

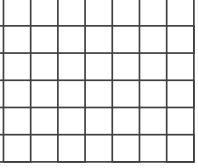
JUNCTION X
ALGIERS



Functional Specification

HACK THE FUTURE

POWERD BY CELEC



JUNCTION X ALGIERS

Welcome to the official specification document of JunctionXAlgiers, a hackathon where technological innovation and creativity come together to tackle real-world challenges with high impact.

Organized with passion by the CELEC club, JunctionXAlgiers is far more than just another tech event; it's a true innovation hub that brings together Algeria's brightest minds. It's a place where creativity can fully flourish to design solutions that are truly groundbreaking.

As you read through this document, you'll discover all the essential elements that will guide you through this unique adventure: the challenges to be solved, the objectives to be reached, and the evaluation criteria that will be used to assess the submitted projects.

Now that you've been selected to take part, you have everything you need to turn your ideas into real, tangible solutions and to leave your mark on this edition.

JunctionXAlgiers where your ideas come to life!

THE CHALLENGES:

Throughout the hackathon, we invite you to carefully explore the challenges we've put forward and choose the one that speaks to you the most.

Your mission will be to develop a technical solution for the challenge you've chosen. Keep in mind that innovation and creativity will be key and they'll be highly rewarded.

The winning teams will have the opportunity to take home generous prizes, proudly offered by our partners.

Challenge 1: Optimizing Urban Transport in Algiers

Context

As the main urban hub of the country, the city of Algiers is facing increasing issues related to daily transportation. Despite the variety of transport modes available (buses, metro, tramway, train, cable ...), the lack of coordination between these services makes trip planning complicated and reduces the overall efficiency of the public transport system.

The goal is to develop a digital solution that improves accessibility and smooths out public transport usage for all users.

Challenge

Your mission is to design and prototype a mobile application (web and/or native) dedicated to multimodal trip planning in the city of Algiers. This solution should centralize data from the different transport operators (bus, metro, tramway, train, cable car) to offer optimized routes from point A to point B.

The app must provide users with complete real-time information, such as:

Total travel time, estimated cost, transfers and schedules.

Any other relevant data to help optimize their journey

Key Points to Address

- ⌚ **Smart Trip Planning:** Integrate schedules and routes of all public transport services in Algiers (ETUSA, metro, tramway, SNTF...) to allow efficient and dynamic planning.

 **Multimodal Routes:** Suggest optimized combinations of different transport methods (e.g. train + bus + tramway) when needed to help users reach their destination faster and more efficiently.

 **Map Display:** Show proposed routes on an interactive map with clear indications of steps and transfers.

 **Smooth User Experience:** Provide an intuitive, responsive interface that is accessible to all types of users, regardless of age

Evaluation Criteria

 **Functionality:** Does the app manage to provide complete, coherent, and realistic routes?

 **Quality of Information:** Are the routes well-detailed? Is the data accurate (fares, travel time, transfers)?

 **User Experience:** Is the interface intuitive and pleasant to use? Is the map clear?

 **Innovation:** Does the app introduce new approaches (artificial intelligence, real-time data integration, dynamic recommendations...)?

 **Technical Quality:** Is the solution technically well built? Is the architecture solid? Does it make use of open APIs or GTFS datasets?

Participants are encouraged to go beyond the initial requirements by imagining how their solution could evolve for example, by integrating additional services such as online payments, bike-sharing systems, ride-hailing (VTC), etc.

Challenge 2: Optimizing the Management of Eid al-Adha Sacrifice Videos for the Al-Insan Al-Jazaïri Foundation

Context

The Al-Insan Al-Jazaïri Foundation, a non-profit Algerian charity organization, has been active for several years in various areas of social aid.

On the occasion of Eid al-Adha, it organizes a large-scale annual campaign of animal sacrifices for the benefit of underprivileged families, with over 1,500 sacrifices in recent editions. In the spirit of transparency, each donor receives a personalized video of the sacrifice carried out on their behalf, reinforcing trust and creating a direct connection with the act of donation.

