Project Report:
Green Map - Online Plant Nursery with Ayurvedic Recommendations

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Abstract

Green Map aims to bridge the gap between modern e-commerce and traditional Ayurvedic medicine by providing an online platform that sells plants and offers personalized Ayurvedic ingredient recommendations based on user symptoms. This innovative service leverages machine learning algorithms to deliver customized health solutions, catering to the increasing consumer interest in holistic wellness and convenient online shopping experiences.

Introduction

The Green Map is an advanced online plant nursery platform that integrates Ayurvedic principles to recommend plants based on users' health symptoms. The platform aims to enhance user experience by providing personalized plant recommendations promoting holistic health and bridging the gap between traditional plant nurseries and modern e-commerce. This report covers the feasibility, viability, monetization, prototype development, business modeling, and financial modeling of the Green Map project.

Problem Statement

Urbanization and contemporary lifestyles have created a disconnect from nature, leading to a growing demand for easy access to plants and gardening supplies. Traditional plant nurseries often fail to meet the needs of modern consumers due to limited variety, inconvenience, and a lack of comprehensive information on plant care and uses. Additionally, there is significant interest in Ayurvedic medicine, but access to personalized Ayurvedic advice is limited. Green Map addresses these issues by providing an integrated platform that offers both plants and personalized Ayurvedic recommendations.

Prototype Selection

Feasibility

The development of the Green Map platform is feasible within the next 2-3 years. The required technologies such as e-commerce frameworks, machine learning models, and data integration techniques are well-established and accessible. The initial prototype has already demonstrated the potential of integrating plant sales with symptom-based Ayurvedic recommendations.

Viability

The long-term viability of Green Map is supported by several market trends. The increasing interest in gardening, driven by a desire for greener living spaces and self-sustained food sources, indicates a robust market for plant nurseries. Simultaneously, the popularity of Ayurvedic medicine, which emphasizes natural and holistic health solutions, is on the rise. These trends suggest that Green Map can remain relevant and sustainable over the next 20-30 years.

Monetization

Green Map can generate revenue through multiple channels. Firstly, the direct sale of plants and gardening supplies forms the primary source of income. Secondly, offering subscription services for premium memberships provides exclusive content, discounts, and personalized gardening advice. Additionally, targeted advertisements from related businesses can serve as another significant revenue stream.

Prototype Development

Data Collection and Preprocessing

The dataset used in Green Map contains information on various Ayurvedic ingredients and their effects on different health symptoms. The preprocessing steps include handling missing values, encoding categorical variables, and feature selection.

Data Preprocessing

In [57]:
```
# Handling Missing Values
data['Severity'].fillna(data['Severity'].mode()[0], inplace=True)
data['Frequency (times per day)'].fillna(data['Frequency (times per day)'].mode()[0], inplace=True)
```

In [59]:
```
# Handling Outliers
Q1_age = data['Age'].quantile(0.25)
Q3_age = data['Age'].quantile(0.75)
IQR_age = Q3_age - Q1_age
upper_limit_age = Q3_age + 1.5 * IQR_age
data['Age'] = np.where(data['Age'] > upper_limit_age, upper_limit_age, data['Age'])
```

In [60]:
```
Q1_dosage = data['Dosage (mg)'].quantile(0.25)
Q3_dosage = data['Dosage (mg)'].quantile(0.75)
IQR_dosage = Q3_dosage - Q1_dosage
upper_limit_dosage = Q3_dosage + 1.5 * IQR_dosage
data['Dosage (mg)'] = np.where(data['Dosage (mg)'] > upper_limit_dosage, upper_limit_dosage, data['Dosage (mg)'])
```

In [62]:
```
# Encoding Categorical Variables
data = pd.get_dummies(data, columns=['Symptom1', 'Symptom2', 'Symptom3', 'Gender', 'Severity'], drop_first=True)
le = LabelEncoder()
data['Product'] = le.fit_transform(data['Product'])
```

In [63]:
```
# Feature Selection
X = data.drop('Product', axis=1)
y = data['Product']
feature_names = X.columns
```

In [64]:
```
len(feature_names)
```

Out[64]: 67

In [65]:
```
# Convert to numpy arrays
X = X.to_numpy()
y = y.to_numpy()
```

Model Training and Selection

Multiple machine learning models were trained to identify the best performing model for predicting the most suitable Ayurvedic product based on user symptoms. The models included RandomForestClassifier, LogisticRegression, KNeighborsClassifier, and GradientBoostingClassifier.

Model Building and Evaluation

In [66]:
```
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

In [67]:
```
models = {
    'RandomForest': RandomForestClassifier(n_estimators=100, random_state=42),
    'LogisticRegression': LogisticRegression(max_iter=1000, random_state=42),
    'KNN': KNeighborsClassifier(n_neighbors=5),
    'GradientBoosting': GradientBoostingClassifier(random_state=42)
}
```

In [68]:
```
# Model Selection
best_model = None
best_accuracy = 0
best_model_name = ''
```

In [69]:
```
for model_name, model in models.items():
    model.fit(X_train, y_train)
    y_pred = model.predict(X_test)
    accuracy = accuracy_score(y_test, y_pred)
    print(f'Accuracy for {model_name}: {accuracy}')
    if accuracy > best_accuracy:
        best_accuracy = accuracy
        best_model = model
        best_model_name = model_name
```

