MLOps_UseCase_API_Design

API Endpoint Design

Use Case	Service Name	Description	HTTP Command	Signature	Responses	Model Example (JSON)	Example HTTP Response (JSON)
Clinical Diagnostics Enhancement IDC Detection	*DiagnosePatient*	*Diagnose a patient based on their medical data*	*POST*	*https://127.0.0.0:5000/diagnose-patient*	*200 = success, 400 = error, 500 = error*	***{"patientId": "patient123","patientData": {"age": 45,"weight": 70,"height": 175,"symptoms": ["Swollen/painful breast, fever", "cough", "fatigue,"]}}***	***{"patientId": "patient123","diagnosis": [{"condition": "Flu", "likelihood": 0.75},{"condition": "breast cancer", "likelihood": 0.60}],"message": "Diagnosis completed successfully."}***
Clinical Diagnostics Enhancement	*TrainDiagnosticModel*	*Train a new version of the diagnostic model with provided training data*	*POST*	*https://127.0.0.0:5000/train-model*	*200 = success, 400 = error, 500 = error*	***{"trainingDataURL": "https://storage/training-data/diagnostic-data.csv","modelParameters": {"learningRate": 0.01,"epochs": 10},"description": "Training data for clinical diagnostic model."}***	***{"status": "Training completed","modelId": "diagnostic_model_v1.2.0","trainingMetrics": {"accuracy": 0.94,"loss": 0.06},"message": "The model was successfully trained."}***
Clinical Diagnostics Enhancement	*EvaluateDiagnosticModel*	*Evaluate the performance of the diagnostic model with provided evaluation data*	*POST*	*https://127.0.0.0:5000/evaluate-model*	*200 = success, 400 = error, 500 = error*	***{"evaluationDataURL": "https://storage/evaluation-data/diagnostic-evaluation-data.csv","modelId": "diagnostic_model_v1.2.0","evaluationMetrics": ["accuracy", "precision", "recall"]}***	***{"status": "Evaluation completed","modelId": "diagnostic_model_v1.2.0","evaluationResults": {"accuracy": 0.93,"precision": 0.92,"recall": 0.91},"message": "The model was successfully evaluated."}***

Use Case	Service Name	Description	HTTP Command	Signature	Responses	Model Example (JSON)	Example HTTP Response (JSON)
Research and Development in Oncology	*PredictCancerRisk*	*Predict the risk of cancer based on patient genetic and clinical data*	*POST*	*https://127.0.0.0:5000/predict-cancer-risk*	*200 = success, 400 = error, 500 = error*	***{"patientId": "patient456","patientData": {"age": 55,"geneticMarkers": ["BRCA1", "BRCA2"],"lifestyleFactors": ["smoking", "diet"]}}***	***{"patientId": "patient456","cancerRisk": {"breastCancer": 0.85,"lungCancer": 0.60},"message": "Cancer risk prediction completed successfully."}***
Research and Development in Oncology	*TrainOncologyModel*	*Train a new version of the oncology model with provided training data*	*POST*	*https://127.0.0.0:5000/train-model*	*200 = success, 400 = error, 500 = error*	***{"trainingDataURL": "https://storage/training-data/oncology-data.csv","modelParameters": {"learningRate": 0.01,"epochs": 10},"description": "Training data for oncology model."}***	***{"status": "Training completed","modelId": "oncology_model_v1.2.0","trainingMetrics": {"accuracy": 0.90,"loss": 0.10},"message": "The model was successfully trained."}***
Research and Development in Oncology	*EvaluateOncologyModel*	*Evaluate the performance of the oncology model with provided evaluation data*	*POST*	*https://127.0.0.0:5000/evaluate-model*	*200 = success, 400 = error, 500 = error*	***{"evaluationDataURL": "https://storage/evaluation-data/oncology-evaluation-data.csv","modelId": "oncology_model_v1.2.0","evaluationMetrics": ["accuracy", "precision", "recall"]}***	***{"status": "Evaluation completed","modelId": "oncology_model_v1.2.0","evaluationResults": {"accuracy": 0.89,"precision": 0.88,"recall": 0.87},"message": "The model was successfully evaluated."}***
Educational and Training	*AnalyzePathologyImage*	*Analyze a pathology image and provide*	*POST*	*https://127.0.0.0:5000/analyze-image*	*200 = success, 400 =*	***{"imageId": "img789","imageURL": "https://storage/pathology-images/image789.jpg"}***	***{"imageId": "img789","diagnosticInsights": {"cancerCellsDetected": true,"cellCount": 250,"tumorType":***

Use Case	Service Name	Description	HTTP Command	Signature	Responses	Model Example (JSON)	Example HTTP Response (JSON)
Tool for Pathologists		*diagnostic insights*			*error, 500 = error*		***"Adenocarcinoma"},"message": "Image analysis completed successfully."}***
Educational and Training Tool for Pathologists	*TrainPathologyModel*	*Train a new version of the pathology image analysis model with provided training data*	*POST*	*https://127.0.0.0:5000/train-model*	*200 = success, 400 = error, 500 = error*	***{"trainingDataURL": "https://storage/training-data/pathology-images.zip","modelParameters": {"learningRate": 0.01,"epochs": 10},"description": "Training data for pathology image analysis model."}***	***{"status": "Training completed","modelId": "pathology_model_v1.2.0","trainingMetrics": {"accuracy": 0.92,"loss": 0.08},"message": "The model was successfully trained."}***
Educational and Training Tool for Pathologists	*EvaluatePathologyModel*	*Evaluate the performance of the pathology image analysis model with provided evaluation data*	*POST*	*https://127.0.0.0:5000/evaluate-model*	*200 = success, 400 = error, 500 = error*	***{"evaluationDataURL": "https://storage/evaluation-data/pathology-evaluation-images.zip","modelId": "pathology_model_v1.2.0","evaluationMetrics": ["accuracy", "precision", "recall"]}***	***{"status": "Evaluation completed","modelId": "pathology_model_v1.2.0","evaluationResults": {"accuracy": 0.91,"precision": 0.90,"recall": 0.89},"message": "The model was successfully evaluated."}***

Field	Description
Endpoint Name	***Model Training Service***
Endpoint URL	***/trainModel***
HTTP Method	***POST***

Description	*Endpoint for training machine learning models with provided data and parameters.*
Request Parameters	***data*** *(string, required),* ***params*** *(dictionary, required)*
Response	*JSON object containing* ***model_artifact*** *(string) and* ***training_metrics*** *(dictionary)*
Example Request	***curl -X POST http://127.0.0.1:5000/trainModel -H "Content-Type: application/json" -d '{"data": "sample_data", "params": {"learning_rate": 0.01}}'***
Example Response	***{"model_artifact": "dummy_model_path", "training_metrics": {"accuracy": 0.95}}***