



# Tecnológico de Monterrey

**Instituto Tecnológico y de Estudios Superiores de Monterrey**

*State of Mexico Campus*

*Development and implementation of software systems*

Implanted Solution Araba Market

(this is just a resume with some information from many documents of the project)

TC3005B

Group: 502

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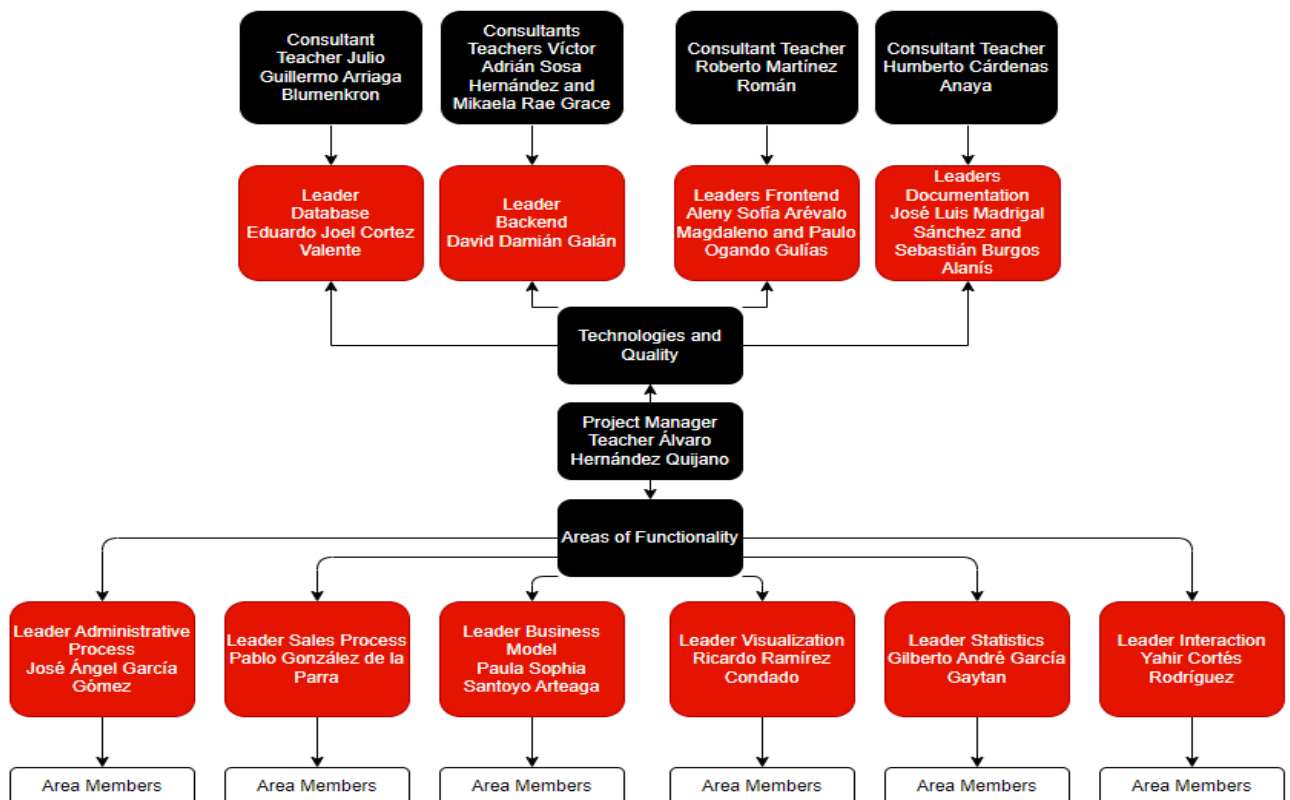
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## Purpose

The objective of the project is to offer a technological solution that speeds up the process of selling new and used cars, providing functionalities that facilitate the activities and operations of the employees of an automotive group, as well as buyers. Therefore, a web platform is implemented that maintains the hierarchies established in the sales management organization of a company in the automotive industry, so that the established permits and restrictions offer an environment of trust and high security, in addition to having well-defined and established steps to make the car acquisition process more efficient and comfortable for buyers, who will no longer have to go to a physical agency to find out information about the car and pay for it.

It is also important to mention that this software project seeks to optimize each of the stages involved in completing an online sale, considering the most important standards in aspects such as security, reliability, usability, maintainability, and efficiency. In addition to the fact that this project offers value propositions to make the user experience more pleasant, having the opportunity to take advantage of features that automate certain steps and provide relevant analytics for decision-making, this is also aligned with the business objective of the training partner NDS Cognitive Labs, since they are given the possibility of having the quintessential digital medium for the sale of cars from automotive groups, offering different agencies a new channel to increase their sales, which is related to the business model that has been raised for NDS to obtain benefits.

