

PFE BOOK

2025-2026

WE ARE HYDATIS, WE HELP BUILDING THE NEXT GENERATION OF IMPACTFUL,
SCALABLE AND SUSTAINABLE STARTUP

CONTENT



1 ABOUT US

2 PROJECTS AVAILABLE

3 HOW TO APPLY?



ABOUT US

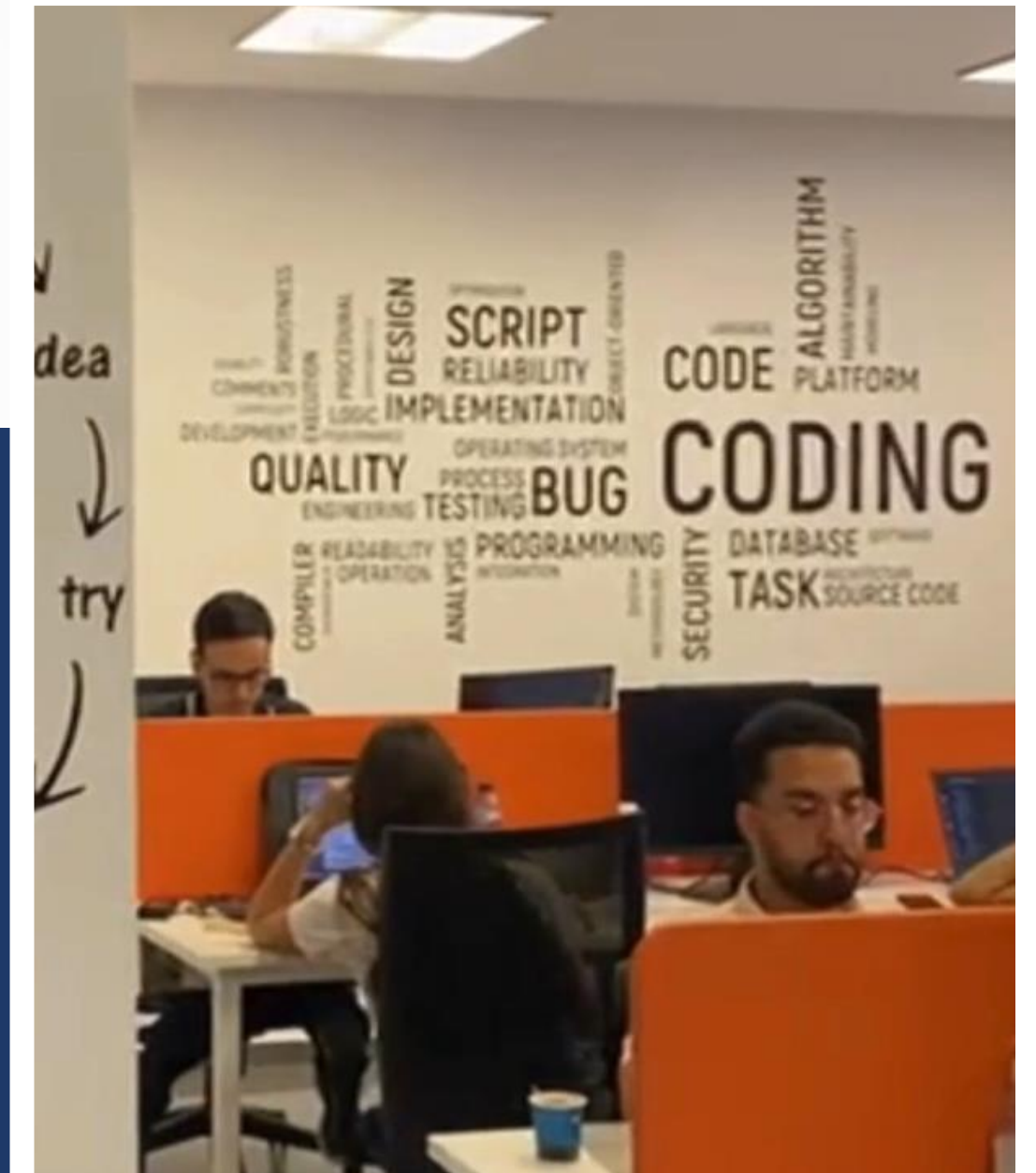
QUALITY IS OUR PRIORITY

We are a product-focused Tech venture studio

We partner with ambitious people and companies to build digital products and experiences

