### **Project Proposal: Predicting SNAP Participation Using Machine Learning**

Dataset location: https://www.ers.usda.gov/data-products/foodaps-national-household-food-acquisition-and-purchase-survey/

#### **Overview**

This project will build a machine learning model to predict whether a household participates in SNAP using data from the USDA’s **FoodAPS Survey**. The goal is to classify households as SNAP participants or non-participants based on factors like income, food purchases, and access to food outlets.

#### **Problem**

We aim to predict SNAP participation to help identify factors influencing food assistance needs. This will improve targeted outreach efforts for the SNAP program.

#### **Approach**

We will use **supervised classification** with models like **Logistic Regression** or **Random Forest** to classify households. Metrics such as **Accuracy**, **Precision**, and **Recall** will evaluate performance.

#### **Data**

The project will use the **FoodAPS Survey** dataset, which includes:

* Household income
* Food purchases
* Access to food outlets
* Household demographics

#### **Steps**

1. **Data Cleaning**: Handle missing values and prepare variables.
2. **EDA**: Explore key features like income and food purchases.
3. **Feature Engineering**: Select relevant features and create new ones if needed.
4. **Model Training**: Train classification models, optimize, and evaluate.
5. **Results**: Visualize key insights and model performance.
6. **Deployment**: Present findings through a dashboard or report.

#### **Tools**

* **Python Pandas/Matplotlib**: Data analysis and visualization
* **Scikit-learn**: Model building
* **Leaflet/Plotly** (optional): Map-based visualizations

#### **Deliverables**

* A trained classification model predicting SNAP participation.
* Visualizations of key patterns and model results.
* A report with recommendations.

#### **Timeline**

* **Weeks 1-2**: Data cleaning, EDA
* **Weeks 3-4**: Model training and evaluation
* **Week 5**: Final report and presentation

This model will provide valuable insights into factors influencing SNAP participation, aiding in more effective food assistance policies.