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Online Gambling with Virtual Assistant

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This work is dedicated to my family who have always supported me throughout my life and motivated me to face the Master's degree in my academic path.

Resumo

Atualmente é possível verificar um crescimento exponencial na utilização de assistentes virtuais na vida quotidiana. Num mundo cada vez mais movido pela tecnologia e pelo avanço da Inteligência Artificial, o Ser Humano tende a utilizar esta tecnologia de forma a tornar a sua vida mais comoda, e realizar certas ações mais facilmente.

A par deste crescimento e desenvolvimento tecnológico, verifica-se também que vivemos numa sociedade preocupada com a inclusão do próximo, com aqueles que sofrem de alguma incapacidade, nomeadamente e especialmente a visual, pois é fulcral para a interação com o mundo digital, entre outros. Alavancando o anteriormente dito, existe uma crescente preocupação com a Acessibilidade no mundo digital, tentando garantir que todos os conteúdos, recursos e infraestruturas estão acessíveis independentemente da pessoa e da sua eventual incapacidade.

Visando a área de negócio dos Jogos de Apostas Online, que movimenta cerca de 600 milhões de euros por ano em Portugal, é possível verificar que as melhores práticas de acessibilidade não estão a ser aplicadas, como demonstrado neste documento.

Objetivando a resolução deste impedimento, a presente tese visa a criação de uma solução comtemplando os processos de analise, prototipagem, implementação e testes.

O protótipo realizado foi testado por um grupo de utilizadores de forma a validar a viabilidade da solução. Após essa validação foram tiradas algumas conclusões que são apresentadas no último capítulo deste documento.

Palavras-chave: Assistente Virtual, Alexa, Jogos Online

Abstract

Currently, it is possible to verify an exponential growth in the use of virtual assistants in everyday life. In a world increasingly driven by technology and the advancement of Artificial Intelligence, the Human Being tends to use this technology in order to make his life more comfortable and perform certain actions more easily.

Alongside this growth and technological development, we also see that we live in a society concerned with the inclusion of others, with those who suffer from some disability, namely and especially visual, because it is essential for interaction with the digital world, among others. Leveraging the above, there is a growing concern with Accessibility in the digital world, trying to ensure that all content, resources and infrastructures are accessible regardless of the person and their possible disability.

Targeting the business area of Online Gambling, which moves about 600 million euros per year in Portugal, it is possible to verify that the best accessibility practices are not being applied, as demonstrated in this document.

In order to solve this impediment, this thesis aims to create a solution contemplating the processes of analysis, prototyping, implementation and testing.

The prototype was tested by a group of users in order to validate the solution's viability. After this validation, some conclusions were obtained, which are presented in the last chapter of this document.

Keywords: Virtual Assistant, Alexa, Online Gambling

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Acronymous

Acronymous List

VA	Virtual Assistant
API	Application Programming Interface
AI	Artificial intelligence
OP	Operative Systems
HTTP	HyperText Transfer Protocol
WWW	World Wide Web
URI	Uniform Resource Identifier
DB	Database
ISEP	Instituto Superior de Engenharia do Porto
SIIS	Sistemas de Interação e Inovação Social

1 Introduction

"We need to understand that if we all work on inclusion together,

it's going to be faster, broader, better, and more thorough than

anything we can do on our own."

Ellen Pao

This chapter provides a brief background on the project to introduce the scenario that gave rise to this work. It will also be presented the problem that is intended to be solved or help to solve, defining specifically the points that will be addressed in this report. Next, in order to indicate what is intended to be accomplished with this project, the objectives of the project and what outcomes are expected will be listed. To conclude, the structure of the report will be shown, providing a brief overview of the chapters that will follow.

1.1 Context

In a world where it is possible to see that every day the human being is fighting even more for Human Rights and Equality, there still are some areas where a lot of improvements need to be done in order to bring more of those two aspects numbered before. As time passes and new technologies are introduced, new types of infinite solutions are possible. With this, we still can see that, for example, blind people or people with disabilities, still have some difficulties in the online gambling area.

On the other hand, we can see that there is a technology that is changing our daily habits, such as the way we open our shutters, the way we turn on and off the lights, etc. Virtual Assistants are becoming more and more present in our lifes, in the houses of everybody.

