An AI-driven SaaS integration project involves designing, implementing, and deploying several components to realize a solution. The key goal of this project is to develop a machine learning model capable of predicting customer inquiries and allowing for efficient support workflows within the SaaS environment. The proposed solution would involve the following steps:

1. Data Collection: Gather historical customer support data.
2. Data Processing and Feature Engineering: Preprocess the data for machine learning.
3. Training the model will involve developing a predictive model that anticipates customer inquiries.
4. The model should be integrated into the SaaS application.
5. Reporting and analytics features showing model performance and how to optimize workflows based on its performance could also be implemented.

We are going to implement the project using the likes of GCP, TensorFlow, BigQuery, Cloud Functions, and Node.js. We now give an overview of the project into key components and then give the detailed code snippets for each part.

1. Data Collection and Preprocessing

Data Collection

Suppose we have historical data regarding customer support tickets. These might include fields like:

- Ticket ID
- Customer ID
- Issue Description
- Category -Billing, Technical Issue, etc.
- Time to Resolve
- Resolution -Resolved, Unresolved

This data can be kept in Google BigQuery or Google Cloud Storage in CSV format.

Data Preprocessing

The preprocessing will involve cleaning, encoding categorical features, and transforming text data. We will be training a model using TensorFlow.

1. Python for Data Preprocessing:

2. Model Development

We will design a model using TensorFlow to predict the category of the inquiry based on the description of the issue.

3. SaaS Application Integration

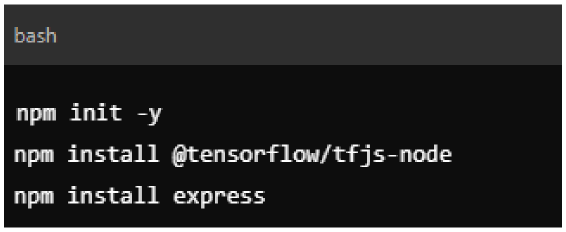
Now we have a refined AI model that is dedicated to predicting customer inquiries, but we need to implement it on the SaaS platform. This model will predict the category of new support tickets in real time, which will route those into respective departments or agents.

We will deploy this using Google Cloud Functions with TensorFlow Serving.

a. Building Cloud Function for Model Inference

First, deploy a Google Cloud Function to serve the machine learning model and perform inference.

1. Cloud Function (Node.js): We'll use TensorFlow.js to run the model inference in Node.js.



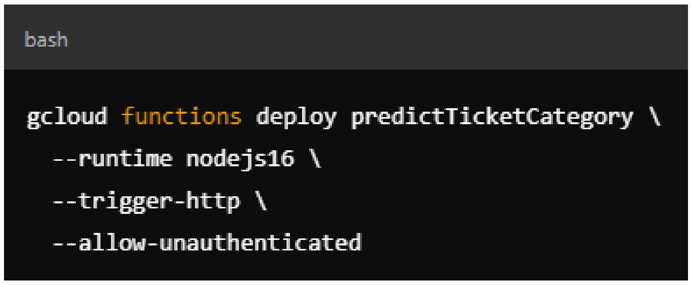
bash

```bash
npm init -y
npm install @tensorflow/tfjs-node
npm install express
```

2. Cloud Function Implementation:

Create a file index.js for the Cloud Function:

3. Deploy the Cloud Function:



bash

```bash
gcloud functions deploy predictTicketCategory \
  --runtime nodejs16 \
  --trigger-http \
  --allow-unauthenticated
```

The Cloud Function is now accessible via an HTTP endpoint that can be called to predict the category of new customer support tickets.

b. Integrating with SaaS Platform

In this approach, you may invoke the Cloud Function with HTTP requests from your front-end application, such as React or Vue.js, or your backend API.

- Enclosed is a sample React component configured to send a request to the Cloud Function:
- The enclosed component enables agents to submit customer issue descriptions. These issue descriptions are posted to the Cloud Function to predict an appropriate category for them.

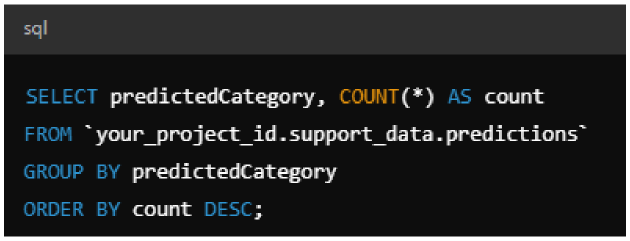
4. Reporting and Analytics

1. Once the model is integrated into the system, reporting and analytics functionality should be added to monitor performance and usage.

Analytics Using Google BigQuery

1. **Store Predictions in BigQuery**: Every time a prediction occurs, log the result to Google BigQuery to analyze further.
2. **Generate Reports**: Using either Google Data Studio or BigQuery, create these dashboards to review accuracy of model, ticket categorization, and agent performance.

SQL query to show ticket categories in BigQuery :



```sql
SELECT predictedCategory, COUNT(*) AS count
FROM `your_project_id.support_data.predictions`
GROUP BY predictedCategory
ORDER BY count DESC;
```

This query gives you an overview of how often each category is predicted, which can be useful for optimizing workflows.

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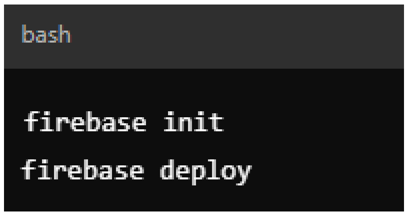
5. Final Deployment and Monitoring

Deploy Frontend (React) to Firebase Hosting

1. Set up **Firebase** and deploy your React frontend:



```bash
firebase init
firebase deploy
```

2. **Monitor the Model:** Use Google Cloud Monitoring and Cloud Logging to keep track of the performance and health of the Cloud Function and the model.

Conclusion

This AI-driven SaaS integration project showcases how machine learning models can enhance automated workflows in customer support systems. The project leveraged TensorFlow, Google Cloud Functions, BigQuery, and React in its implementation for an end-to-end solution that does the following:

- Preprocesses and trains a model on historical support ticket data.
- Integrates the model into a SaaS platform to predict customer inquiries.
- Provides real-time predictions to help route tickets and optimize support processes.
- Tracks performance and usage with BigQuery for reporting and analytics.

This solution can be further enhanced with additional machine learning models for more complex tasks, such as sentiment analysis or automated ticket resolution.