

Team Member

Zhou Ziqi: 负责项目整体讲解、方法说明与结果展示, 数据集收集整理

Wu RenYu: 负责模型训练、性能评估与可视化分析。



Cracking the Code: A Lightweight Classifier for Understanding Meme-Driven Narratives

A Technical Showcase on Classifying Meme Templates
Using Transfer Learning with MobileNetV2

Memes Are the New High-Speed Narrative Battleground



Speed & Scale

Mememes serve as powerful narrative tools. They propagate faster than text on platforms such as Twitter (X), shaping cultural consensus.



Market Impact

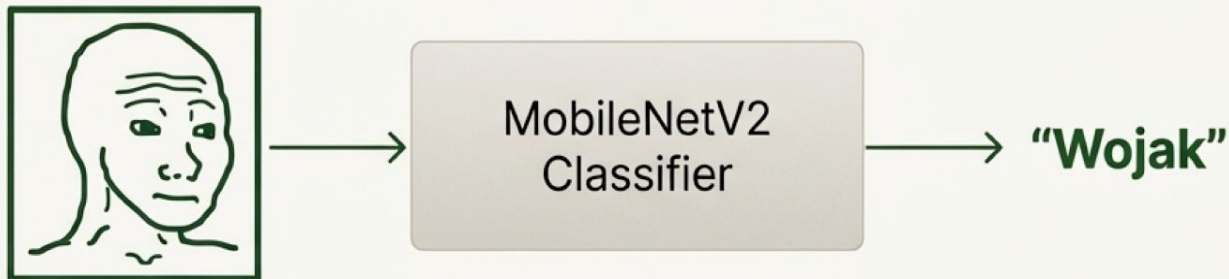
They play an essential role in shaping market sentiment, conveying opinions, and are particularly influential in domains like the crypto market.



The Analysis Gap

Their visual, symbolic, and rapidly evolving nature makes them incredibly difficult to track and analyze automatically, creating a critical need for new InfoOps tools.

Our Mission: Automating Meme Recognition at the Template Level



The Task

Given a meme image, classify it into one of several predefined meme template categories.

The Goal

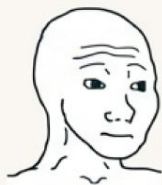
Design a **lightweight** yet **effective** image classifier for real-world, high-speed applications like Information Operation (InfoOps) pipelines.

The Targets: Focusing on Prevalent and Culturally Significant Meme Archetypes



Pepe

Versatile archetype used for a wide spectrum of expressions.



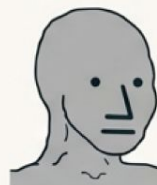
Wojak

Represents a wide range of emotions, often sorrow or melancholy.



Doge

Associated with ironic humor and the cryptocurrency community.



NPC

Symbolizes individuals who do not think for themselves.



Chad

Represents an idealized, often stoic or confident figure.



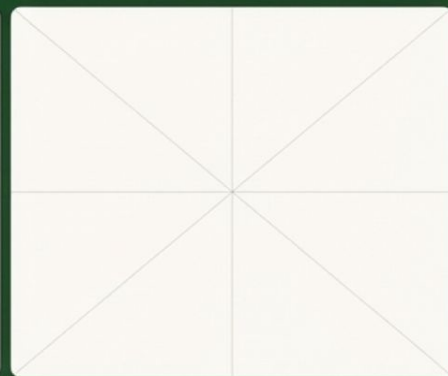
Bullish Meme

Conveys positive market sentiment and optimism.



Bearish Meme

Conveys negative market sentiment and pessimism.