We help businesses make big decisions about their future by making tangible versions of tomorrow

Our studio envisions, design, build and launch digital products that bring value to business and people



HYDATIS VALUES



TOPICS

1 Generative IA

2 Digital experience

3 Internet of Things
& Embedded system

4 AI Agents & Autonomous
Systems

5 SecureTech

6 ClimateTech & AgriTech

7 Mobile



Generative AI



Subject 1: IA-01

Title: Design of an Advanced Cognitive Assistant for Interactive Multidimensional Analysis and Intelligent Synthesis of Contextualized Insights within a Decision Dashboard

Technologies: NLP (spaCy, NLTK), open-source generative AI, Python for AI model development, Java for backend integration, Angular for the user interface, PostgreSQL for insights storage.

Subject 2: IA-02

Title: Design and Refinement of an Advanced AI Solution for Dynamic Speech Transcription and Contextual Semantic Analysis of Phone Alerts for an Anti-Aggression Platform

Technologies: Open-source speech recognition (Coqui STT), NLP analysis (spaCy), Python for modeling and audio processing, Java for backend integration, Angular for the user interface.

Subject 3: AI-03

Title: Design of an Intelligent System for Automating Responses to Requests for Proposals (RFPs) Using Generative AI Models and Data Optimization Mechanisms for Contextualized and Personalized Responses.

Technologies: NLP and generative AI (Hugging Face Transformers), Python for model development and data processing, Java for the backend, Angular for the user interface, PostgreSQL for storing response data.



DIGITAL EXPERIENCE

Subject 1: GL-1

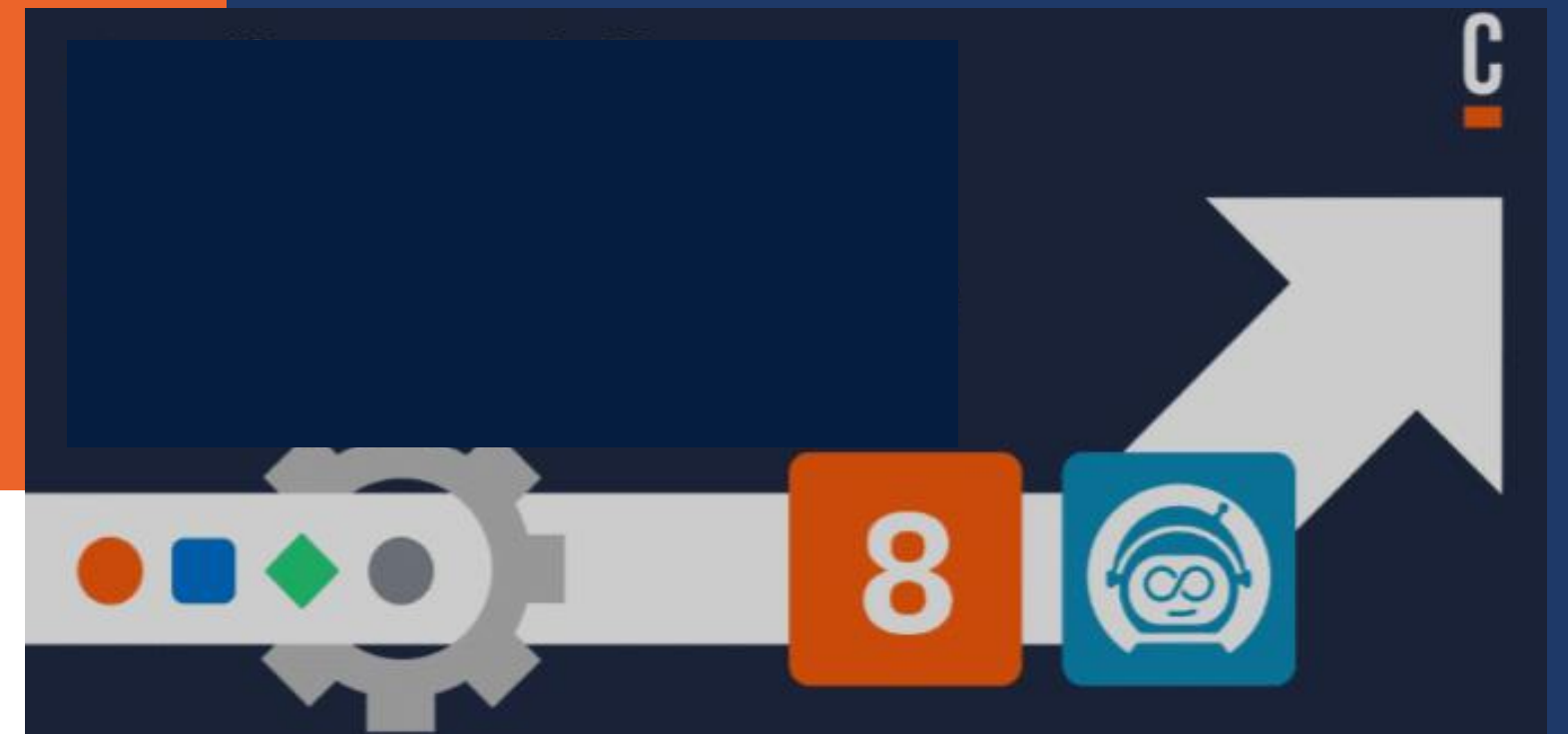
Title: Development of a Business Workflow Orchestration System Based on Camunda and Enhanced with AI for Process Prediction and Adaptation

