**Capstone Project Proposal & Timeline**

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**For**: Professor David Koslowsky

**Class:** DS745

1. **Proposed Project Title.**
   * Integrated Supply Chain and Manufacturing Order Forecasting (ERP – Odoo / Excel-PowerBI)
2. **Project Description.**
   * A client based project for my current employer, Greyscale AI. This project will leverage the data stored in our Odoo ERP system and integrate it with a visualization tool (excel to start, then PowerBI) to create a real time parts dashboard. It will give insight into parts on order, on hand, and work in progress as well. The forecast will be driven by our sales order pipeline.
3. **Rationale (list of reasons) for undertaking this project.**
   * As a startup we need to carefully manage cash flow to ensure parts ordered/on hand is no greater than 20% of parts required based on our machine sales orders. Aging inventory ties up cash flow, and in some cases, due to product design changes, may result in scrap/loss for parts that go end of life.
   * COVID has made sourcing parts challenging, therefore a real time dashboard is essential for forecasting parts months in advance
   * The ERP (Odoo) manages the entirety of our procurement/inventory/manufacturing services, and is a SQL DB that can integrate into automated workflows reporting (time savings)
   * The main driver of pursuing this project is to develop good habits early on. As we scale, we can continue to serve data in a nimble/meaningful way to the rest of the organization if we build a foundation early on.
   * Project scope will be identified by my management, our ERP consultant, and myself. This team will continue to review progress on reporting/automation integration from the Odoo ERP, and progressively serve more insights for executive management to drive discussions and decisions to manage supply chain and manufacturing operation.
4. **Proposed Project Purpose**
   * The client is my employer, Greyscale AI. They are an original design manufacturer that also manufactures their own Xray inspection machine for the food and beverage industry. Josh Sokoloff is my boss and the Chief Customer Officer, and his role is to manage business systems and manufacturing across the organization.
   * This project will assist Josh in providing real time insights to executives across the organization on day to day business activities, and plan procurement with our CFO based on quarterly forecasts.
5. **Project Objectives.**
   * Develop a functional supply chain forecast that automatically loads demand, current inventory, and inventory awaiting receipt, to plan a quarterly cast for parts required for machine builds
   * Develop a visualization (dashboard / report) that can be distributed to stakeholders across the organization for real time supply chain and manufacturing process views
   * Eliminate manual queries and excel tools, and focus on automated data reporting workflows (less manual error, and daily maintenance)
   * Establish working processes for data governance across the organization
6. **Application of Data Science Concepts.** 
   * Linear regression with confidence intervals to forecast upper/lower inventory bounds to build machines (DS740)
   * Data munging and cleansing from querying Odoo ERP using python (pandas/ and excel (DS710/715)
   * Real time dashboard, with time on x axis, and parts on y axis. Use color, formatting and font/size to present data in a clear and concise manner (DS775)
   * Data governance by establishing data cleansing practices (removing NAs/counting rows/standard formatting)
7. **Description of Final Document.**
   * Introduction (Client overview, scope, rationale)
   * Scope (What was done, and how it integrates with the business)
   * Architecture
   * Project Summary (what was done / tools used / data analysis techniques)
   * Results (measurable KPIs/KOIs)
   * Lessons Learned
   * Next Steps
8. **Project Timeline with Activities.**

Week 1

* + Discuss Capstone with my company’s management
  + Complete introduction discussion
  + Submit capstone project idea

Week 2

* + Develop excel report (draft) to test preliminary functionality
  + Review project proposal feedback, and submit project timeline and overview

Week 3

* + Architect solution, including roadmap (manual queries to automated workflow)
  + Research technologies and tools for modelling and visualization (including Odoo integration)
  + Complete Project discussion

Week 4

* + Review progress with management and solicit feedback
  + Share V1 of excel dashboard with management for preliminary review (data aggregation, cleansing, visualizing – manual)

Week 5

* + Research data engineering/automation functions
  + Enroll/conduct Odoo ERP Training
  + Enroll/conduct PowerBI Training

Week 6

* + Continue fine tuning feature selection for excel dashboard, and verifying data is accurate (consolidating inventory counts vs. ERP)
  + Identify functions required for SKLearn / Pandas data cleansing and modelling in python
  + Project Update 1
  + Chapter 1 submission for faculty comments

Week 7

* + Finalize excel dashboard for parts on hand vs manufacturing orders (month by month)
  + Test Odoo ERP automation (scheduled query and pull into python script)

Week 8

* + Continue development using PowerBI / Seaborn for dashboard
  + Continue development of SKLearn modules for machine forecasts
  + Project Update 2
  + Chapter 2 submission for faculty comments

Week 9

* + Complete functioning forecast and confidence interval dashboard based on ERP integration (Odoo)
  + Schedule script to run daily using CRON/Scheduled Action job
  + Complete draft of visualization dashboard in excel/PowerBI, with appropriate labelling, formatting and colors for management review

Week 10

* + Forecast and interval data verification
  + Incorporate management feedback from management on dashboard
  + Fine tune python script for data cleansing, formatting and export needs

Week 11

* + Finalize python forecasting and confidence interval script for parts (quarterly forecast for 1 year)
  + Chapter 3 submission for faculty comments
  + Project Update 3

Week 12

* + Work on final paper preliminary sections (introduction / scope / architecture)
  + Prepare access and cadence for automated reporting workflow (date/time, data refresh rate, formatting for specific stakeholders)

Week 13

* + Finish remaining sections of final paper (summary, results, lessons, next steps)
  + Project Update 4
  + Chapter 4 Submission for faculty comments
  + Turnitin submission for Chapters 1-4

Week 14

* + Submit final paper (client)
  + Present project during my employers all hands meeting (5 min)

Week 15

* + Submit self-reflection paper
  + Prepare all final documentation on capstone website form