Step 1: Building a Diverse, Curated Dataset for Robust Training

Sourcing Strategy

- Kaggle meme datasets
- Hugging Face (Pepe/Wojak datasets)
- Twitter (X) collected images
- Google Images scraping

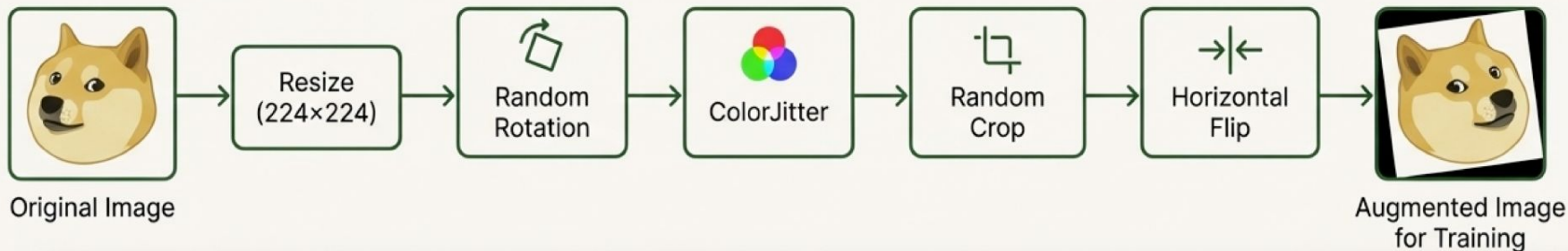
Dataset Snapshot

Classes: **7**

Images per Class: **50-100**

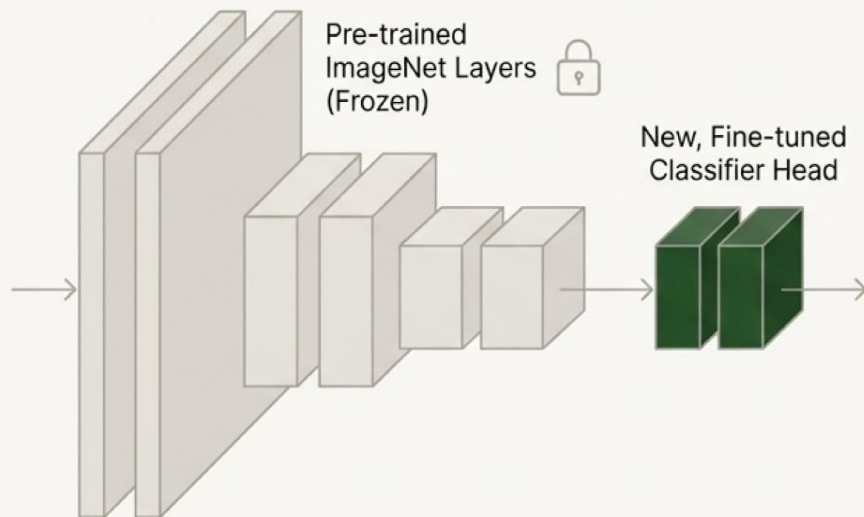
Total Images: **~800**

We augmented our small dataset to improve model generalization.