This work will focus on helping to close the gap that exists in the inclusion and access of blind and partially sighted people by providing access to a new world, the world of online betting/gambling.

1.2 Problem

The world of Online Betting / Gambling is something that has been growing exponentially. (Ali, 2021) The number of users who bet, and the revenue generated through this market have had enormous growth, and COVID-19 has had a positive impact on it (Ali, 2021).

It turns out that there are many citizens who, for some kind of physical or visual impairment, are deprived of playing independently. In this sense, online gambling is an activity from which this niche of people finds themselves deprived being the need to work at this level to promote digital equity in games as a basis for social equality.

It is necessary to investigate alternatives with the potential to minimize this problem and facilitate access to online gambling by these people, such as people with visual impairment, among others.

1.3 Goals and Expected results

Throughout this document, it is intended to highlight developments on the following points:

- Comprehension of concepts related to Virtual Assistants and the game I am replicating in this project;
- Analyses of different Virtual Assistants;
- Understanding and researching how to develop an “application” for Vas;
- Identify libraries, APIs and coding languages that can be used for the development of the desired solution;
- Explanation of the prototype Architectural decisions;
- Development of a prototype ;
- Validation and Functional Tests of the prototype;
- Assessment of solution to solve the problem by the test groups.

At the end of the development of this project, it is expected to have a solution that contributes to solve this problem and fulfils all mentioned requirements. With this, it is important to refer that the solution should also be easy and simple to use, very intuitive and ready for daily usage.

1.4 Motivation

What led me to this project, looking for a solution to this specific problem was, not only the possibility of having already worked in an online gambling company, where after some research and tests, I understood that their website was not ready for everyone, i.e., the level of accessibility was below expectations, but also the possibility of bringing innovation to a world that, in my opinion, requires something different, something new, a new way of doing things to captivate and attract new customers.

The fact that I am a computer engineer and knowing that I am someone who is curious and always looking for new challenges, to learn new things, and the will to pursue a new degree in my academic career were also important factors for the development of this study.

1.5 Dissertation Structure

This document is divided into 7 chapters.

In chapter 1, "Introduction", a general context of the theme is presented followed by the identification of the problem that supports it. The objectives and expected contributions are presented, as well as a summary of the value analysis of this work. The main aspects that motivated the author to do this work are addressed and the chapter ends with the structure of this document.

At the second chapter, the "Value Analysis" chapter, will be presented the value of the solution in more detail, providing the Value Proposition, the Canvas model, and the SWOT Analysis of the project.

In the third chapter, the “State of the Art”, an analysis of the main target audience of this solution and Accessibility, a deeper analysis of the Virtual Assistants is provided, by talking about their history and referring to some of the most used ones. To conclude this chapter, an explanation about Online Gambling and the Euro Millions is provided and how the game works.

In chapter 4, the “Design” chapter, will be described the design process of the solution by explaining the functional and non-functional requirements and the use cases, the Architecture of the solution and the technologies to be used. And to complete this chapter will be explained how to develop an Alexa Skill with the usage of the Alexa Skills Kit.

In the fifth chapter, the “Development” chapter, the whole development process will be explained, as well as all the decisions that were taken during it, which changed the final prototype. We will also be demonstrated some code blocks that aim to explain how the Alexa Skill and Middleware API was developed.

In the sixth chapter, the “Tests and Prototype Evaluation” chapter, will be explained how the solution will be tested, the groups that will help to test and to conclude the results from the tests and the information extracted from the experiments.

In the seventh and last chapter, the “7 Conclusions and Future Work” chapter, will be considered the data that was obtained from the tests and experiments undertaken in the previous chapter to generate conclusions and determine what will need to be done in the future.

2 Value Analysis

"Curiosity begins as an act of tearing to pieces or analysis"

Samuel Alexander

In this chapter will present the value of this solution by providing the Value Proposition, the Canvas model, and the SWOT Analysis of the project. Before contextualizing these three different concepts they will be explained.

2.1 Value Proposition

The value proposition is the description a company uses to summarise the product it is providing, who should purchase it and why. Therefore, it is necessary to answer a few questions when creating a value proposition.

- What is the product?
- Who is the target customer?
- What value is being offered?
- What makes the product unique/different?

