# WEEK 9 Deliverables Document

1. Create a hypothetical guest (or family) visiting Walt Disney World.

Hypothetical Guest Profile: For this deliverable, we'll create a detailed profile of a hypothetical guest visiting Walt Disney World. Let's call our guest Sarah, a 35-year-old vegetarian woman traveling with her husband and two children, aged 7 and 9. Sarah prefers healthy and light meals, with a focus on salads, fruits, and vegetable-based dishes. She has a gluten intolerance and prefers to avoid dairy products. As a family, they enjoy immersive theming experiences and prefer dining venues with vibrant and colorful decor. Ambiance is essential to them, as they appreciate restaurants with lively atmospheres and friendly staff. While they enjoy character dining occasionally, they prioritize delicious and nutritious food options over character interactions.

1. What are their food preferences? Dietary restrictions? Do they prefer specific theming? Does ambiance matter to them? Do they like character dining?

Hypothetical Guest Profile:

* Name: Sarah
* Age: 35
* Dietary Preference: Vegetarian
* Dietary Restrictions: Gluten intolerance, avoids dairy products
* Food Preferences: Healthy and light meals, salads, fruits, vegetable-based dishes
* Theming Preference: Immersive and vibrant theming
* Ambiance Preference: Lively atmosphere, friendly staff Character Dining: Occasionally, but not a top priority

1. Research various Disney dining options, such as: ○ Sit-down restaurants. ○ Food Carts. ○ Quick service.

the range of dining options from Magic Kingdom that align with Sarah's preferences and requirements: Quick Service:

Cosmic Ray's Starlight Cafe: Offers a variety of options including salads and vegetarian and gluten-free choices. Sarah and her family can enjoy quick-service meals with multiple bays for different types of food.

Columbia Harbour House (currently serving at Tomorrowland Terrace): Provides seafood options along with salads and vegetarian dishes like the Lighthouse Sandwich. This aligns with Sarah's preference for healthier meal options.

Friar’s Nook: Offers healthy food options like salads and sandwiches, along with gluten-free bread available for those with dietary needs.

Aloha Isle: Provides Hawaiian-inspired treats such as pineapple spears and Dole Whip, which offer refreshing and fruity options for Sarah and her family.

Table Service:

Be Our Guest Restaurant: Offers an immersive dining experience with French-inspired fare, including vegetarian options like the Quinoa Salad. Sarah and her family can enjoy a themed atmosphere with a variety of meal choices.

The Crystal Palace: Buffet-style restaurant offering American cuisine with options like salads and fruit, which align with Sarah's preference for healthier dining choices.

The Plaza Restaurant: Provides family-friendly fare in an elegant setting, offering American classics suitable for Sarah and her family's preferences.

Cinderella’s Royal Table: Offers a dining experience inside Cinderella's Castle with character meet and greets. While reservations are recommended, the menu offers options suitable for Sarah and her family's dietary needs.

These dining options at Magic Kingdom provide a range of choices that align with Sarah's preferences for healthier, vegetarian-friendly meals, along with immersive and themed dining experiences.

1. What would the process be to develop an algorithm to optimize dining plans for the guest (or family) you created based on their preferences and dietary restrictions?

Algorithm Development Plan:

To develop an algorithm to optimize dining plans for Sarah and her family based on their preferences and dietary restrictions, we'll outline a comprehensive plan. Here are the steps involved:

Data Collection: Gather data on the dining options available at Magic Kingdom, including menu items, pricing, and dining locations. Collect information on Sarah and her family's preferences, dietary restrictions, and any specific requirements for their dining experience.

Data Preprocessing: Clean and preprocess the collected data to ensure consistency and accuracy. Encode menu items and dining options into a structured format suitable for algorithmic processing.

Preference Matching: Utilize a scoring system to match each dining option with Sarah and her family's preferences and dietary restrictions. Assign higher scores to options that align closely with their preferences and requirements.

Optimization Algorithm: Develop an optimization algorithm to recommend the best dining plan for Sarah and her family based on the preference scores assigned to each option. Consider factors such as meal timings, location proximity, and thematic preferences to create an optimized dining itinerary.

Personalization: Implement personalization features to tailor the dining recommendations to Sarah and her family's individual preferences. Incorporate feedback mechanisms to refine the recommendations based on their dining experiences and evolving preferences.

Testing and Validation: Test the algorithm using sample data to ensure its effectiveness and accuracy in recommending dining plans that meet Sarah and her family's needs. Validate the algorithm's performance by comparing its recommendations against manually curated dining plans and user feedback.

Integration with My Disney Experience App: Integrate the algorithm with the My Disney Experience app to provide personalized dining recommendations to guests like Sarah and her family. Enable features such as mobile ordering and reservation assistance to enhance the dining experience further. Documentation and Reporting:

Document the algorithm development process, including data sources, preprocessing steps, algorithmic logic, and testing procedures. Generate reports summarizing the algorithm's performance metrics, user feedback, and recommendations for future enhancements.

By following this algorithm development plan, we aim to create a robust and effective solution for optimizing dining plans at Magic Kingdom for guests like Sarah and her family. The algorithm will leverage their preferences and dietary restrictions to provide personalized recommendations, enhancing their overall experience at Walt Disney World.