Step 2: Choosing Speed and Precision with MobileNetV2

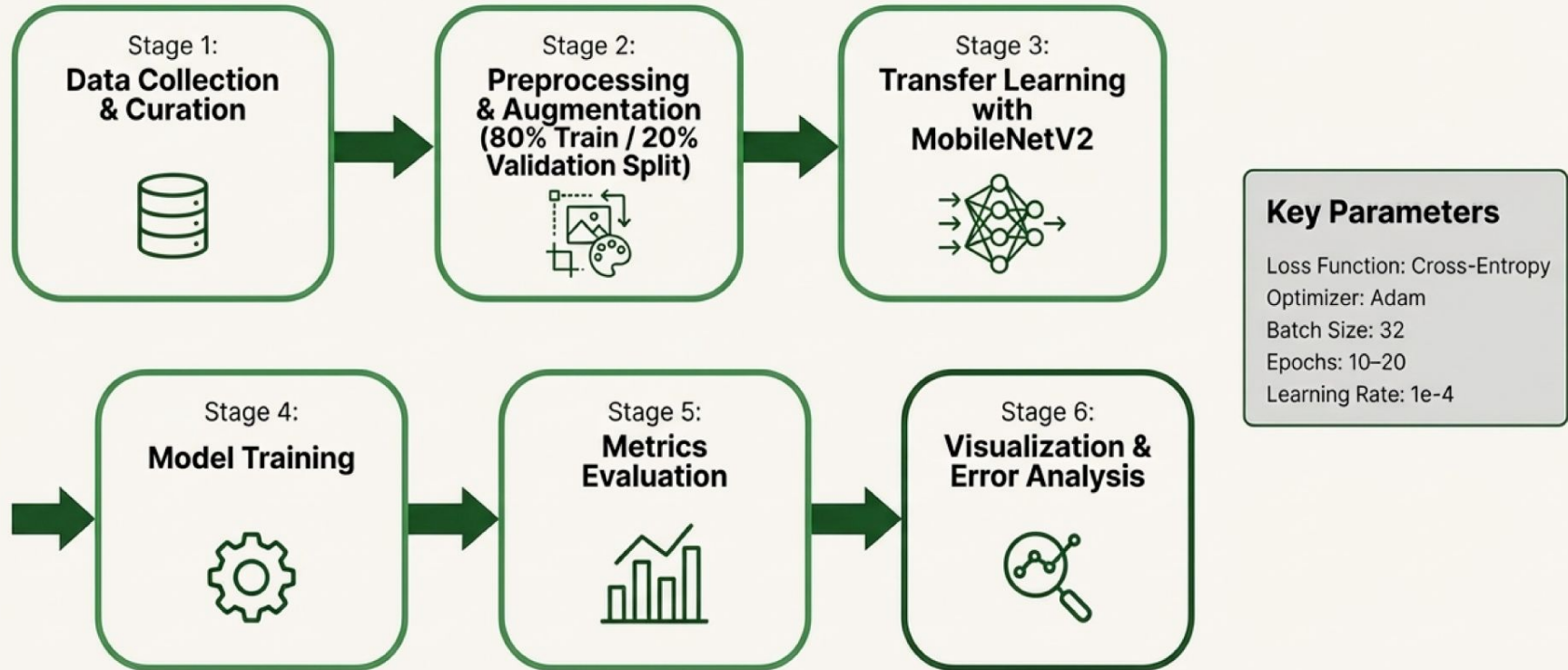
The 'What'



The 'Why'

- **Lightweight**
Ideal for fast training and deployment.
- **Effective**
Proven to perform well even on small, specialized datasets.
- **Transfer Learning Strategy**
We freeze the early feature-extraction layers and fine-tune only the final classifier head for our specific task.