Taking into consideration these questions, this is the obtained value proposition:

"The final output of this project is an application, more precisely an Alexa Skill, that is easy to use and adapt for different products, that promotes the usage of the voice for online gambling. The target customer is everyone that wants or already plays online games, and the main target is people with visual impairment. This product is unique because there is not an application like this, that allows people to, in this case, play Euromillions with the usage of his voice."

2.2 Canvas

The Business Model Canvas is a strategic management tool, which allows you to develop and outline new or existing business models on a single page.

This business model is organized into nine sections, each section represents an element of the business that when combined, helps the company understand how to deliver and achieve value. To be able to properly describe the business, in each section some questions must be answered, namely:

- Customer Segments
    - Who is the target customer?
    - Which are the characteristics of these target customers?
- Customer Relationships
    - What type of relationships can the customers expect?
- Channels
    - What channels are used to communicate with the customer?
- Value Proposition
    - What value is being delivered?
- Revenue Streams
    - How much is the customer willing to pay?
    - How is the customer preferring to pay?
- Key partners
    - Which partners are key to running the business?
- Key activities
    - What activities are fundamental to the running of the business?
- Key resources
    - What resources are fundamental to the running of the business?
- Cost Structure
    - Quais são os custos inerentes do modelo de negócio?

After answering all the questions mentioned above in each topic, the next image shows the Canvas model for this solution.

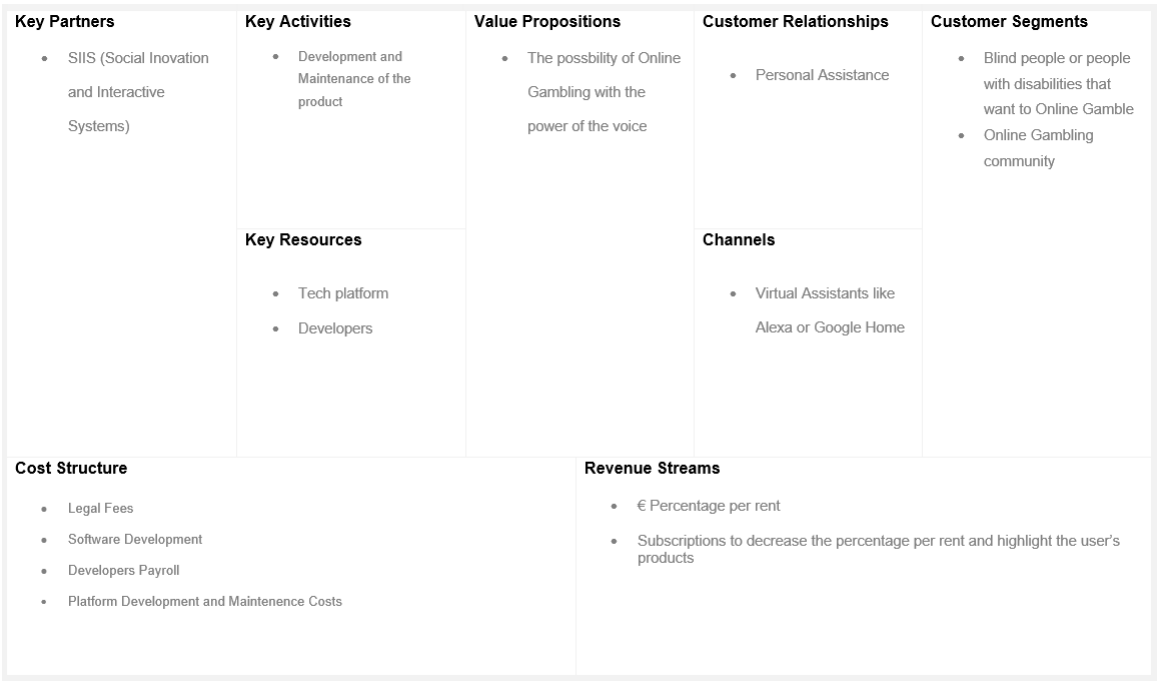

Figure 1 - Canvas Model

2.3 SWOT Analyses

SWOT Analysis, as the word says, is a type of analysis based on the SWOT word. This word represents Strengths, Weaknesses, Opportunities, and Threats, and so a SWOT analysis is a technique for assessing these four aspects of a business (Anon., s.d.).

