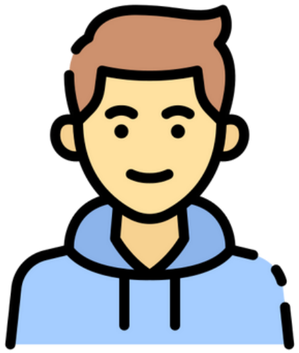
# ML OPS

# MACHINE LEARNING OPERATIONS

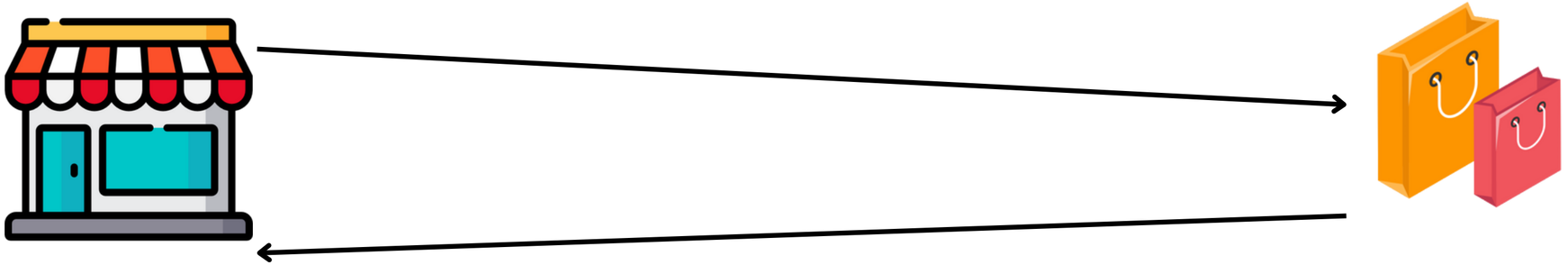
**MLOps, or Machine Learning Operations, is a set of practices, tools, and processes that aim to streamline and automate the end-to-end machine learning (ML) lifecycle. It combines principles from DevOps, data engineering, and machine learning to ensure that ML models are developed, deployed, monitored, and maintained efficiently and reliably**

# The Biriyani Mastery

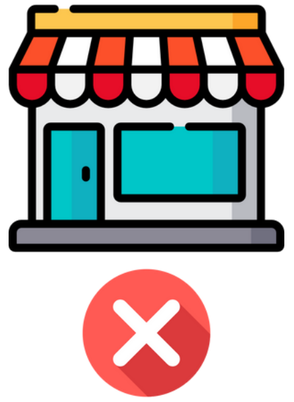
## A STORY OF GROWTH



BRO, THIS IS INSANE! WHERE HAVE YOU BEEN HIDING THIS TALENT? THIS IS RESTAURANT-LEVEL BIRIYANI!" "YOU SHOULD START A BUSINESS!" "I'D PAY FOR THIS ANY DAY!



# SOMETHING'S DIFFERENT TODAY... DID YOU CHANGE THE RECIPE?



I love your biriyani, but can you make it spicier?

