

SEG 4105



Project Charter



Personal Food Log App: Smartphone - Based VBM System

Submitted by

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Project Charter

Project: Personal Food Log App Smartphone-Based Visual Balanced Meal (VBM) System

Course: SEG 4105 • Client: Digital Health Inc. (TA as customer) • Team: 4 students

Date: September 26, 2025

1. Purpose / Business Case

Digital Health Inc. leads in energy expenditure tracking but lacks a reliable way to measure energy intake. Current “photo food log” apps are either manual, inaccurate, or not scalable. This project addresses that gap by developing a smartphone app that logs what a person eats from images, with backend support for detecting visible ingredients and estimating calories. This will allow the company to offer a full intake expenditure system, which is more attractive to health clinics, dietitians, athletes, and individual users looking for serious accuracy.

Value: a complete intake/expenditure ecosystem, improved system through easy food logging using pictures for estimating calories.

2. Goal

Deliver a mobile app and cloud service that demonstrates the full workflow:

1. The user opens the app and captures meal photos (one or more, under normal lighting).
2. Images are uploaded securely to a cloud endpoint.
3. Backend runs a baseline ML pipeline that:
 - detects visible food items,
 - estimates volume using image geometry/auto-calibration assumptions,
 - converts volume → weight via density tables,
 - computes calories using nutrition tables.
4. The service returns a structured breakdown (items, estimated weights, calories, confidence) which the app displays clearly.

For this stage, accuracy will be shown only at a basic level. The Project Plan will outline the roadmap toward higher accuracy (datasets, incremental training, evaluation), consistent with the Request for Bid, which says that you only need to convince the customer of feasibility.

3. Objectives (SMART)

Mobile Capture and Display

Develop a cross-platform mobile interface (Android/iOS) that lets users capture meal photos and view a structured result from the backend.

- **Specific:** Camera capture and results screen implemented.
- **Measurable:** At least one end-to-end demo run shows a captured image and returned calorie breakdown.
- **Achievable/Realistic:** Uses standard device APIs and lightweight interface design.
- **Time-bound:** To be completed by November 20, 2025.

Cloud Service and Data Exchange

Deploy a cloud-based service on AWS that accepts uploaded images and returns structured responses in JSON format, enabling integration with the mobile app.

- **Specific:** Image upload, secure transfer, and response structure defined.
- **Measurable:** API specification plus sample requests/responses and tests.
- **Achievable/Realistic:** Initial implementation may simulate results rather than perform full food recognition.
- **Time-bound:** To be completed by November 20, 2025.

Calibration and Data Model Definition

Design a baseline auto-calibration approach (no external objects), with nutrition and density look-up tables and a standard schema for food logs.

- **Specific:** Document calibration approach, schema, and reference tables.
- **Measurable:** Short technical note and integrated code hooks.
- **Achievable/Realistic:** Limited to demonstration cases, aligned with “Request for Bid” constraints.
- **Time-bound:** To be completed by October 27, 2025.

Research and Benchmarking

Do a literature and dataset review for realistic performance targets.

- **Specific:** Summarize at least three peer-reviewed papers and two public datasets; outline an incremental training roadmap.
- **Measurable:** Deliver a 2–3 page research summary feeding into the Project Plan.
- **Achievable/Realistic:** Focus on widely available references (e.g. Food-101, Food Recognition 2022).
- **Time-bound:** To be completed by the first client feedback meeting (week of Oct 6, 2025).

Governance and Project Planning

Produce an IEEE-1058 aligned Project Plan covering requirements, work breakdown structure, schedule, risk/change/configuration management, and verification/validation processes.

- **Specific:** Complete plan structured to standard, with supporting documentation.
- **Measurable:** Submission reviewed and approved by TA.
- **Achievable/Realistic:** Uses provided templates and realistic estimates.
- **Time-bound:** To be completed by November 20, 2025.

4. Scope

In scope (this term):

- Cross-platform mobile capture (Android/iOS).
- Secure upload and a JSON-based API contract.
- Ingredient-level reporting for visually detectable components.
- Baseline pipeline (detection → volume → weight → calories) with simplified or mock outputs as needed.
- Simple, fast user flow with basic capture feedback.
- Small curated evaluation samples aligned with public datasets.
- AWS backend with minimal scalability/readiness.
- Privacy basics: consent screen, HTTPS, minimal retention.

Out of scope (this term):

- High level of accuracy.
- Full inference of non-visible ingredients (e.g., oil, salt, spices).
- App Store/Play Store release or production deployment.
- Big-data scaling or advanced personalization.
- Requiring users to place external reference objects in photos.

