template.pdf>

Milestone5:Project Files Submission and Documentation

For project file submission in GitHub, kindly click the link and refer to the flow. For the documentation, kindly refer to the link.

Ref.Template:<https://github.com/RajivDalal/hydration-essentials/tree/main/5%20-%20Project%20Executable%20Files>

Milestone6: Project Demonstration

In the upcoming module called Project Demonstration, individuals will be required to record a video by sharing their screens. They will need to explain their project and demonstrate its execution during the presentation.

Drive Link:

https://drive.google.com/file/d/1ttZVHR8l7EeXGIVVDtrePknueddHFC3G/view?usp=drive_link