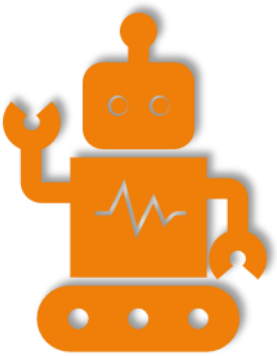
Students' names: Escobar Gabriel, Espindola Agustín.

Company's name: Robotic Environment.



Robotic Environment

1. Introduction

Good morning, we are Gabriel Escobar and Agustin Espindola, both Electronic Engineers who studied at the National Technological University in the city of Paraná.

We are currently settled in Paraná. I am 27 years old. After I finished college, I specialized in robotics as I always liked everything related to the topic. Inside the company, I oversee the Robotics Department. My partner Gabriel, co-founder of Robotic Environment, is the head of the Sales Department and manages our small team of developers. As ours is a relatively small and new emerging company, many of us work in often unrelated and wide areas inside the process of creating and providing robotic solutions.

The company has its headquarters in Buenos Aires. But it has franchises in many places, one of them is in Paraná, Entre Ríos.

The city's landmark we would like to address is the Thompson Beach. In this place we consider that they need our system because our team has made a detailed study in the area, and the data obtained revealed that in this place there is a high level of contamination. On the other hand, we found that a high part of the disposal can be recycled.

We have organized the presentation this way:

First, we are going to talk about our company. We'll start by presenting the products we offer and the markets we move in. After that we would like to talk about the organization guidelines and the way our company is structured, as well as showing you a brief timeline with the relevant events of our history.

After talking about our company, we are going to describe the development process. To do it, we will start by explaining the problem we are trying to solve. Once we have tackled the problem, we are going to give you a tour around the Thompson's Beach area by showing some pictures.

Finally, we are going to describe the project we made in the hopes of solving the problem. It is divided in 3 stages in which we will explain the setting-up of the process, the step by step execution and our contingency plan.

2. Company Description

2.1 Products

Ok, Let's begin with the markets and products.

Well, as we told you earlier, our company is in the robotics and investigation business. We founded it with an idea in mind: to facilitate the collection of garbage in different parts of a city, making use of a relatively simple, accessible and easy to implement series of robot specialized in all kinds of terrain and environment.

B420 Beach Cleaning Series

In this particular case, we would like to offer our beach cleaning specialized line, the B420 series. With a set of four small, but powerful, fully independent 775 DC motors. The B420 series achieves a really high torque that lets it move through sand, dirt and grass with ease. They are also water resistant, expecting the possible event of running through small amounts of water. The full plastic body mounted over an aluminum chassis allows it to be easily carried due to its low weight, and provides a long-lasting battery life of around 7 to 8 hours.