However, due to this growing volume, the foundation faces significant logistical and technical challenges particularly regarding the organization of sacrifices, management and delivery of videos, and the overall monitoring of the operation.

Challenge

The challenge is to develop an innovative digital solution that automates, secures, and optimizes the entire process from receiving the video to final delivery to the donor while preserving data confidentiality and ensuring a reliable experience.

Key Points to Address

- ⌚ **Video Classification and Management:** Implement a system that allows easy import of videos captured in the field, automatically organizes them according to a unique identifier linked to each donor, and stores them securely and in a structured manner, using a cloud storage solution to ensure accessibility, backup, scalability, and quick recovery in case of incidents.

- ◎ **Automated Delivery System:** Integrate a mechanism that automatically sends each video to the corresponding donor, along with a personalized message, while managing delivery confirmations and allowing automatic follow-ups if needed.
- ◎ **Monitoring Dashboard:** Provide the foundation with an interactive dashboard to monitor in real-time the status of each video (pending, sent, or confirmed), and generate alerts in case of anomalies (missing files, wrong associations, delivery failures).
- ◎ **Offline Functionality:** Allow teams to associate videos with donors offline, with automatic synchronization once the connection is restored.
- ◎ **Security and Confidentiality:** Ensure the protection of donors; and beneficiaries; personal data through encryption of videos and sensitive information, along with restricted and secure access.
- ◎ **User Experience (UX/UI):** Develop an intuitive, user-friendly, multilingual (French/Arabic) interface that can be easily used by local teams with limited technical knowledge.
- ◎ **Scalability and Maintainability:** Design an architecture capable of handling an increasing volume of videos and adaptable to other charitable campaigns organized by the foundation.

Documentation

Provide complete and clear documentation to help both technical and field teams of the foundation become fully autonomous in using and maintaining the system.

Evaluation Criteria

- ◎ **Processing Efficiency:** Does the system reduce total video processing time by at least 50% compared to the current manual process?
- ◎ **Delivery Reliability:** Is the error rate (wrong associations, delivery failures) below 1%?
- ◎ **Scalability:** Can the solution effectively handle and process more than 1,500 videos during the short Eid period?
- ◎ **Donor Satisfaction:** Are donors satisfied with the quality, speed, and clarity of the service provided, according to the results of a dedicated survey?

Challenge 3: Smart Contact: Recommendation system for real estate agents

Context

In Algeria, as elsewhere, real estate agents must manage thousands of client profiles and a large selection of properties on a daily basis. Today, the process of matching a property with a potential client is still largely manual or intuitive. This method of operation leads to several limitations: missed sales opportunities, considerable time wastage, a poorly personalized customer experience, and reduced operational efficiency.

In this context, the use of artificial intelligence and data science represents a real opportunity to revolutionize the real estate sector by automating and optimizing the process of connecting clients and properties.

Challenge

The challenge is to design an intelligent backend service capable of automatically recommending relevant contacts (potential buyers or tenants) for each new real estate listing. These recommendations will need to be based on several key criteria, including:

- The client's budget.
- Their geographic preferences.
- The type of property sought (apartment, villa, office, etc.).
- The desired surface area and number of rooms.
- Dynamic suggestions driven by AI.
- The ability to compare different properties.
- Generation of a final quote in the form of an invoice for a given property.

Your solution will need to be designed to operate at scale, ensure optimal performance, and provide a seamless and smooth experience for both real estate professionals and customers.