Step 3: A Disciplined Pipeline from Data to Discovery

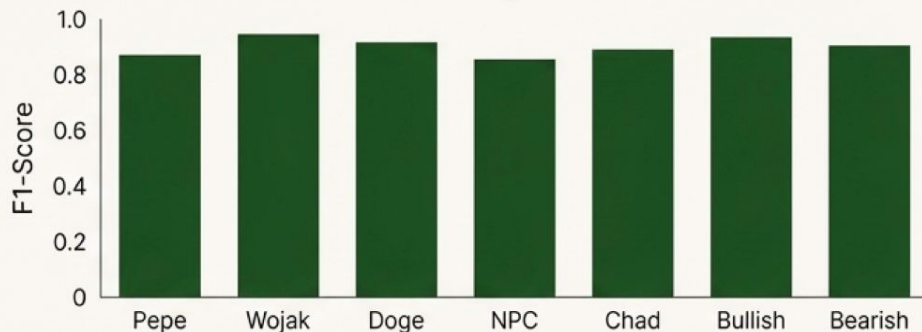


The Verdict: High Performance Achieved Within Expected Range

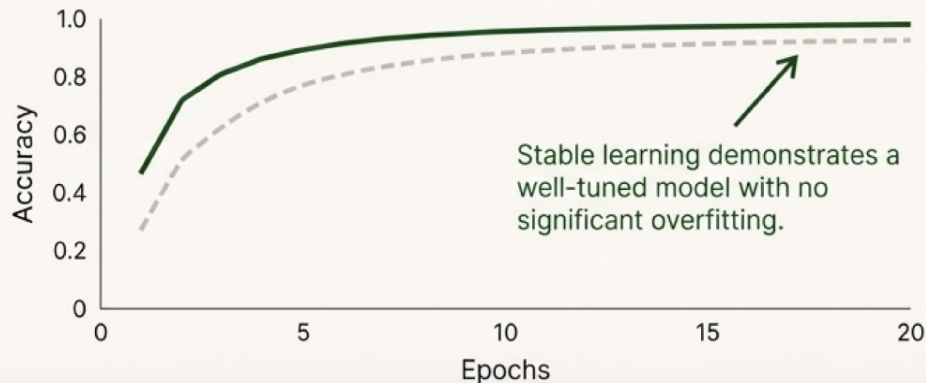
92%

Expected Accuracy
Achieved (85-95% Range)

F1-Score by Class



Model Learning Curves



Beyond Accuracy: Visualizing Model Behavior to Build Insight

Correct Predictions



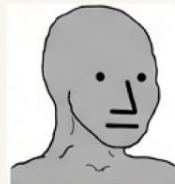
Predicted: **Pepe**



Predicted: **Chad**



Predicted: **Doge**



Predicted: **Wojak**

Error Analysis

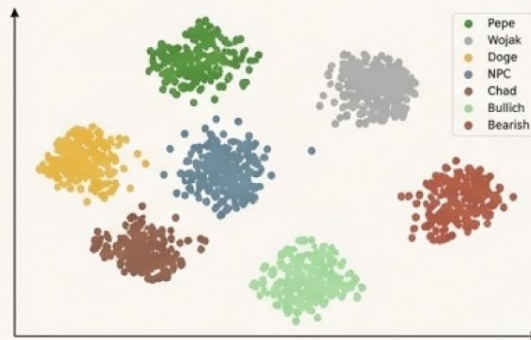
Example: Misclassified as 'Wojak,' likely due to shared simple line-art style with the true class, 'NPC'.

Confusion Matrix

Actual: Pepe	98.00	0.00	0.00	0.00	0.00	0.00	0.00
Wojak	0.00	97.38	0.00	0.00	0.00	0.00	0.00
Doge	0.00	0.00	90.00	0.00	0.00	0.00	0.00
NPC	0.00	7.57	0.00	10.00	0.00	0.00	0.00
Chad	0.00	0.00	0.00	0.00	97.00	0.00	0.00
Bullish	0.00	0.00	0.00	0.00	0.00	92.00	0.00
Bearish	0.00	0.00	0.00	0.00	0.00	0.00	20.00
Predicted: Pepe	Wojak	Doge	NPC	Chad	Bullish	Bearish	