Technologies: Camunda BPM, Spring Boot for workflow orchestration, Java for backend development, Angular for the user interface

Subject 2: GL-2

Title: Design and Development of a Dynamic Reporting Module for an Automated Human Resource Management System, with IoT Integration and Predictive Analysis of HR Data

Technologies: Jaspersoft for reporting, Spring Boot for the backend, Java, Angular for the user interface, PostgreSQL for HR data management.



DIGITAL EXPERIENCE

Subject 3: GL-3

Title: Development of a Modular and Responsive Interface for Real-Time Integration and Analysis of Environmental Data Streams on an IoT Platform, Optimizing Decisions through AI

Technologies: Mosquitto MQTT for IoT message management, Spring Boot for data processing, Java for the backend, visualization framework (Grafana), Angular for the user interface.

Subject 2: GL-2

Title: Development and Implementation of a GIS Mapping System for Vehicle Position Validation and Parking Management Optimization, Integrating Real-Time Data to Enhance User Experience and Space Planning.

Technologies: PostGIS for spatial database, Java and Spring Boot for the backend, mapping visualization framework (Leaflet or OpenLayers), PostgreSQL.



Internet of Things & Embedded system

Subject: IoT-01

Title: Integration and optimization of an IoT system based on Raspberry Pi, STM32, and LoRa Kit for real-time monitoring of environmental parameters and automated management of actuators on a connected platform, utilizing bidirectional communication with protocols such as MQTT, CoAP, and TCP/IP

Technologies: Raspberry Pi, STM32, LoRa Kit for sensors, MQTT and CoAP protocols, Java with Spring Boot for data processing, Angular for the user interface.



Mobile

Subject: Mob-1

Title: Development of an Intelligent and Interactive Mobile Application for Real-Time Monitoring and Proactive Management of Environmental Parameters, Integrating Predictive Mechanisms and Alert Notifications for Efficient Energy Optimization

Technologies: Ionic (mobile framework based on Angular), Java for the backend, Mosquitto for notifications via MQTT, integrated predictive analytics.