## Organization and Explication of Areas



#### Technologies and Quality:

- Database: It refers to the area that is in charge of designing and deploying data storage and access mechanisms, maintaining their integrity, confidentiality and accessibility.
- Backend: This area is in charge of managing and manipulating the data that passes through the system, defining services that allow offering functionalities to carry out specific operations, and also establishes the permissions and restrictions that must be met.
- Frontend: In this case, it refers to the generation of the user interface, having the necessary graphic elements to establish a direct interaction with buyers and employees, with whom information can be entered and received.
- Documentation: On the other hand, this area is in charge of defining the standards, conventions and reports that verify that the generated product has a good level of quality, in addition to offering information that allows understanding everything that was done, in order to facilitate the maintainability and scalability of the software.

#### Areas of Functionality:

- Administrative Process: This area is in charge of establishing the necessary hierarchies to offer the operations corresponding to each role, as well as to offer the ability to make a simple and efficient management. Taking into account the roles that have been mentioned before in this document, this area ensures that the different users will have to go through an authorization or verification process, so that our buyers can be sure that the source of the cars is completely true, and the necessary restrictions will also be implemented so that certain roles cannot perform actions of someone who is at a higher level in the hierarchy, which gives greater control over the agencies' work area.
- Sales Process: On the other hand, this area implements the functionalities related to the sale of a car and this process begins when a buyer is interested in knowing more information about one in particular, being able to request a test drive or make a payment and ending until the delivery of the car. It is also in charge of offering the necessary information so that sellers know the status of their cars, as well as reviewing the buyer's requests and actions, to generate a safe and efficient sale.
- Business Model: Instead, the business model area defines the ways in which NDS will be able to monetize the platform, establishing the value propositions and strategies that allow customers, that is, automotive groups, to prefer to use our platform to take advantage of to the maximum our functionalities, which will be offered depending on the plans, subscriptions, and commissions that you have. In the case of Araba Market, the model is mainly related to the implementation of subscriptions that offer credits to carry out operations within the platform.
- Visualization: Regarding visualization, it refers to those functionalities that are related to the display of information in a visual way, which covers different formats, from the list of cars, the 360° view, financing plans, insurance, etc. In addition to the fact that

the interface is intended to be attractive and intuitive for all users, so that they can make decisions efficiently and without doubt.

- Statistics: On the other hand, statistics is in charge of offering an overview of the behavior of the platform from different perspectives, using the stored data to give dashboards with graphs that give the opportunity to know the performance and productivity of employees and cars.
- Interaction: Finally, the interaction is related to the functionalities that imply direct communication between users or with an assistant of the platform. This includes the seller-client chat that allows direct negotiation, to chatbots that resolve common questions, which helps buyers and administrators feel in a safer and more flexible environment within the platform.

(It is important to mention that all the members of the group worked with the different technologies, to put into practice the topics of the course, but taking into account the individual abilities and the project management, each member may have focused more on a specific technology to get the requirements of their functionality area done, and in terms of documentation, some people spend more time making specific documents for the group, but they also had the task of standardizing some others, so everyone could register their results, like the templates related to testing or the log of activities that were filled individually by each requirement responsible).

## **Requirements**

### Functionals

#### *Administrative Process*

- 1.1 The system will allow the manager to have the ability to manage cars within from your agency (CRUD).
- 1.2. In the event that the publication is in Reserve status, it can be entered into the hitch bidding system.
- 1.3. The manager will be able to upload his inventory of cars through a standardized CSV.
- 1.4. The system will allow the generation of a generic and flexible model to store the cars from any agency (Web Scraping).
- 1.5. The manager will be able to upload individual cars to the agency through the model.
- 1.6. The system will allow limiting the number of specific characteristics of the cars, with the option of adding extra features to a new unit.
- 1.7. The system should allow predicting the possible performance of a new car at the agencies.
- 1.8. The system will allow the manager of the agency to be able to upload their plans of financing.

- 1.9. The system will allow the manager of the agency to be able to upload the insurances that offers.
- 1.10. The system will force agencies to go through an authorization process.
- 1.11. The system will allow agencies to upload articles of incorporation, certificate of tax identification, address and legal documents.
- 1.12. The platform must allow agencies to configure their information from their bank accounts.
- 1.13. The system will allow the super administrator to see and validate the information of a automotive group (constitutive act, tax identification card, address and Additional features).
- 1.14. The system will allow the super administrator to validate or reject the documents uploaded by the agency.
- 1.15. The system must have reserved names for agency registration (Ex. Volkswagen Santa Fe.).
- 1.16. The system will allow the existence of a hierarchy of roles, starting with Super Administrator, Administrator of an Automotive group, Managers of brand, brand seller.
- 1.17. The automotive group administrator will be able to maintain the data of the agencies and managers (CRUD).
- 1.18. The manager will be able to maintain the data of the sellers (CRUD).

#### *Sales Process*

- 2.1. The system will allow the user to request a test drive, which will reach the agency where the car comes from.
- 2.2. The system will allow you to upload documents for the purchase of the car (INE and license of driving).
- 23. The system will allow the user to "interactively adjust" the options of financing.
- 2.4. The platform must allow the user to make the transfer to an agency.
- 2.5. The system must apply a double authentication factor for customers.
- 2.6. The user will only register or log in when they want proof of drive or buy a car.
- 2.7. The system must have a recommendation algorithm.
- 2.8. The system must save the history of purchase and test drive of each client.
- 2.9. The system must show/promote the next cars that get on the platform (Netflix).