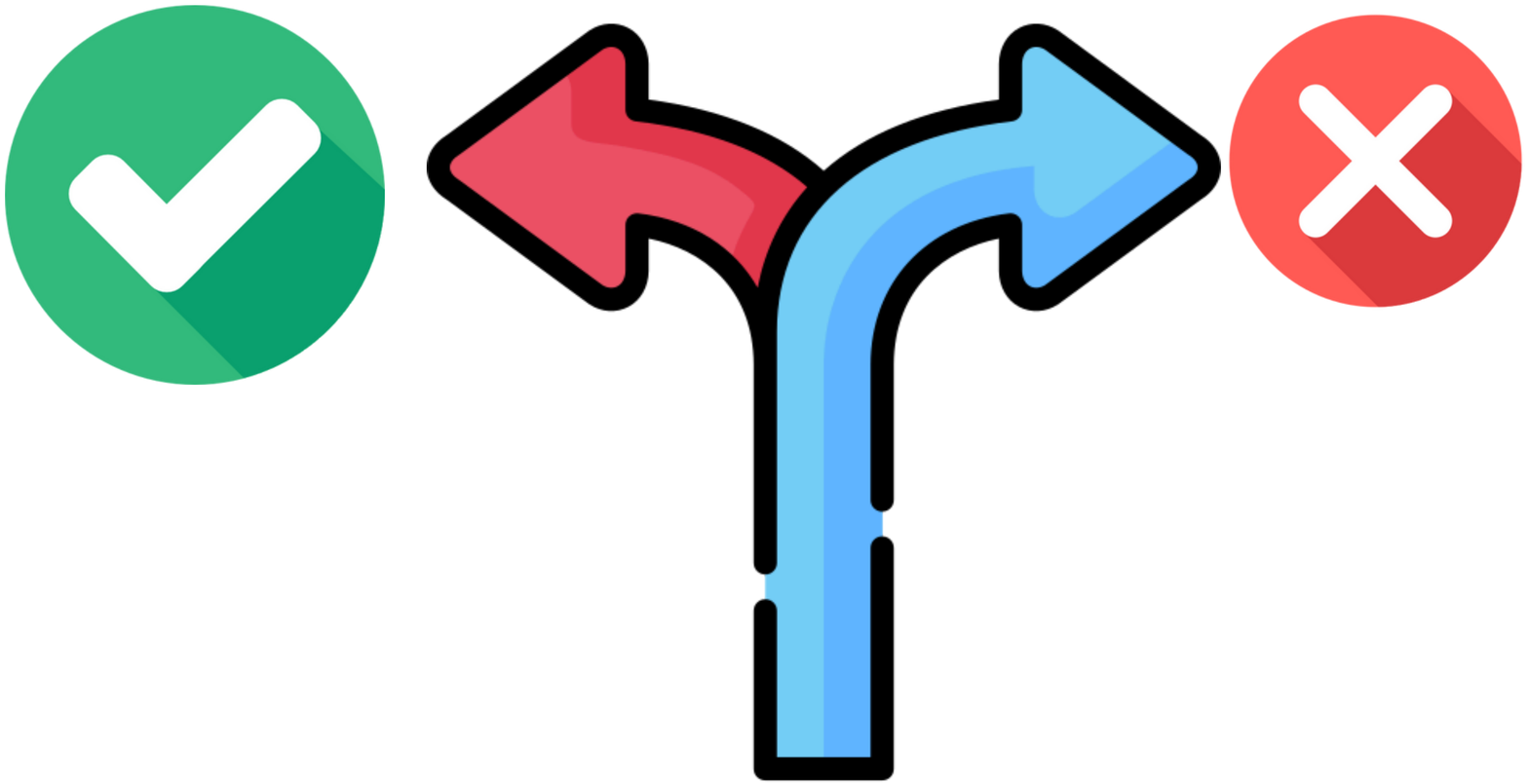
MILD DUM BIRYANI

SPICY DUM BIRYANI

Your biriyani is amazing, but I prefer it milder

MUTTON DUM BIRYANI

PANEER BIRYANI



# AUTOMATION

A digital inventory system
to track ingredient levels

Timers to alert chefs when
the biriyani was perfectly
cooked

A mobile feedback app
where customers could
rate their biriyani

| Business Challenge | MLOPS Content | MLOPS TOOL | EXPLANATION |
|---|---|---|---|
| Buying ingredients daily manually | Automated Data Pipelines | Automated Data Pipelines | Just like Ravi set up a supplier to deliver fresh ingredients daily, MLOps pipelines automate data collection and processing to ensure fresh and reliable data. |
| Standardizing the recipe | CI/CD for ML Models | GitHub Actions, GitLab CI/CD | Ravi wrote down exact spice measurements to ensure consistency. CI/CD ensures models perform the same across environments. |
| Expanding food stalls | Scaling Up ML Models | Kubernetes, TensorFlow Serving | Ravi's new food stalls needed the same quality of biriyani. Similarly, Kubernetes helps scale ML models while maintaining consistency. |
| Adjusting spice levels based on customer preferences | Continuous Model Monitoring | Prometheus, Evidently AI | Just like Ravi introduced mild and spicy variants based on feedback, model monitoring tools track performance and adjust ML models accordingly. |
| Testing new biriyani recipes | A/B Testing for ML Models | MLflow, DVC | Ravi first tested new biriyani types at one location before expanding. A/B testing helps validate ML model changes before full deployment. |

| Business Challenge | MLOPS Content | MLOPS TOOL | EXPLANATION |
| --- | --- | --- | --- |
| Handling bad ingredients | Model Rollbacks | MLflow Model Registry | When bad rice affected the biriyani, Ravi quickly switched suppliers. Similarly, ML model registries allow rolling back to a previous, stable version. |
| Using ingredient kits for uniformity | Containerization & Portability | Docker | Ravi's pre-packaged ingredient kits ensured consistency across locations, just like Docker containers keep ML models consistent across different environments. |

Data Collection and Preparation

Model Development

Model Training

Model Evaluation and Deployment

Lack of Reproducibility

Slow Time-to-Production:

Poor Collaboration

Scalability Issues

Model Decay

Lack of Governance

Reproducibility

Faster Time-to-Production

Improved Collaboration

Scalability

Continuous Monitoring and Retraining

Governance and Compliance