Key points to cover

- ◎ **Recommendation API:** Provide a REST API with, at a minimum, the GET /recommendations/property/:id endpoint to return recommended contacts for a specific property.
- ◎ **Data Modeling:** Define structured data models for the Contact (ID, preferred locations, minimum/maximum budget, desired area, property type) and Property (ID, location, price, area, property type, number of rooms) entities.
- ◎ **Sorted and Scored List:** Generate a list of contacts ranked according to a match score with a clear explanation of the criteria used.
- ◎ **Recommendation Explanation:** Integrate a transparent explanation system, allowing the user to understand why a contact was recommended.
- ◎ **Scalability:** Ensure the capacity to handle more than 10,000 contacts without significant latency.
- ◎ **Bulk processing mode:** Enable the generation of recommendations for all properties in a single query.

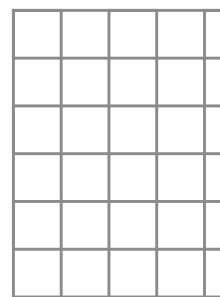
- ⌚ **Smart filtering:** Use hybrid filtering algorithms (business rules, collaborative filtering, content-based filtering, etc.) to refine results.
- ⌚ **Clear and reusable API:** Design logic that can be easily used by third-party developers thanks to a well-documented and structured API.
- ⌚ **PDF comparison and quote:** Integrate a feature to compare two properties and generate a final quote in the form of a PDF invoice.

Evaluation Criteria

- ⌚ **Relevance of recommendations:** Are the suggestions actually tailored to the properties being offered?
- ⌚ **System transparency:** Is it clear why a contact is being recommended?
- ⌚ **Performance:** Can the system handle a large number of contacts without excessive latency?
- ⌚ **Ease of integration:** Is the API clear, well-documented, and easy to use?
- ⌚ **Innovation:** Does the solution offer new features or a unique approach, while leveraging modern machine learning techniques to evolve and adapt over time?

- ⌚ **Completeness:** Does the solution cover all the intended functionalities (comparison, quotes, learning loop, etc.)?

Teams are invited to develop an innovative, scalable solution that can be fully integrated into the existing digital ecosystem. The goal of this challenge is to revolutionize the daily practices of real estate professionals and, beyond that, to inspire new applications in other sectors.



Challenge 4: Digitizing Aquaculture in Algeria for Smart and Responsive Management of Fish Ponds - by Cosider

Context

Aquaculture is a key lever for food security and economic diversification in Algeria. However, fish farmers face numerous challenges in the daily management of their ponds: lack of centralized monitoring, poor responsiveness to anomalies, and difficulty accessing essential data remotely.

The objective of this challenge is to propose a software solution that can leverage already collected data (via API or databases) to provide a smart monitoring, analysis, and alerting tool for fish farming management.

Challenge

Your mission is to develop a web and/or mobile application that connects to an existing data source (simulated or provided API) to allow fish farmers to remotely monitor the status of their ponds, receive alerts in the event of anomalies, view indicator changes, and access a complete history.

The interface must be simple, user-friendly, and suitable for use in rural areas, even with limited connectivity.

Key points to address

- ⌚ **Data centralization:** use of simulated or provided data streams (pH, salinity, suspended solids, etc.), with a summary display of tank status.

- ⌚ **Automatic alerts:** send push or SMS notifications if critical thresholds are exceeded, indicating the parameter concerned and the affected tank.
- ⌚ **Data visualization:** integrate dashboards with time-based graphs, key indicators, and real-time status.
- ⌚ **History and traceability:** archive data and alerts that can be viewed at any time, with the ability to filter by date, parameter, or tank.
- ⌚ **Multilingual and intuitive interface:** simple, fluid design, and compatible with non-technical profiles (French or local language).

Evaluation Criteria

- ⌚ **Functional relevance:** Does the solution meet the practical needs of a fish farmer in their daily decision-making?
- ⌚ **Alert quality:** Accuracy of thresholds, frequency of notifications, clarity of messages sent.
- ⌚ **User experience:** Simplicity, responsiveness of the application, accessibility on different types of devices.
- ⌚ **Data exploitation:** Ability to synthesize information, produce useful statistics, or detect abnormal trends.
- ⌚ **Scalability and robustness:** Solution capable of managing multiple ponds, multiple users, and adapting to different data sources.