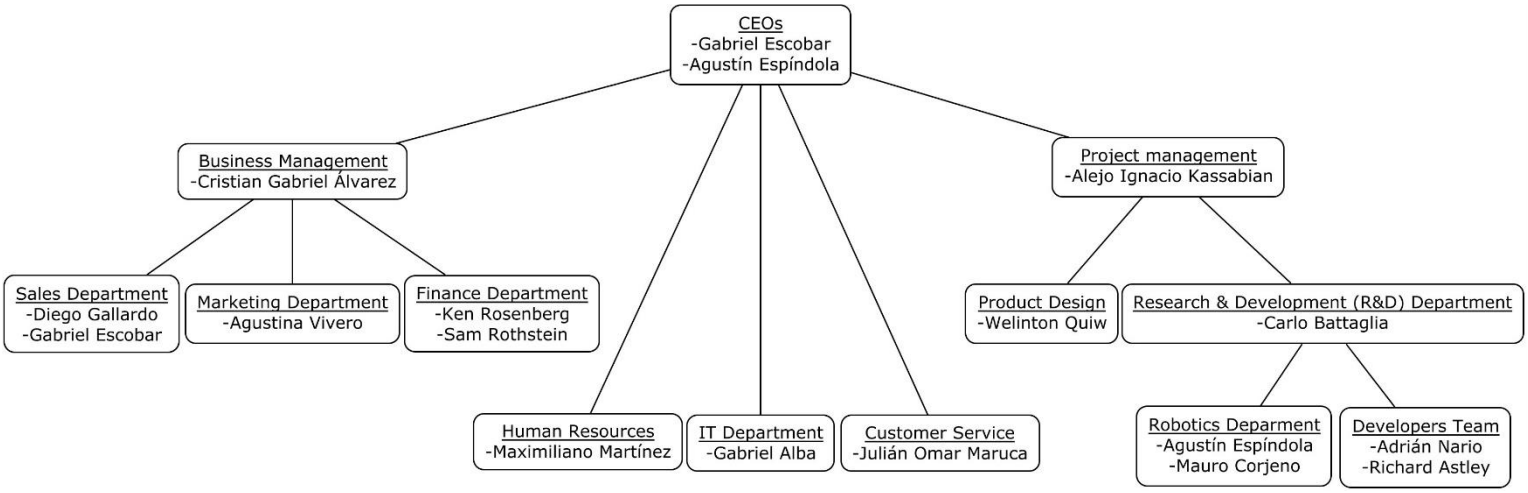
The B420 series control is handled entirely with a simple Arduino Uno equipped with a L298P motor control shield. It makes use of a HC-SR04 ultrasonic sensor in the front side, to detect objects in its way and send a signal to the frontal lift, which starts working with a powerful set of two S3003 servomotors, capable of handling up to 6kg.
In the middle of the robot body, the cargo box, with a size of 60x20 inches and 50 inches tall, can carry waste until it is full and then head back to a previously determined disposal point, where it discharges itself and continues working.

L298P Shield

Once there is a 10% of the battery total charge left, the B420 would finish any ongoing tasks and go back to a provided charging station. We offer an optional ultra-fast charging port for a small extra price, which provides a full battery charge in around 15 minutes.

A capable team inside our company is currently working on a new version, the B420s, that incorporates a 4w solar panel for an even longer autonomy and a big improvement in the amount of waste it can carry, which led us to also substantially upgrade the motor power.

2.2 Company Organization Guidelines



Now let us introduce the people that make our company work:

CEOs

Agustín Espindola and Gabriel Escobar are the founders and current CEOs of Robotic Environment. They oversee and care about every working part of the company, and given its small size, they also work directly inside some of the various departments and sections.

- Human Resources: Maximiliano Martínez is responsible for this department. This part of the company performs tasks such as training employees, selecting and recruiting adequate and qualified personnel, and maintaining a comfortable and safe workplace.
- IT Department: Gabriel Alba is the mind behind the overall efficiency of the company's workflow. Inside this department, he provides the infrastructure that makes a fluid communication between employees possible and the automation of daily tasks.
- Customer Service: Inside this very important part of the company, Julián Maruca has a very capable team under his charge that deals with customer calls. They can handle any problem related to a product malfunction and answer any questions a client may have about the company or the available services. To make sure our post-sale service is the best, Julián keeps himself and his subordinates informed and updated.

Business management:

Cristian Álvarez leads the business-related departments that are listed below, and often coordinates them when teamwork is in need.

- Sales department: inside this department the engineer Gabriel Escobar and sales specialist Diego Gallardo supervise the distribution and sale of the company's products abroad. Another activity they do is looking for places where the company could get its product through a franchise.
- Marketing Department: Its main function is to manage and coordinate sales strategies that allow the company to achieve its final objectives, research markets and keep an eye in companies that perform in the same field. On the other hand, this department makes others know what our product is about and the benefits they provide. In this area you will find Agustina Vivero doing this work.

- Finance Department: Our Finance Department is in the hands of two renowned financial and legal geniuses, Sam Rothstein and Ken Rosenberg. They organize, plan, audition, account for and control the company finances. Also, they usually produce the financial statements.

Project management:

The following departments of the company center around the product development from the beginning until they are finished and are currently being led by Alejo Kassabian.