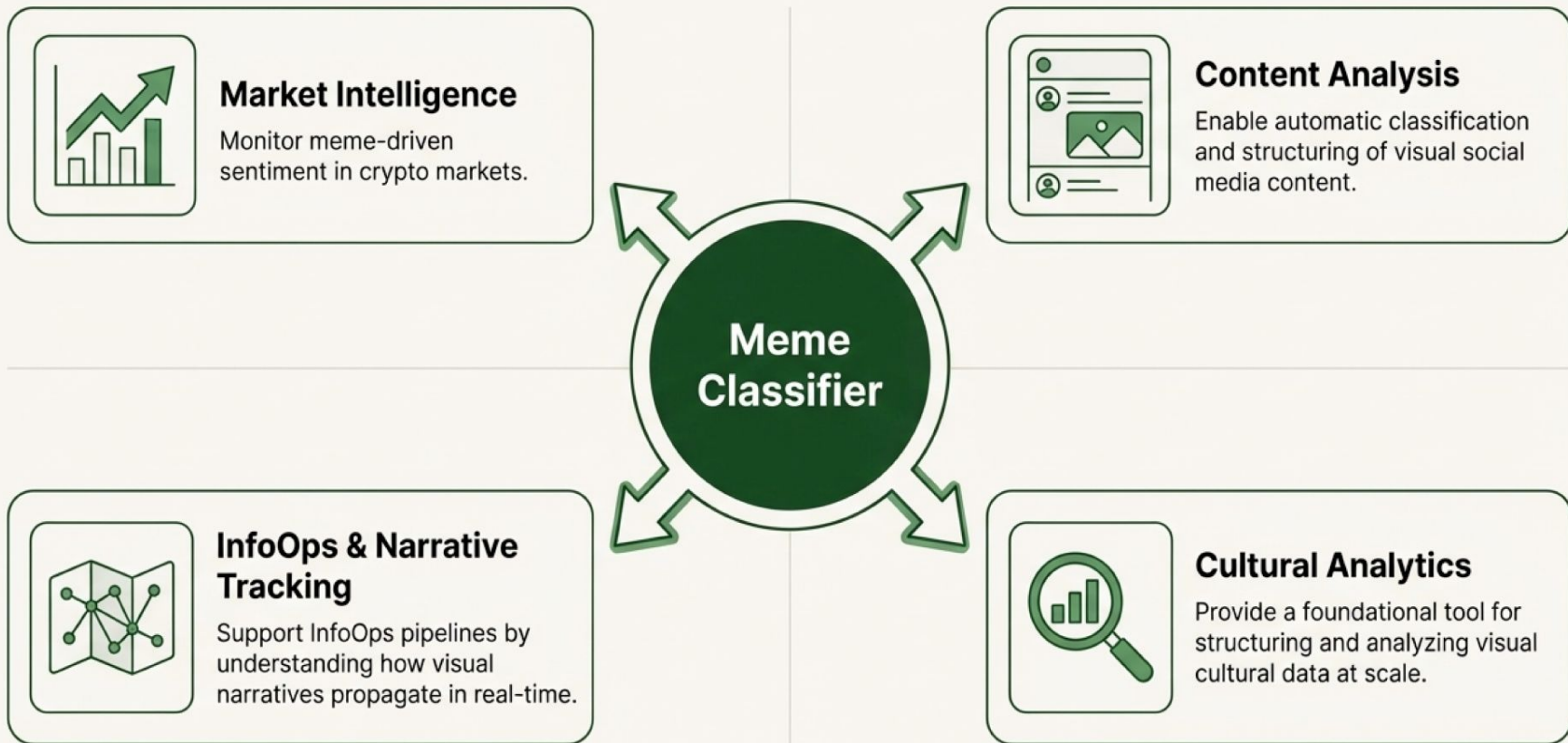
Highlights minor confusion between visually similar pairs like NPC and Wojak.

t-SNE Feature Embeddings



Learned feature embeddings show clear separation between most classes, validating the model's discriminative power.

A Core Component for Strategic Narrative Intelligence



A Simple, Powerful, and Validated Solution

- ✓ **Built:** A lightweight, high-accuracy meme template classifier achieving 85-95% accuracy.
- ✓ **Leveraged:** Transfer learning with MobileNetV2 on a small, augmented dataset of ~800 images.
- ✓ **Validated:** Model performance with a rigorous pipeline, including F1-scores, a confusion matrix, and feature embedding visualizations.

Future Work: From a Classifier to a Multi-Modal Analysis Engine

- **Expand Scope:** Incorporate more meme classes and nuanced sub-templates to increase classification granularity.
- **Integrate Modalities:** Combine the image classifier with text analysis for comprehensive, multi-modal sentiment and narrative tracking.
- **Deploy for Impact:** Package the model as a real-time API for live social media monitoring and integration into larger analytical platforms.