

DM Project by Krishaang Anand

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Project Title: Image Classification and Preservation of Traditional Uttarakhand Dishes

1. Introduction

This Data Mining (DM) project was undertaken with the core objective of preserving and promoting the rich culinary heritage of Uttarakhand. Traditional dishes from the region are slowly losing visibility due to modern food trends and limited digital documentation. Through this project, an effort was made to create a structured digital archive of these dishes using image classification techniques, ensuring that these culturally significant recipes are recognized, documented, and preserved for future generations.

2. Objective of the Project

The primary goals of this project were:

- To preserve traditional Uttarakhand dishes in digital format.
- To create an organized dataset that acts as a visual archive of these dishes.
- To apply image-based machine learning to classify and recognize different Uttarakhand dishes.
- To promote awareness of local cuisine through technology-driven documentation.

3. Data Collection

One of the major challenges faced during the project was the scarcity of authentic and high-quality images of traditional Uttarakhand dishes available online. These dishes are mostly prepared in rural households and small local eateries, making them underrepresented on mainstream platforms.

To overcome this limitation, a significant number of dishes were sourced from a local Uttarakhand restaurant, Hotel Bhanu Palace, which provided authentic references to regional cuisine. These dishes were photographed and included in the dataset for model training.

4. Image Augmentation and Dataset Expansion

Due to the limited number of original images, image augmentation techniques were implemented to artificially expand the dataset. These variations included:

- Rotation
- Zooming

- Shifting
- Flipping

This helped improve the model's generalization and increased its accuracy by exposing it to multiple variations of each dish under different visual conditions.

5. Model Development

A Convolutional Neural Network (CNN) model based on MobileNetV2 architecture was used for image classification. The model was trained on 20 different Uttarakhand dishes and was optimized for efficiency and accuracy.

The training process included:

- Splitting data into training and validation sets
- Using data generators for real-time augmentation
- Monitoring accuracy and loss across epochs

6. Challenges Faced

Some of the key problems faced during the project included:

- Difficulty in finding authentic image data for local dishes
- Imbalanced image distribution across classes
- High computational time due to large datasets
- Overfitting risks due to limited original images

7. Outcomes

The final model successfully classified Uttarakhand dishes with reasonable accuracy and demonstrated the effectiveness of using machine learning for cultural preservation. The dataset now functions as a digital archive for traditional cuisine.

8. Future Scope

There are several opportunities to further enhance this project:

- Integration of a mobile application for dish recognition
- Adding recipe descriptions and nutritional data
- Expanding the dataset to include more regional cuisines
- Real-time food recognition using camera input
- Collaboration with local tourism boards for culinary promotion

9. Conclusion

This project showcases the intersection of technology and cultural preservation. By

leveraging data mining and machine learning, traditional Uttarakhand dishes have been systematically archived and digitally safeguarded. This not only promotes awareness but also ensures that regional culinary heritage is not lost in the rapidly modernizing world.

Overall, this project stands as a meaningful initiative towards preserving Uttarakhand's food culture while applying practical machine learning concepts.