AI Agents & Autonomous Systems

Subject: AI Agents-1

AI Agent for Autonomous Market Intelligence & Lead Detection

Objective

Design and prototype an autonomous agent that performs continuous **commercial watch**, detects relevant **market signals**, and **generates potential leads or alerts** for the sales team.

Key Features

Daily scanning of open web sources (news, tenders, social, competitor sites, etc.)

Extraction of relevant info (keywords, named entities, opportunities, trends)

Scoring and prioritization of insights (relevance, urgency, strategic fit)

Periodic report generation or live dashboard updates

Optional: chatbot/assistant interface to interact with the agent

Technological Environment

Languages: Python (Scrapy, Asyncio), LangChain or CrewAI

NLP Models: OpenAI, HuggingFace, spaCy

Data sources: Web scraping, RSS feeds, APIs, LinkedIn/Twitter (if accessible)

Tools: ElasticSearch for indexing, Streamlit/Dash for front-end

Architecture: Event-driven micro-agent architecture (async), Docker



AI Agents & Autonomous Systems

Subject: AI Agents-2

PFE 1 – Master AI Agent for Intelligent Insurance Routing

Objective

Design a central AI agent that analyzes a user's personal or company profile and intelligently routes the request to the appropriate specialized insurance advisor agent (health, car, crop, business, etc.).

Key Features

- User profile classification (NLP + structured data)
- Smart routing based on insurance type, urgency, and context
- Orchestration of sub-agents and aggregation of their responses
- Unified user interface for recommendations

Stack: Python, LangChain or Autogen, FastAPI, Redis queue, JSON schemas, Streamlit or React



AI Agents & Autonomous Systems

Subject: AI Agents-3

AI Advisor Agent for Health & Life Insurance

Objective

Develop a specialized AI agent that recommends the best health or life insurance plans for individuals, based on age, family status, medical history, risk tolerance, and budget.

Key Features

Personalized plan comparison (hospital, dental, life, disability...)
Simulation of premium vs. coverage scenarios
Integration with regulatory constraints or eligibility rules
Clear output: "best plan + why + alternatives"

Stack: Python, HuggingFace (NER, classification), rule engine (Durable Rules / custom), Pandas, Streamlit



ClimateTech & AgriTech

Subject : Clim-01

Design of a Parametric Crop Insurance Index Using Satellite Data for Smallholder Farmers

Technological Environment:

Languages: Python (pandas, numpy), R (optional)

Data Sources: NDVI (MODIS, Sentinel-2) via Google Earth Engine, CHIRPS rainfall data

Tools:

Google Earth Engine for satellite data extraction and processing

Jupyter Notebook for data analysis

Scikit-learn for basic modeling

QGIS for spatial mapping

Storage & Visualization: PostgreSQL/PostGIS + Metabase or

Dash/Plotly for data visualization



ClimateTech & AgriTech

Subject : Clim-02

Evaluating Basis Risk in Index-Based Agricultural Insurance: A Comparative Study Using Satellite vs. Ground Weather Data Technological Environment:

Languages: Python (pandas, matplotlib, geopandas)

Data Sources: CHIRPS (weather), Sentinel-2/NDVI (GEE), FAOStat (yields if available)

Tools:

- Google Earth Engine for remote sensing

- Scikit-learn for correlation and statistical modeling

- GeoPandas and Folium for geospatial visualization

- Jupyter Notebook for interactive reporting

Storage: SQLite or PostgreSQL with PostGIS



ClimateTech & AgriTech

Subject : Clim-03

Modeling and Pricing an Agricultural Insurance Product Using Open Data and Agro-Climate Variables

Technological Environment:

Languages: Python or R

Data Sources: WorldClim, SoilGrids, FAO, CHIRPS, Sentinel

Tools:

Scikit-learn or Statsmodels for modeling

Streamlit or Dash for interactive pricing simulation

PostgreSQL database for structured data

Git for version control

Optional: Google Colab or AWS EC2 for scalable computation



ClimateTech & AgriTech

Subject : Clim-04

Risk Dashboard for Agricultural Insurance Stakeholders Using Open Climate and Satellite Data

