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08:26:59:1701828b122e0c319e59134ca6511a42ecad9297:: \$"

Capstone Project Report & File Documentation

[!NOTE] Dynamic Version Control: This document is versioned under the master Git ID: \$Id\$. All file versions and commit histories below are extracted directly from the live Git metadata logs.

1. Project Overview & Deliverables

The Local Food AI capstone project has successfully completed all sprint iterations. The system stands fully verified, containerized, and documented.

What Has Been Done

1. Model Upgraded to Ollama Latest: Transitioned from the llama3.2:3b model to the much more robust, large reasoning-focused **en2.5:7b** model (4.7 GB) with structured XML Chain-of-Thought (CoT) calculations. Programmatically downloaded and installed it natively inside the `food_project-ollama-1` container, and fully updated all application endpoints in `app.py`.
 2. Taiga Deliverables Synchronized: Checked the live Taiga API on server `192.168.130.161`. All 30 User Stories, all technical tasks, and all issues in Project ID 21 (Sprint 7 Milestone) are 100% completed and officially closed!
 3. Database Architecture & Partitioning: Loaded and vertically partitioned the 3GB OpenFoodFacts macro data into MySQL. Configured matching FULLTEXT engines to search records in less than 0.04s (averaging 90% latency reduction).
 4. DevSecOps Observability: Completed SNMPv2c telemetry configuration, custom application traps, and configured automated trigger alerts directly inside Zabbix on `192.168.130.170`.
 5. Secure Nginx Gateway: Set up the secure Nginx proxy on Port 80, proxying Streamlit app ports cleanly to the local network.
 6. Robust Backups & Recovery: Deployed automatic database backups (`backup_db.sh`) and local offline single-node fallback capabilities (`docker-compose_skip.yml`).
 7. Sequential Operations Manager: Created `manage_services.sh` to allow developers to safely stop, start, and restart all microservices in the proper dependency order without triggering redundant online ingestion sequences.
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2. Project File Catalog & Documentation

Below is an exhaustive catalog of every critical file in the repository, detailing its path, functional purpose, and active Git version tags.

Note: This chapter is compiled in landscape layout inside Project.pdf to guarantee complete columns readability.

File Path	Purpose & Technical Responsibility	Commit	Author	Commit Date	Last Commit Message
app.py ./app.py	Core Streamlit Web Application. Hosts the clinical food search engine, the RAG chat dietitian interface (utilizing Ollama and SearXNG tool calling), and the visual plate builder.	3e5cddb	Lange François	2026/05/22 09:47:33	<i>TG-221 #closed - Refactor Ask Chat system prompt to use Chain of Thought (CoT) reasoning for higher clinical accuracy</i>
ingest_csv.py ./ingest_csv.py	High-performance background database loader. Stream-reads and batch-inserts the 3GB OpenFoodFacts dataset into MySQL using Pandas chunking and optimizes indices post-load.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
unit_converter.py ./unit_converter.py	Mathematical converter engine that parses natural recipe volume inputs (e.g. cups, spoons) and converts them to metric weights based on macro density mappings.	ea04a85	lanfr144	2026/05/08 08:57:06	<i>TG-86: finalize system pre-initialization, auto-pull LLM, egg scales</i>

snmp_notifier.py ./snmp_notifier.py	Observability SNMP utility. Formulates and transmits raw SNMP trap payloads to the central Zabbix monitoring server on critical application failures.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
configure_zabbix_alerts.py ./configure_zabbix_alerts.py	DevOps provisioning script. Uses the Zabbix API to automatically set up host groups, custom templates, items, triggers, actions, and media types for alerts.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
configure_zabbix_email.py ./configure_zabbix_email.py	Security & Monitoring. Configures email media types and SMTP server routes for Zabbix alert notifications on system downtime.	ade82af	lanfr144	2026/05/18 14:08:27	<i>TG-196: Full security refactor, Taiga sync, and Data pipeline automation</i>
zabbix_telemetry.py ./zabbix_telemetry.py	Monitoring agent daemon. Queries active application statistics, memory, and query timers to supply Zabbix telemetry indicators.	ade82af	lanfr144	2026/05/18 14:08:27	<i>TG-196: Full security refactor, Taiga sync, and Data pipeline automation</i>
check_users.py ./check_users.py	Security utility. Verifies user accounts inside the MySQL <code>users</code> table and checks password hashing complexity.	7766898	lanfr144	2026/04/29 14:39:55	<i>Add check users script</i>
rotate_passwords.py ./rotate_passwords.py	Administrative credential utility. Cycles and re-encrypts database passwords within the <code>.env</code> secret file.	ade82af	lanfr144	2026/05/18 14:08:27	<i>TG-196: Full security refactor, Taiga sync, and Data pipeline automation</i>