- Product design: Welinton Quiw is one of the brightest minds inside our company in matters of design and concept development. His job is the cornerstone of the product construction and future success, placing the foundation from which the engineering team and developers can easily work a way to finally deliver the goods our company is well known for.
- Research & Development (R&D) Department: This department is important for its activities in the intellectual and practical side of the company view. Here, the Developers Teams and Robotics Department find themselves working with each other in an integrated space, where they oversee the development of the product step by step. The robot prototype has a detail that makes it different from other companies, it has both a handmade touch to the manufacturing and an automated mechanical side. Agustín Espindola, Mauro Corjeno, Adrián Nario and Richard Astley are in charge of the respective departments, all of them under the supervision of Carlo Battaglia, to whom they report.

2.3 Company History

Now that you know all about us, we want to tell you a little about the path our company has taken since it was born:

2010: Agustin Espindola meets Gabriel Escobar in the UTN admission course.

2011: They start planning the project.

2012: They found Robotic Environment.

2013: They rent an office in Paraná.

2014: Sales increase significantly.

2015: The company headquarters move to Buenos Aires.

2016: The main offices lose files in a flood.

2017: Robotics Environment recovers and expands its business.

2018: The company´s staff grows.

2019: Robotics Environment launches a new line of products.

2020: The company strives to survive during the COVID pandemic.

In the year 2010, Agustín Espindola met Gabriel Escobar at the UTN FRP during the admission course, where they applied for the electronical engineering career. During their first year of college, they got interested in robotics and found a purpose in the important task of taking care of the environment. In 2012, while attending their second year at the university and accompanied by some of their professors, they decided to found a company that would make their mission possible.

They started working in a small garage until the next year they could finally afford an office located in Paraná's city center. Just a few months later, in the summer of 2014, a significant increase in sales boosted the company growth, making it possible to move to Buenos Aires a year later, where they would set the headquarters of the now called "Robotics Environment" company, while keeping the Paraná offices as an important part of the production department.

Sadly, a great flooding hit the region in September of 2016, provoking a great loss in terms of infrastructure and information when the water reached the main offices. The company's recovery took an entire year, after which they tried to stabilize and expand its business.

In 2018, Robotic Environment was already a modern and prosperous company, and its evolution came along with a new wave of young and capable professionals determined to continue with the progress. This incorporation of fresh ideas led to the release of a new line of avant-garde products during the past year.

Today, the company strives to survive in the current socioeconomic context product of the COVID-19 pandemic that has led to many issues, forcing the staff to unite in an attempt to achieve a better future.

3. Project Development

3.1 Tour round the landmark

Well, it is time now to dive into the problems, but first let's get in context:

The Thompson Beach begins at the entrance to the Puerto Sanchez neighborhood to the Nautical Club. Next, we show a photo of the area that the beach occupies. The terrain seems mostly plain, and our B420 series can perform in optimal condition over this kind of landscape.

As we can see in this photo, the place has garbage cans, but there are people who prefer to throw the garbage on the beach.

The following images show Thompson beach clean and ready to be enjoyed as well as the landscape it offers.

In this particular photo we can see that in the foreground of the image there are people sunbathing. In the middle of the image there are people playing in the water and in the

background of the image there is an island. This island is the Margarita island.

3.2 Problem Statement

Next, we are going to show you some of the problems that this place has.

3.2.1 Description of the scenes that help picture the problem

In this picture we can see a disturbing amount of trash thrown on the beach. As far as the Thompson Beach landscape unfolds, bottles and various plastic containers sit half-buried in the sand. The tallest buildings of Paraná arise in the background beyond the river. There is not that much to see in the open beach other than the precious nature that characterizes the region, but the view can certainly be obscured by the lack of environmental awareness that sadly characterizes the region as well.

The first thing we can see in the front of this picture is a pile of various types of garbage in the sand between the river and the coastal vegetation. The trash mainly consists on plastic bags and bottles. Further away down the river, there are people in boats enjoying a sunny day in the river.

