



M2 Internship - Front-end / Cloud Integration / Medical AI

Development of a medical-AI demonstrator

Front-end engineering and OVH Cloud orchestration

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Project: AI-assisted analysis of stroke MRI

Duration: 5-6 months - Indicative period: February-August 2027 - Gratification: legal rate in force

Subject

Design and implement the front-end of the medical-AI demonstrator and ensure its end-to-end integration with the existing backend services and OVH Cloud infrastructure. The intern will develop a robust clinical-facing Web application able to upload multimodal MRI data, launch an AI analysis, monitor its execution, visualize the produced results and coordinate the underlying on-demand GPU workflow. The objective is not a stand-alone Web interface, but an integrated demonstrator in which user interaction, asynchronous processing, cloud resources and AI services behave as a coherent system.

Position of the problem

A first proof of concept is already operational. It provides user authentication, an analysis history, MRI upload, execution of lesion/thrombus analysis pipelines, and 3D visualization of input images and segmentation results. The deployed platform includes a Web dashboard, backend services, RabbitMQ, a reverse proxy, Portainer and an OVH GPU instance manager. A permanent CPU server hosts the platform, while a GPU instance is created on demand when an analysis is launched.

The present challenge is to evolve this proof of concept into a *robust maturation demonstrator*. From the user's point of view, launching an analysis should trigger a reliable workflow such as

Web UI → API / job creation → GPU provisioning → AI execution → results → visualization.

This workflow must remain understandable and recoverable when a GPU flavor is unavailable, provisioning fails, a service is temporarily unreachable, or an AI task terminates with an error. The front-end must therefore expose meaningful task states and provide the integration layer between the clinical workflow and the distributed platform.

Internship objectives

- **Front-end architecture and UX/UI.** Redesign the current user interface as a modular, maintainable Web application. Implement authentication, analysis history, creation of a new analysis, drag-and-drop upload of MRI sequences, progress/status views, result download and integration of the existing 3D medical-image viewer. The interface will be refined using feedback from clinical and project users.
- **End-to-end analysis workflow.** Implement the complete life cycle of an analysis, from submission to result availability. Formalize explicit states such as *queued*, *provisioning*, *running*, *completed* and *failed*, and ensure that state changes are propagated consistently between backend and front-end.
- **OVH Cloud orchestration.** Integrate the front-end/backend workflow with the on-demand GPU mechanism. The demonstrator must request a GPU resource, detect when it is ready, start the AI workload, collect the results and release the resource. Particular attention will be paid to timeouts, unavailable GPU flavors, changes in the OVH catalog and fallback strategies when the preferred resource cannot be allocated.
- **Asynchronous communication and resilience.** Interface with the existing backend and message-queue architecture so that long AI jobs never block the Web layer. Compare or implement suitable mechanisms for job-state updates (controlled polling, Server-Sent Events or WebSocket, depending on the retained architecture). Define clear user-visible error handling for upload, provisioning, communication and AI execution failures.
- **Integration and observability.** Stabilize API contracts and data models with the backend developers. Introduce analysis identifiers, structured status/error information and sufficient logging/diagnostic feedback to trace a user request across the Web application, backend services, orchestration layer and GPU execution environment.

Expected deliverables

- A production-quality front-end prototype integrated with the existing authentication, analysis and result services.
- A complete demonstrator workflow: MRI upload → job creation → GPU provisioning → AI execution → result retrieval → visualization/download.
- A documented state model and robust management of long-running asynchronous jobs, including failures, retries/timeouts and user feedback.
- Integration with the OVH on-demand GPU infrastructure, including a documented fallback strategy for unavailable GPU resources or changed cloud configurations.
- Integration of the medical-image/result viewer and presentation of the relevant biomarkers or algorithm outputs made available by the backend.
- Automated front-end/integration tests for critical user journeys, together with reproducible build/deployment instructions compatible with the project's Docker/CI/CD environment.
- Technical documentation covering architecture, API dependencies, configuration, deployment and handover to the development team.

Candidate profile

We are looking for a strongly motivated M2 student or final-year engineering student with **significant practical experience in modern front-end development**. The candidate should be able to take ownership of a real application rather than only implement isolated screens.

Strong skills are expected in JavaScript/TypeScript and in a modern framework such as **React**, Vue.js or an equivalent technology, together with REST APIs, asynchronous programming, authentication, state management and Git. Experience with Docker and Linux is highly desirable. Knowledge of several of the following will be a strong advantage: WebSocket/SSE, RabbitMQ or other message brokers, reverse proxies, CI/CD, cloud APIs, OVH/OpenStack, object storage, Portainer and distributed-service debugging.

The key profile is a **Front-end & Cloud Integration Engineer**: someone comfortable moving from UX/UI implementation to API integration and cloud-oriented troubleshooting. Prior experience in medical imaging is not required, but rigor, traceability and sensitivity to the constraints of a medical-software environment are important.

What we offer

- A concrete engineering problem at the intersection of Web technologies, cloud computing, medical imaging and artificial intelligence.
- Responsibility for a visible and central component of an existing medical-AI platform, rather than a green-field academic mock-up.
- Direct interaction with backend developers, AI researchers and clinical users, with rapid feedback on the demonstrator.
- Hands-on experience with distributed services, Dockerized deployment and on-demand GPU execution on OVH Cloud.
- Exposure to the technical maturation of a medical-software project, including robustness, traceability, cybersecurity, testing and preparation for later SaMD/quality requirements.
- The possibility to continue the collaboration beyond the internship depending on project needs, results and funding opportunities.

Practical information and application

The intern will be mainly hosted at the UFR Sciences et Technologies, Université d'Évry Paris-Saclay, 40 rue du Pelvoux, 91020 Evry-Courcouronnes. The work will be carried out in close interaction with the developers responsible for the backend and platform maturation. Internship gratification will follow the legal rate in force.

To apply, send a CV, a short motivation letter, examples of previous Web projects (Git repository, portfolio or equivalent, when available), and University transcripts since the first year of the BSc/Licence to:

`vincent.vigneron@univ-evry.fr` and `hichem.maaref@iut.univ-evry.fr`.