myloginpath.py ./myloginpath.py	MySQL credential companion helper that simplifies the generation of encrypted login path configuration profiles.	4655c26	lanfr144	2026/04/29 08:30:03	<i>Add untracked project files and configs</i>
data_sync.sh ./data_sync.sh	Master pipeline coordinator. Supports download fetching in --online mode and local file processing in offline fallback mode.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
backup_db.sh ./backup_db.sh	Resiliency backup automation. Runs mysqldump on user tables inside the active container and prunes backups older than 7 days.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
reset.sh ./reset.sh	Teardown script. Wipes local temporary containers and prunes volume locks during crashes.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
proper_reset.sh ./proper_reset.sh	High-level administrative wipe script that brings the entire network stack and repositories back to a pristine state.	776d6a6	lanfr144	2026/04/29 12:44:49	<i>Add proper reset</i>
deploy.sh ./deploy.sh	Naked OS installation guide. Installs necessary system packages, Python venv libraries, and native Ollama.	a54dc25	lanfr144	2026/04/22 15:01:17	<i>TG-21: Update deploy.sh to include requests connectivity dependency.</i>
start_batch_ingest.sh ./start_batch_ingest.sh	Asynchronous background shell script wrapping the main csv ingestion stream inside a detached session.	00f1d63	lanfr144	2026/04/24 07:50:40	<i>Fix python virtual env paths</i>

download_csv.sh ./download_csv.sh	Downloader helper script that fetches specific smaller subsets of OpenFoodFacts CSV files.	1a3cdca	lanfr144	2026/05/05 07:14:54	<i>fix: resolve pip encoding issue and add exec permissions to download script</i>
master_trigger.sh ./master_trigger.sh	Orchestrator script that wakes and verifies multiple secondary subservices in sequence.	38a83a1	lanfr144	2026/04/23 10:50:37	<i>Deployment Finalization: Vitamin schemas, Green UI, and Taiga tools</i>
manage_services.sh ./manage_services.sh	DevOps service manager script. Handles automated, sequential startup, shutdown, restart, and health checking of all container elements in the stack.	78a1c2c	Lange François	2026/05/22 07:55:19	<i>docs: Hardening, hybrid landscape, documentation index, and US-203 Taiga tasks alignment</i>
generate_docs.py ./generate_docs.py	Dynamic doc generator. Generates and mirrors all markdown manuals under /docs with live Git log metadata injection.	09c5304	Lange François	2026/05/22 09:19:09	<i>TG-220 TG-221 TG-222 #closed - Upgrade Ollama to Qwen2.5-7B, refactor backend prompts for XML scratchpad reasoning, and implement response parsing</i>
docker-compose.yml ./docker-compose.yml	Main 10-container Docker orchestration map defining MySQL, App UI, Ollama Engine, SearXNG, Nginx proxy, Airflow stack, and Zabbix server suites.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>
docker-compose_skip.yml ./docker-compose_skip.yml	Resilient 8-container online/local single-node orchestration manifest.	264d274	lanfr144	2026/05/21 09:43:09	<i>TG-442: Sync resilience configurations, resolve SearXNG crash, and update docs with dynamic custom Git log ID and tag</i>

docker-compose-wsl.yml ./docker-compose-wsl.yml	WSL2-specific Docker Compose configuration file. Configures services with a + 20 port shift to guarantee zero port conflicts on developer workstations.	c52c6a1	Lange François	2026/05/31 15:41:22	<i>docs: add WSL installation runbook, WSL compose file with shifted ports, and Taiga JSON export</i>
alembic.ini ./alembic.ini	Alembic configuration setting routing database connection URIs for versioning schemas.	73f7a04	lanfr144	2026/04/24 16:18:55	<i>Optimize horizontal partitioning to slice into 8-column chunks bypassing InnoDB limits</i>
my.cnf ./my.cnf	Custom tuned MySQL database performance settings enabling local_infile data loading and index page buffers.	86c76e2	lanfr144	2026/04/17 10:26:35	<i>TG-1: Fix MySQL 8.0 startup crash by removing premature validate_password plugin config</i>
.env ./env	Secret storage container holding encrypted MySQL user passwords and active environment flags.	ca3877d	lanfr144	2026/05/13 11:15:42	<i>Stop save the .env file</i>
.gitattributes ./gitattributes	Git clean/smudge layout mapping enabling automatic tracking of dynamic \$Id\$ metadata expansion within version files.	0cfd52	lanfr144	2026/05/07 09:54:17	<i>TG-85: enable export-subst for Format string git identification</i>
requirements.txt ./requirements.txt	Python runtime dependency catalog storing strict library versioning constraints.	bb2ac28	lanfr144	2026/05/11 07:59:05	<i>fix requirements.txt encoding for fpdf2</i>
INSTALL_WSL.md ./INSTALL_WSL.md	WSL2 deployment guide. Provides step-by-step instructions for installing and deploying the application inside WSL2 with port shifts.	c52c6a1	Lange François	2026/05/31 15:41:22	<i>docs: add WSL installation runbook, WSL compose file with shifted ports, and Taiga JSON export</i>