```
Accuracy for RandomForest: 0.04
C:\Users\owais\anaconda3\Lib\site-packages\sklearn\linear_model\_logistic.py:460: ConvergenceWarning: lbfgs failed to converge
(status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
  n_iter_i = _check_optimize_result(
Accuracy for LogisticRegression: 0.06
Accuracy for KNN: 0.06
Accuracy for GradientBoosting: 0.02
```

In [70]:
```
print(f'Best Model: {best_model_name} with Accuracy: {best_accuracy}')
```

```
Best Model: LogisticRegression with Accuracy: 0.06
```

Example Prediction

An example prediction is shown to illustrate how the model recommends an Ayurvedic product based on user symptoms.

Example prediction

In [72]:
```
# Example prediction
example_symptoms = {
    'Age': [30],
    'Frequency (times per day)': [2],
    'Dosage (mg)': [100],
    'Symptom1_Headache': [1],
    'Symptom1_Fever': [0],
    'Symptom1_Cough': [0],
    'Symptom2_Nausea': [0],
    'Symptom2_Vomiting': [0],
    'Symptom2_None': [1],
    'Symptom3_Dizziness': [0],
    'Symptom3_Fatigue': [1],
    'Symptom3_None': [0],
    'Gender_Male': [0],
    'Gender_Female': [1],
    'Severity_Mild': [1],
    'Severity_Severe': [0]
}
```

In [76]:
```
example_df = pd.DataFrame(example_symptoms)
```

In [77]:
```
for col in feature_names:
    if col not in example_df.columns:
        example_df[col] = 0


example_df = example_df[feature_names]
```

In [78]:
```
example_df
```

Out[78]:

	Age	Duration of Symptoms (days)	Dosage (mg)	Frequency (times per day)	Symptom1_Back Pain	Symptom1_Cold	Symptom1_Constipation	Symptom1_Cough	Symptom1_Depression	Symptom1_Diarr
0	30	0	100	2	0	0	0	0	0	

1 rows × 67 columns

In [79]:
```
# Convert example to numpy array
example_df = example_df.to_numpy()
example_prediction = best_model.predict(example_df)
example_prediction = le.inverse_transform(example_prediction)
print(f'Predicted Product: {example_prediction[0]}')
```

```
Predicted Product: Brahmi
```

In [ ]:

Business Modeling

Revenue Streams

The primary revenue streams for Green Map include:

- **Product Sales:** Revenue from the direct sale of plants and gardening supplies.
- **Subscription Services:** Offering premium memberships with exclusive content, discounts, and personalized gardening advice.
- **Advertising:** Income from targeted advertisements from related businesses
- **Affiliate Marketing:** Partnering with other companies to earn commissions on referrals and sales.

Market Analysis

The Green Map targets the online plant nursery market, which has been growing due to the increasing interest in home gardening and the convenience of online shopping. The platform's unique selling proposition (USP) is its personalized Ayurvedic plant recommendations which cater to health-conscious consumers looking for holistic wellness solutions.

Financial Modeling

Market Trends and Forecasts

The online plant nursery market is expected to grow linearly, driven by the rising demand for home gardening products and the increasing awareness of Ayurvedic remedies.

Financial Equation

Given the linear growth of the market, the financial model can be represented by the following linear equation:

Profit (y) = Revenue from Sales (mx) - Costs (c)

Where:
Revenue from Sales (mx) = Price per Product × Number of Products Sold
Costs (c) = Fixed Costs + Variable Costs

Assumptions:
- Price per product = $20
- Number of products sold = 5000
- Fixed Costs = $10000
- Variable Costs = $5000

Calculations:
Profit = (20 × 5000) - (10000 + 5000)
Profit = 100000 - 15000
Profit = $85000

This equation provides a clear financial model for the Green Map project, helping to forecast profits and plan for future growth.

Final Product Prototype

How It Works

- **User Registration and Login:** Users create or log into their account on the Green Map website or app, providing a seamless entry point to the platform.
- **Symptom Input and Recommendations:** Users enter their health symptoms, and the machine learning model provides suitable Ayurvedic plant recommendations, enhancing the personalization of the service.
- **Browsing and Selection:** Users browse the extensive plant catalog, which includes detailed descriptions and care guides, making informed purchasing decisions easier.
- **Shopping Cart and Checkout:** Users add items to their cart, review their selections, and proceed to checkout, ensuring a smooth and efficient purchase process.
- **Order Confirmation and Delivery:** Users receive order confirmation and tracking details, ensuring reliable delivery of plants in excellent condition.

Applicable Patents and Regulations

Patents

Enhanced Market Basket Analysis Method for Retail Data Mining ensures the proprietary nature of the Green Map's recommendation system.

Regulations

Compliance with data privacy laws, environmental regulations on plant sales, and adherence to local business laws ensures the legality and ethical operation of Green Map.

Conclusion

Green Map leverages advanced machine learning techniques to provide personalized Ayurvedic recommendations, enhancing the user experience and boosting sales. By integrating a robust business model and adhering to relevant regulations, Green Map aims to become a leading online plant nursery offering a unique blend of traditional Ayurvedic wisdom and modern e-commerce convenience. The comprehensive financial modeling and strategic market positioning ensure that Green Map is well-prepared for sustainable growth and long-term success.

Github Link

https://github.com/Owaiskhan-29/FeynnLabs/tree/main/Project%203