Technological Environment:

Languages: Python (backend), JavaScript (optional for frontend)

Frameworks:

Streamlit or Dash for fast web app development

Leaflet.js or Kepler.gl for interactive maps

Data Sources: Google Earth Engine API, openMeteo, FAO, Sentinel

Storage: Firebase or PostgreSQL

Deployment: Docker + Heroku / Vercel / Streamlit Cloud



ClimateTech & AgriTech

Subject : Clim-05

Assessing the Impact of Climate Change on the Viability of Index-Based Insurance for Smallholder Farmers

Technological Environment:

Languages: Python or R

Data Sources:

Climate projections (CMIP6) via Copernicus

Historical weather data (CHIRPS), NDVI (MODIS), FAO crop yield stats

Tools:

xarray / netCDF4 for large-scale climate data

Time series models: Prophet or ARIMA

Matplotlib / Seaborn for data visualization

Jupyter Notebooks + Git for documentation and reproducibility



Securetech

Subject: Sec-01

Smart Video Management Platform for Real-Time Event Detection

Objective

Design and prototype a VMS module that uses AI to detect specific events (e.g. intrusion, abandoned object, crowding) from IP cameras in real time.

Key Components

Video ingestion from RTSP streams

Object detection and event classification using AI (YOLOv8, MobileNet, etc.)

Real-time alerting system (dashboard + notifications)

Optional: integrate with an existing VMS (open-source like ZoneMinder or Shinobi)

Technological Environment

Languages: Python (OpenCV, TensorFlow/PyTorch), Node.js (backend if needed)

Tools:

GStreamer / FFmpeg for video streams

YOLOv8 or MediaPipe for detection

Redis + WebSocket for real-time push

Streamlit or React for front-end interface

Deployment: Docker, local server or edge device (e.g. NVIDIA Jetson)



Securetech

Subject: Sec-02

Video Management Dashboard with Multi-Camera Analytics and Metadata Search

Objective

Build a lightweight VMS dashboard that allows multi-camera visualization, event tagging, video archiving, and intelligent search based on metadata (e.g. person/vehicle/color).

Key Components

Multi-camera viewer UI

Storage strategy (motion-based, time-based, or object-based recording)

Metadata extraction (labels, timestamps, types)

Semantic search (e.g. "find all red vehicles between 14h–16h")

Technological Environment

Languages: Python (FastAPI), JavaScript (React.js)

Tools:

OpenCV + DeepStream SDK or OpenVINO

Elasticsearch or PostgreSQL for metadata indexing

Docker Compose for deployment

Optional: integration with Milestone/ONVIF APIs for professional VMS



Securetech

Subject: Sec-01

Cloud Video Management System & Real-Time Mobile Streaming for Multi-Brand Cameras

Objective

Design and implement a scalable VMS solution that can:
Ingest and store RTSP/ONVIF video streams from various camera brands

Save video recordings to a centralized cloud storage (S3-compatible)

Provide secure, real-time video playback through a cross-platform mobile application

Key Features

Multi-camera and multi-brand support (via ONVIF/RTSP)

Real-time streaming (WebRTC or HLS) to mobile

Cloud video archiving and metadata organization

Basic stream health monitoring and user access control

Technological Environment

Languages: Python or Node.js (backend), React Native (mobile)

Protocols: RTSP, ONVIF, WebRTC, HLS

Tools: FFmpeg, GStreamer, MinIO or Amazon S3, PostgreSQL

Deployment: Docker, optional Kubernetes for scaling



HOW TO APPLY ?

- 1 **TAKE ON THE CHALLENGE**
- 2 **Attach an updated CV (French or English)**
- 3 **Specify the reference of the topic chosen as an object**
- 4 **Email: stages@hydatis.fr www.hydatis.com**



contact us



stages@hydatis.fr



www.hydatis.com



Tunisie: Centre Urbain Nord, Immeuble Golden Tower

France : 12 Rue Paul Demange, Meudon la forêt