2.10. The system shall display and save a photo after a proof of driving.

2.11. The client can carry out the process of buying a new or used car from the platform.

#### *Business Model*

3.1 Super administrator can manage credit values (auto post, auctions, agency, keep car on platform) and the costs of the plans.

3.2. The system must offer a subscription system for the administrator of automotive groups.

3.3. The system must incorporate a bidding system according to the quantity of the down payment to secure car sales.

3.4. The system shall charge a test drive fee.

#### *Visualization*

4.1. The system will allow the end user to know the total cost of acquisition of the vehicle, that is, knowing the financing plans of each agency.

4.2. The system will allow the client to know the different offers of each agency, to be able to analyze and choose the option that best suits you (Comparator).

4.3. The system will allow the user to see the financing plans and sure what the agency offers.

4.4. Initially, the user can perform a search without the need for register on the platform.

4.5. The system must allow users to compare cars.

4.6. The system must allow the interactive visualization of certain vehicles in 360°.

#### *Statistics*

5.1. The system will allow the administrator to see statistical information of the system.

5.2. The system will allow the administrator to see the sales processes of his agency, just like on the stage they are on.

5.3. The system will allow displaying graphs of the behavior on the platform in different levels of role hierarchy.

5.4. The system should allow you to display and monitor your financial goals (deciding the granularity of this).

5.5. The system shall allow the administrative roles of the agencies to observe and monitor the current sales flow depending on the granularity you choose (Funnel/Sales Flow).

#### *Interaction*



- 6.1. The platform will allow NDS to offer 24/7 assistance.
- 6.2. The system must have a chat between the buyer and seller.
- 6.3. The seller will be able to see a summary of the buyer's profile to offer you new offers.
- 6.4. The system will offer scripts to the seller so that they can carry out their sale more efficiently.
- 6.5. The chat will allow the buyer to negotiate the price of a car.
- 6.6. The system must have post-sale attention for buyers.
- 6.7. The system will have a chatbot that will support different users.
- 6.8. The chatbot will be able to generate car recommendations based on the Buyer search patterns.
- 6.9. The chatbot will be able to answer simple questions, mainly related to elements of Araba Market.

### No Functionals

#### *Security*

- 7.1. The system must store sensitive user information in a manner encrypted and that comply with international security standards.
- 7.2. The interface must connect correctly with the database to maintain the integrity of messages.
- 7.3. The system must allow validating the identity of a client and/or group of agency through digital documents.
- 7.4. The system will have a record of the interactions.

#### *Usability*

- 8.1. The platform must be usable through Visualization/Navigation effectiveness of the content for the user.
- 8.2. The user must be able to find his vehicle with the fewest possible clicks.
- 8.3. The system must have a visual design that allows to see the Clear recommendations/promotions.
- 8.4. The system should incorporate an optimized view of all cars in one search.
- 8.5. The chat should have an intuitive and easy-to-use interface.

#### *Performance*

- 9.1. The system must have an optimized search to find cars.
- 9.2. The system must have a database that manages the information of any communication channel on the platform.

## **Operating Environment**

The project makes use of different technologies for its operation, so each one is described and the versions with which it runs are mentioned. Regarding the hardware, the platform is a Software as a Service that makes use of the cloud services of Amazon Web Services (AWS), Google Cloud Platform (GCP) and the generation of web applications in the Python programming language with Flask, so there is no server or physical device required to run Araba Market. On the other hand, in terms of software, React (with Javascript programming language) is used for the frontend, with version 18.2.0, while the backend uses Node JS (initially with Typescript programming language that is transpiled to Javascript for its execution). the browser), version 18.15.0 and the database is non-relational in MongoDB, with a version 6.0.5. On the other hand, when making use of cloud services for the deployment of the online platform, the versions are the most updated as of June 2023. It is important to mention that the tools used in AWS are S3 for file storage, EC2 for application execution. and Cognito for authentication. Instead, the GCP tools are Instance Group to implement Araba Market and Load Balancer to distribute the workload between different instances. Finally, from the flask library, methods like jsonify and request are used to extract keywords from the input texts.

## **Acknowledgments**

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First of all, we thank our professors, who gave us the necessary technical and strategic foundations to be able to materialize the idea of our project and also their experience provided us with various tools and practices that could improve our processes and ways of working, which leads to having a platform with a good level of quality.

On the other hand, we thank the training partner NDS Cognitive Labs, who provided us with their initial idea, needs and requirements to create Araba Market. It is also worth mentioning that their representatives were in constant communication with us, which is highly appreciated, since they allowed us to have a higher level of efficiency in the project stages. Likewise, the review we had with them was of great help, since their feedback allowed us to generate a more accurate and sophisticated result.

Lastly, we would like to thank the Tecnológico de Monterrey for giving us the opportunity to live the experience of a software project close to what is experienced in the world of work, since we have a better idea of what is required to be successful in this type of challenges, not only in the technical aspect, but also in interpersonal issues and soft skills.