5. Deliverables & Acceptance Criteria

- Project Charter (this document) - approved by TA : **September 26, 2025**
- Research Brief - datasets, benchmarks, incremental training approach: **October 6, 2025**
- Architecture Note - system context, component diagram, request/response schema, calibration approach, and data model: **October 18, 2025**
- Proof of Concept (POC) - mobile app + AWS endpoint + baseline pipeline: **November 20, 2025**
- Project Plan (IEEE-1058) - requirements, WBS, schedule, risks, configuration/change, V&V: **November 20, 2025**
- Presentation & Demo: **November 21–28, 2025**
- Post-Performance Analysis (PPA): **December 5, 2025**

6. Stakeholders & Roles

- **Customer (Sponsor):** Digital Health Inc. (TA)
 - Approvals, feedback, evaluation.
- **Project Manager:** Nicholas
 - Schedule, quality, TA contact; contributes to API/tests.
- **ML Lead:** Reyaan
 - Pipeline design, dataset strategy, metrics.
- **Mobile Lead:** Jessica
 - Capture UI, device testing, API integration.
- **Backend Lead:** Kyro
 - AWS services, endpoint, CI integration.

Team Note: All four team members contribute to coding, reviews, and demo preparation.

7. Assumptions

- Public datasets (e.g. Food-101, Food Recognition 2022) remain accessible and meet the requirements for our project.
- The visible portion of a dish within the picture is assumed to be similar to the rest of the dish for the purposes of estimating volume/weight.
- The proof of concept will be evaluated mainly on demonstrating feasibility (end-to-end workflow), not on high level accuracy.
- AWS services are available throughout the project.
- Team members are engaged and have regular meetings and coordinate with each other.
- TA feedback meetings occur as scheduled.
- Tools and datasets required can be used under free/open licenses.

8. Constraints

- **Platform:** Must use Amazon Web Services (AWS).
- **Time:**
 - Charter due **September 26, 2025**,
 - Project Plan and Proof of Concept due **November 20, 2025**,
 - Presentation and Demo due **November 21–28, 2025**,
 - Post-Performance Analysis due **December 5, 2025**.
- **Team:** Four students; no external hires.
- **Compliance:** Only visually detectable ingredients are in scope; users will not place coins, rulers, or other reference objects for calibration.
- **Budget:** Prefer free/open tools and datasets; rely on AWS free tier/credits.

9. Risk Register

Legend:

Likelihood = Low (unlikely), Medium (possible), High (likely)

Impact = Low (minor), Medium (noticeable delay), High (jeopardizes demo)

ID	Risk	Likelihood	Impact	Owner	Mitigation	Trigger
R1	Food detection is weak, so the demo isn't convincing	Medium	High	ML Lead	Start with a proven baseline model and test on a small set of dishes. Have a simple backup (e.g. fixed labels) for demo day	If early test accuracy is poor or unstable
R2	Calibration is off, so portion sizes (volume/weight) are wrong	Medium	High	Backend Lead	Give users simple photo tips (angle/lighting) and assume a standard plate size, check against a few reference dishes. Warn the user when confidence is low	If sample checks show large errors
R3	App and API don't integrate cleanly	Medium	Medium	PM	Lock the JSON format early, create a basic test that runs on every build and do a short joint test session each week	If a change breaks the end-to-end path
R4	Schedule problems and not keeping up	Medium	High	PM	Weekly check-ins, cut non-essentials first, hold buffer time before Nov 20 and aim for an early doable path	If any week slips by >2 days
R5	Privacy concerns about photo/data handling	Low	High	PM	Use HTTPS, don't store photos unless needed, if stored, anonymize and delete quickly	If we need to store data beyond the demo
R6	Extra UI/features adds to workload	Medium	Medium	PM	Keep a "nice-to-have later" list, any change >1 day needs PM approval	When new requests appear during build
R7	Workload lands unevenly on one person	Medium	Medium	PM	Break work into small tasks with a clear owner, pair up on tricky items. PM watches workload and rebalances	If someone is blocked or overloaded

10. Change / Issue Management

The Project Manager maintains a simple change log. Any change that affects scope, schedule, or deliverables requires TA approval. Issues are reviewed in weekly team meetings and critical issues are communicated to the TA within 24 hours.

11. Success Criteria

- The app captures meals and returns a clear, itemized calorie breakdown from the cloud service within a target response time of \leq 5 seconds for demo dishes.
- The TA confirms the architecture and plan show a credible path to improved accuracy and scalability on AWS.
- All deliverables are submitted on time; the demo convinces stakeholders of feasibility.

12. Milestones

- Team formation & roles: [September 18, 2025](#)
- Charter submitted: [September 26, 2025](#)
- Research brief ready: [Week of October 6, 2025](#)
- API schema & Architecture Note: [October 18, 2025](#)
- Feedback #2 (POC checkpoint): [Week of October 27, 2025](#)
- Project Plan & POC demo: [November 20, 2025](#)
- Presentation & Demo: [November 21–28, 2025](#)
- Post-Performance Analysis (PPA): [December 5, 2025](#)

13. References

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- Liao, W., He, Y., & Li, X. (2015). Scalable cloud-based food recognition using deep learning. *Cluster Computing*, 18(4), 1431–1441. <https://doi.org/10.1007/s10586-015-0468-2>
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- Project Management Institute. (2021). *Project Charter*. PMI Knowledge Center.

Datasets:

- Kaggle. (2019). *Food-101 dataset*. <https://www.kaggle.com/dansbecker/food-101>
- Kaggle. (2022). *Food Recognition 2022 dataset*. <https://www.kaggle.com/datasets/sainikhileshreddy/food-recognition-2022>