Project Plan
Technology Peripheral Inventory Predictor

The Capstone Experience
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Functional Specifications

• Peripheral vending machines
• How to efficiently stock them?
• Machine learning to optimize purchases
• Metrics to inform purchasers of purchase history
• Cost analysis to see expected purchase cost
Design Specifications

• Web app split into frontend/backend
• Item selection interface to filter peripherals to only what the user wants to see
• Analysis/Prediction interface for seeing what the algorithm has predicted for future purchases
• New Purchase interface to incorporate new purchases into the system
Screen Mockup: Item Selection
Screen Mockup: Sidebar Navigation
Screen Mockup: Predictor

Filters

- Input Text
- Search Filters

- DEPARTMENT
- ITEM DESCRIPTION
- FACILITY
- SUPPLIER
- ITEM CATEGORY
- COMPANY

Price/Quantity

Samsung 21.5 in LED LCD Monitor 1920 x 1080 Full HD DVI/VGA/ 3 year warranty

Adjust filters to view further analyzed results.

CLOSE

Samsung 21.5 in LED LCD Monitor 1920 x 1080 Full HD DVI/VGA/ 3 year warranty

CLOSE
Screen Mockup: New Purchase

The image shows a screen mockup for a new purchase. It includes sections for item details, location information, supplier information, and a timeframe. There are input fields for various details such as facility, department, and invoice date. The interface also includes options to add and predict information.
Technical Specifications

• Frontend and backend hosted on Django
• Backend connects to PostgreSQL database to access purchase history
• For machine learning, scikit-learn is used in the backend to create predictions
• The requested data is processed in the backend, then the response is visualized with D3.js
System Architecture

End User (Humana’s employees)

Web Frontend
- JavaScript

Backend
- Python
  - Executive Driver
  - Data Query Module
  - Machine Learning

Security
(Humana’s own security)

Database

Web Application
System Components

• Hardware Platforms
  ▪ iMacs in lab

• Software Platforms / Technologies
  ▪ Django for hosting web app
  ▪ PostgreSQL for database
  ▪ Scikit-learn for machine learning
  ▪ D3.js for data visualization
  ▪ Material.io for UI
Risks

- **Prediction Format**
  - Past purchase history cannot predict future demand; it only identifies past trends and extrapolates.
  - Discuss with client; present multiple ways of viewing the data and select whichever one is preferred.
- **New Purchases**
  - The format in which future Humana employees would like to upload bulk purchase history is unknown.
  - Create a flexible importer for bulk data, and discuss with client to find suitable data format
- **Online Machine Learning**
  - System must incorporate new data into predictions; our team has no experience with this
  - Discuss the technique with others who are knowledgeable; do research into which frameworks are best suited for the task
- **Data Quality**
  - The given data may have some duplicate entries and some peripherals are misspelled. This can significantly affect the performance of the algorithm.
  - Explore ways in which the data may be cleaned; isolate the low-quality parts of the data and see if they negatively affect the machine learning algorithm performance.
Questions?