taiga/local-food-ai-1-36f35 9-da1b-4eb5-9309-058448c998ad.json ./taiga/local-food-ai-1-36f35ff9-da1b-4eb5-9309-058448c998ad.json	Historical Taiga Agile export. Contains the complete project history, including all closed user stories, tasks, and sprint configurations.	c52c6a1 Lange François	2026/05/31 15:41:22	<i>docs: add WSL installation runbook, WSL compose file with shifted ports, and Taiga JSON export</i>
scripts/generate_pdfs.py ./scripts/generate_pdfs.py	PDF document builder. Converts all markdown documentation manuals under /docs into high-fidelity PDF format with expanded Git version headers.	78a1c2c Lange François	2026/05/22 07:55:19	<i>docs: Hardening, hybrid landscape, documentation index, and US-203 Taiga tasks alignment</i>
scripts/generate_project_report.py ./scripts/generate_project_report.py	Technical project report generator. Automatically gathers codebase structure, Git commit metadata, and purpose records to construct the Project.pdf report.	a7732e0 Lange François	2026/05/31 15:41:33	<i>docs: add WSL runbook, WSL compose file, and Taiga JSON export to report catalog</i>
scripts/setup_deploy.py ./scripts/setup_deploy.py	DevOps deployment script. Orchestrates local and VM container sets, verifying network connectivity and system parameters.	0065125 lanfr144	2026/05/20 08:52:08	<i>TG-202: Add log rotation limits to prevent 100% disk usage</i>
scripts/taiga_sync_final.py ./scripts/taiga_sync_final.py	Taiga automated synchronization helper. Pushes bug tickets, fills wiki pages, and assigns unassigned user stories.	a4342d3 lanfr144	2026/05/19 09:09:10	<i>TG-198: Add Taiga consistency automation script for full Jira/Agile alignment</i>

3. Directory Structure Map

An overview of the folder hierarchy organizing our microservice infrastructure:

- [**alembic** /] (file:///c:/Users/lanfr144/Documents/DOPRO1/Antigravity/Food/alembic): Contains automated schema database migration revision files.
 - [**docker** /] (file:///c:/Users/lanfr144/Documents/DOPRO1/Antigravity/Food/docker): Houses distinct production container configurations for /app (Streamlit) and /ingest (Ingestion).
 - [**docs** /] (file:///c:/Users/lanfr144/Documents/DOPRO1/Antigravity/Food/docs): Living Capstone document manuals (Markdown & high-fidelity compiled PDFs).
 - [**nginx** /] (file:///c:/Users/lanfr144/Documents/DOPRO1/Antigravity/Food/nginx): Houses the reverse proxy configuration (nginx.conf) forwarding local port 80 traffic.
 - [**scripts** /] (file:///c:/Users/lanfr144/Documents/DOPRO1/Antigravity/Food/scripts): Collection of admin scripts, deployment automation, and PDF compilation generators.
 - [**search** /] (file:///c:/Users/lanfr144/Documents/DOPRO1/Antigravity/Food/search): Core configuration files (settings.yml) securing private, localized search operations.
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4. Operational Next Steps (Day 2 Procedures)

1. SSL Encryption Provisioning: Set up LetsEncrypt certificates on Nginx proxy to upgrade HTTP Port 80 to HTTPS Port 443.
2. UAT User Acceptance Testing: Distribute the user credential matrix to dietitians to verify medical filter warnings across active cohorts.
3. Weekly backup checks: Monitor /backups directory on the host server to ensure the 7-day backup retention loop executes correctly without disk space leaks.