3.2.2 Analysis of the factors that give rise to the problem

Now, all these alarming facts have been caused by some punctual factors. In the city of Paraná, the degree of pollution generated by garbage is unknown. There are many people who go to the beach and prefer to throw their garbage in the sand instead of throwing it in the trash can. The main factors that increase the problem of pollution are:

- Garbage cans are far from where people sit:
  People often prefer to throw their garbage in the sand rather than walk a few miles.
- Not enough garbage cans to meet the demand:
  The garbage cans are not evenly spread along the place and often are not big enough to contain all the garbage that people throw in one day.
- Lack of personnel to collect garbage:
  The amount of trash can sometimes be so large that the available personnel finds it hard to collect it in a single day.
- People's lack of awareness about what garbage generates in the environment:
  It is evident that most of Paraná's citizens and tourists in general lack environmental awareness, otherwise a great part of the problem would vanish.
- People fishing under no supervision:
  Some of the garbage that reaches the coast comes from the many fishing boats that

tend to leave their waste in the river rather than waiting until they come back to the beach to throw them in the garbage cans.

- Massive amounts of people in the summer season makes it hard to supervise the situation:
  It is easy to see how a large amount of people during the busiest seasons makes the numbers of junk skyrocket when the perpetrators face no direct consequences.

3.3 Project Description

Upon seeing the causes and consequences of the problem, we forged a plan we would like to share.

3.3.1 Stage I

To implement this project, our team must cover certain areas. One of them, and perhaps the most important, is the geographical study of different regions and its climates. This is the foundation from which we begin to elaborate our products.
Based on the information acquired by our researchers, our development team can start to work with confidence in the design of the many lines we offer.
For this particular case, we will gather relevant information about the Thompson beach, its key points and overall terrain characteristics.

Another area our team must account for is the economical one. Before we can greenlight the more concrete processes, a deep research is going to be made over costs and markets.
Once the planning is done, the correspondent branch of workers are going to undertake the physical construction and logical programming of the products.

3.3.2 Stage II

- A specialized team of researchers are going to analyze the Thompson beach region and look for specific terrain characteristics to give the designers an idea of the degree of abruptness the products must overcome and what are the limitations.
- The same group is going to investigate about the climate and general atmosphere of the beach, to later choose the correct construction materials and accurately determine the product life span.
- All the data will also help our team to decide where to locate the key points inside the beach, such as the designated garbage disposal zone, the charging station and storage area.
- Once all the information is gathered, the team of designers is going to break it down in organized guidelines to follow during the creative process and propose the outcome to the rest of the company.
- Our Finance Department is going to evaluate the designers end result and decide on whether the plan is viable or not. If the project is within the range of possibilities, they are going to estimate future costs and gains.
- The manufacturing sector is going to create and assemble the product body and internal parts, working side by side with the Robotics Department and programmers that give life to the robot.

- Once the process is done and the robot is ready to use, a qualified team is going to train the Thompson beach personnel in the correct usage of the equipment and how to react towards any inconvenience.

3.3.3 Contingency Plan

A common problem that may arise during the early phases, especially if the investigation is carried out in the summertime, is that we may suffer erratic power outages. To deal with this possibility, our investigation team will carry a generator set to the Thompson beach, preventing data loss and assuring a continuous workflow.

Another problem our investigators may face is an adverse climate during field work. The only solution we can provide is a good anticipation and the most meticulous prognostication possible to be aware of the possibilities and wisely choose the perfect time to carry out the work.

Other than that, we do not expect any major issues in the financial stage or the constructive one if the usual guidelines are correctly followed, since these activities are carried out in a controlled medium. Any problem that may arise after the project development would be covered in the moment by our post-sale service.

4. Conclusion

Now that we have exposed all our thoughts and genuine concerns about the problem, we would like you to truly contemplate the situation and use your best judgment to consider our company as a solid option to put your trust in.

As we have shown you during this presentation, Robotic Environment is a company that can overcome hard challenges despite its relatively short life. It thrives even on these defying times and proves we intent to keep our organization growing.

With the help of our capable team, we are going to push our project into every place that may need it, helping to build a prosper and healthy world that can be the home of a new generation of environmentally aware people, and we want Paraná to be a part of it.