

MSE 302 – Individual Project: Milestone 1 (IP: M1)

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Repository link: https://github.com/t8huang/mse302_ip_thomas_huang

Part 1 – Problem Brainstorm (max ~1 page)

In the table below are five distinct problem areas and brief summaries (2–4 sentences each).

#	Problem Area	Brief Summary
1	Urban Food Waste & Food Rescue	Restaurants and grocers discard significant amounts of edible food daily. A coordinated system is needed to signal surplus in real time, match it with nearby recipients (food banks, shelters, community fridges), and move it quickly under food-safety constraints. This has strong social and environmental benefits and requires thoughtful process and information-system design.
2	Medication Adherence for Seniors	Older adults often juggle complex medication schedules, leading to missed doses or errors. A solution could combine simple reminders, packaging, and caregiver visibility to improve adherence. Human factors (cognition, accessibility, trust) and regulatory/safety constraints are central.
3	Accessible Public Transit Navigation	People with disabilities face barriers navigating transit (e.g., elevator outages, unclear step-free routes). Improving transit apps/feeds to provide reliable, accessible routing and alerts can materially improve mobility and independence. Requires UX accessibility standards and integration with real-time data.
4	Digital Overload in the Workplace	Workers are overwhelmed by constant messages, meetings, and alerts. An intervention—policy or tool—could reduce low-value communication and help focus time on deep work. Measuring impact (e.g., interruption rate, task completion) and change management are key.
5	Recycling Contamination in Smart Cities	Contamination causes recyclables to be landfilled and raises processing costs. A solution could blend just-in-time guidance (signage/app) with sensing or post-collection sorting support. Behavioral nudges and feedback loops would be important to sustain correct habits.

Evaluation of the Five Ideas & Rationale for Selection

All five ideas are authentic and valuable. The medication adherence concept scores very high on impact but may be harder to scope due to health/privacy constraints. Digital overload is feasible but difficult to validate beyond a small context. Accessible transit and recycling contamination both offer clear societal value and interesting data/UX challenges. The strongest balance across the criteria is **Urban Food Waste & Food Rescue**: it features high social and environmental impact, multi-stakeholder process design, tractable secondary research, and known exemplars to benchmark for gaps. Therefore, I select **Urban Food Waste & Food Rescue** for the contextual research plan.

Part 2 – Contextual Research Plan into Chosen Problem (max ~5 pages)

Step 1: Define Areas for Research

Initial Problem Statement

In cities, large quantities of safe, edible food are discarded daily by restaurants, grocers, and cafeterias while many residents face food insecurity. A fast, trusted mechanism is needed to identify surplus food, match it to appropriate recipients, and move it within safety windows. The design challenge is to specify a process and information system that enables reliable, low-friction redistribution under constraints of perishability, safety, and logistics.

What is Known (from secondary sources and public reports)

- Food waste is a documented sustainability and social issue; governments and NGOs have strategies to reduce it.
- Only a fraction of surplus food is currently rescued; existing platforms and charities demonstrate partial but limited capture of this surplus.
- Food insecurity coexists with surplus; charities report variable supply and resource constraints (transport, cold chain, volunteer availability).
- Donation is permitted under guidelines and liability protections in many jurisdictions; best-practice guidance exists for safe handling.
- Several solution archetypes exist: B2B donation matching platforms, consumer-facing 'surplus deals', community fridges, and coordinated NGO logistics.

What is Assumed (to be validated)

- Businesses will donate if the process is easy, timely, and liability-safe.
- A lightweight marketplace model (real-time listings/matching) can efficiently connect donors and recipients.
- Safety and quality can be preserved with clear rules, simple tooling (labels, time stamps, insulated carriers), and rapid pickup.
- Non-monetary incentives (recognition, impact reporting) and/or small benefits (reduced disposal cost, tax receipts) can sustain participation.

What is Unknown (research questions)

- Which barriers matter most to donors (time, awareness, liability, storage, transport)?
- Which items/conditions are most useful to recipients, and what causes rejection or waste at the receiving end?
- Typical timing/volume patterns of surplus by donor type; implications for pickup capacity and routing.
- Practical safety constraints and minimal viable controls (e.g., time-temperature rules) for prepared vs. packaged foods.
- Sustainable incentive structures and governance (who operates the system, how costs are covered).

Decomposition into Aspects

- Processes & Steps: Surplus identification → listing & matching → pickup/transport → distribution → feedback/impact logging.
- People & Roles: Donors (restaurants/grocers), recipients (food banks/shelters/community fridges), volunteer/driver network, coordinators, city/regulators.
- Interactions: Donor ↔ platform; donor ↔ recipient; drivers ↔ donor/recipient; platform notifications, confirmations, receipts.

- Environment & Context: Urban density/traffic/parking; regulations; socioeconomic factors; tech readiness; seasonal/weather impacts.
- Analogous Contexts: Ride-hailing/delivery dispatch; charitable goods donation workflows; demand-response logistics; resource-sharing communities.

Step 2: Define Sources and Methods

Key Publications / Media / Databases

- Government/NGO reports on food loss and waste (e.g., Environment & Climate Change Canada; municipal waste strategies; UN SDG 12.3 materials).
- Research papers on donation logistics, last-mile rescue, safety in surplus redistribution, and behavior change in waste reduction (Scopus/Google Scholar).
- Platforms and program sites (e.g., FoodRescue.ca, Too Good To Go, Olio) including FAQs, case studies, and any published impact stats.
- Media coverage and practitioner blogs about food rescue operations, community fridges, and donor perspectives.
- Local statistics/open data (food bank usage, waste audits) where available.

Key People / Stakeholders (for perspective gathering)

- Restaurant/café and grocery managers (donor practices and pain points).
- Food bank/shelter coordinators (usefulness of donations, constraints, logistics).
- Volunteer drivers/dispatchers (routing, handoff, cold chain practicalities).
- City sustainability/health officials (guidelines, incentives, liability context).

Methods for Collecting Information (secondary emphasis)

- Literature review with targeted keywords (e.g., “food donation logistics”, “surplus food rescue”, “community fridge operations”, “cold chain in food donation”).
- Benchmarking of existing tools/programs: process mapping, feature comparison, identification of gaps/opportunities.
- Media/social media scan for real-world pain points and successes (e.g., Reddit threads from donors/volunteers; local news case studies).
- Optional brief stakeholder conversations or email exchanges (opportunistic, to validate assumptions or uncover blind spots).
- Synthesis: content analysis; simple affinity clustering; needs/priorities mapping to identify “most important, least satisfied” needs.

Step 3: Research Plan Timeline (to Milestone 3 – Oct 10)

Task	Method	Time Estimate
Review core reports & 3–5 papers	Collect key government/NGO reports and academic articles; extract statistics and constraints	6 hours
Benchmark existing solutions	Analyze FoodRescue.ca, Too Good To Go, Olio, community fridge	5 hours

playbooks; feature/process comparison

Stakeholder perspective scan	Secondary sources (blogs/forums); optional 1–2 short conversations or emails with a donor/receiver	6 hours
Regulatory & best-practice review	Summarize donation guidelines, liability protections, and minimal safety controls for various food types	4 hours
Analogous models exploration	Review ride-hailing/dispatch optimization and community resource-sharing insights for transferable ideas	3 hours
Synthesis & problem refinement	Affinity themes, needs/priorities matrix; initial system requirements/opportunities draft	4 hours
Optional additional interviews	If available, 1–2 targeted chats (e.g., city official/food bank coordinator) to close key unknowns	3 hours