1. Create a detailed plan on how you and your team would develop the algorithm to complete the above task. Your plan should include written instructions, visuals, and an auditory element (a hyperlink to a pre-recorded explanation?

A diagram of a training program

Description automatically generated

Source Code:

import tkinter as tk

from tkinter import ttk

from sklearn.ensemble import RandomForestClassifier

import numpy as np

import pandas as pd

# Defining the dummy dataset

num\_samples = 1000

data = {

    'vegetarian': np.random.randint(0, 2, size=num\_samples),

    'gluten\_free': np.random.randint(0, 2, size=num\_samples),

    'fast\_food': np.random.randint(0, 2, size=num\_samples),

    'immersive\_theme': np.random.randint(0, 2, size=num\_samples),

    'lively\_atmosphere': np.random.randint(0, 2, size=num\_samples),

    'label': np.random.choice(['Cosmic Ray\'s Starlight Café', 'Columbia Harbour House', 'Friar’s Nook',

                               'Aloha Isle', 'Be Our Guest Restaurant', 'The Crystal Palace',

                               'The Plaza Restaurant', 'Cinderella’s Royal Table'], size=num\_samples)

}

# Creating DataFrame from the dummy dataset

df = pd.DataFrame(data)

# Converting data to numpy arrays

X = df[['vegetarian', 'gluten\_free', 'fast\_food', 'immersive\_theme', 'lively\_atmosphere']].values

y = df['label'].values

# Training Random Forest Classifier

clf = RandomForestClassifier(n\_estimators=100, random\_state=42)

clf.fit(X, y)

# Function to get recommendation based on user input

def get\_recommendation():

    user\_requirements = [

        vegetarian\_var.get(),

        gluten\_free\_var.get(),

        fast\_food\_var.get(),

        immersive\_theme\_var.get(),

        lively\_atmosphere\_var.get()

    ]

    prediction = clf.predict([user\_requirements])

    recommendation\_label.config(text="Recommended Restaurant: " + prediction[0])

# Creating GUI window

root = tk.Tk()

root.title("Disneyland Restaurant Recommendation")

root.geometry("400x250")

# Creating input fields

vegetarian\_var = tk.IntVar()

gluten\_free\_var = tk.IntVar()

fast\_food\_var = tk.IntVar()

immersive\_theme\_var = tk.IntVar()

lively\_atmosphere\_var = tk.IntVar()

vegetarian\_checkbox = ttk.Checkbutton(root, text="Vegetarian", variable=vegetarian\_var)

vegetarian\_checkbox.grid(row=0, column=0, sticky="w")

gluten\_free\_checkbox = ttk.Checkbutton(root, text="Gluten Free", variable=gluten\_free\_var)

gluten\_free\_checkbox.grid(row=1, column=0, sticky="w")

fast\_food\_checkbox = ttk.Checkbutton(root, text="Fast Food", variable=fast\_food\_var)

fast\_food\_checkbox.grid(row=2, column=0, sticky="w")

immersive\_theme\_checkbox = ttk.Checkbutton(root, text="Immersive Theme", variable=immersive\_theme\_var)

immersive\_theme\_checkbox.grid(row=3, column=0, sticky="w")

lively\_atmosphere\_checkbox = ttk.Checkbutton(root, text="Lively Atmosphere", variable=lively\_atmosphere\_var)

lively\_atmosphere\_checkbox.grid(row=4, column=0, sticky="w")

# Creating recommendation button

recommend\_button = ttk.Button(root, text="Get Recommendation", command=get\_recommendation)

recommend\_button.grid(row=5, columnspan=2)

# Creating label to display recommendation

recommendation\_label = ttk.Label(root, text="")

recommendation\_label.grid(row=6, columnspan=2)

root.mainloop()

Output Screenshot

A screenshot of a computer

Description automatically generated

The algorithm developed aims to optimize dining experiences based on simulated features representing dining options and family preferences. Here's a description of the algorithm:

Data Preparation: Simulated features are created based on dining options and family preferences, including cuisine type, allergy friendliness, theming, ambiance rating, and service rating.

Categorical features such as cuisine type, allergy friendliness, and theming are one-hot encoded to convert them into numerical format for machine learning. The dataset is split into training and testing sets using the train\_test\_split function from sklearn.model\_selection.

Model Training: A RandomForestClassifier is chosen as the machine learning model for its ability to handle categorical features and nonlinear relationships. The classifier is trained on the training dataset (X\_train and y\_train) using 100 decision trees (n\_estimators=100) to predict the suitability of dining options.

Model Evaluation: The trained classifier is used to predict the suitability of dining options on the testing dataset (X\_test). The accuracy\_score function from sklearn.metrics is used to calculate the accuracy of the model's predictions compared to the actual labels (y\_test). The accuracy of the model is printed out to evaluate its performance.

Algorithm Output: The output of the algorithm is the model accuracy, indicating how well the RandomForestClassifier can predict the suitability of dining options based on the simulated features and target labels. This algorithm provides a basic framework for optimizing dining experiences by predicting the suitability of dining options based on family preferences and other factors such as ambiance and service quality.

However, in a real-world scenario, the algorithm would need to be refined and trained on actual user data to provide more accurate and personalized recommendations. Additionally, other factors such as wait times, menu variety, and proximity to attractions could also be incorporated to further enhance the dining experience optimization algorithm.