2.3.1 Strengths

Strengths are the things that describe what an organization does better and what differentiate these organizations from the others. A few examples of strengths can be a unique technology, a strong brand, or a loyal customer base.

In order to fulfil correctly the Strengths area, it is necessary to answer the following questions:

- What differentiates it from the others?
- What do you do well?
- What is our strongest asset?

2.3.2 Weaknesses

Weaknesses are the things that make an organization not have a great performance, not being at their best level. This is the area that directly contrasts with the Strengths and knowing this, this is what the organization needs to improve to be competitive.

To accurately fill out the Weaknesses section, the following questions should be answered:

- What can be improved?
- Where are we lacking resources?
- What are the detractors?

2.3.3 Opportunities

Opportunities can be classified as openings or chances for new and positive things to happen. These opportunities usually come from the outside and require special attention for what may happen in the future.

To successfully fill out the Opportunities section, the following questions should be answered:

- What new market segments can be explored?
- What opportunities are open?
- What trends it is possible to take advantage of?

2.3.4 Threats

Threats are the factors from the outside that will have a negative impact on the organization or will arm the organization. An example of a threat can be the rising material costs or problems with the supply chain.

To correctly fill out the Threats section, the following questions should be answered:

- What consumer trends threaten the organization?
- What threats could harm the organization?
- What is the competition doing?

2.3.5 Project SWOT Analysis

After describing what a SWOT analysis is and how to do it, the next image illustrates the SWOT analyses made for the solution developed in this project.

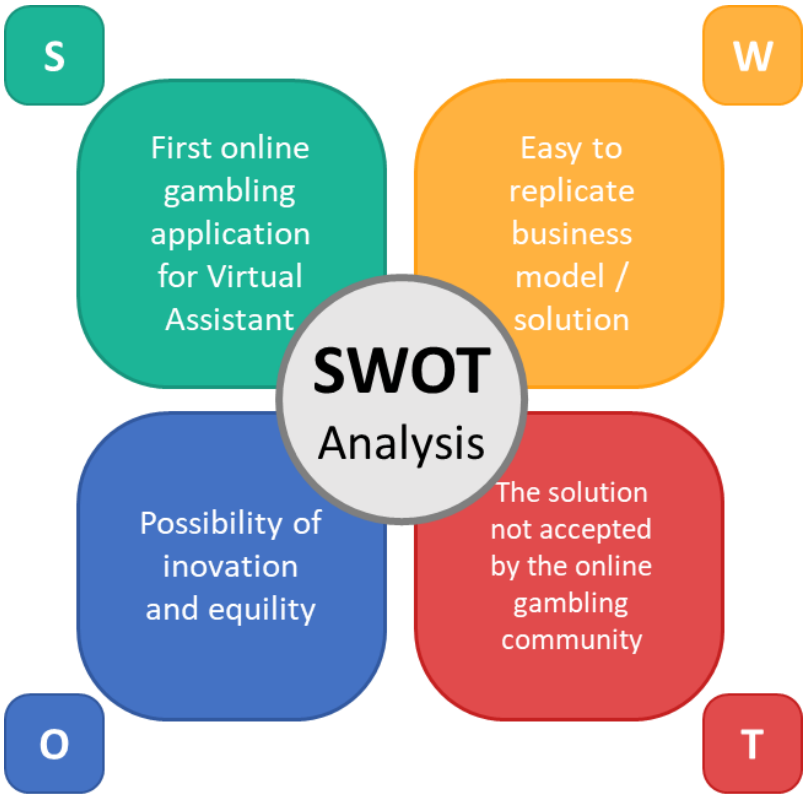

Figure 2 - SWOT Analysis

To make the SWOT analysis easier to understand for this solution, only one thing was mentioned in the four different areas.

In the Strengths section, the biggest strength found is that this can be the first online gambling application for Virtual Assistants. Knowing that this is an unexplored market/field, this can be the pioneer solution.

As a Weakness, the problem of being an easy solution to replicate is the biggest weakness of this solution.

The possibility of innovation and the help in the equality integration of everybody is the strongest opportunity that this project has.

To conclude, as talking about the biggest threat identified, what can make this project/solution fail is if it is not accepted by the online gambling community and possible new joiners with this innovation.

3 State of Art

"State of the Art is the frenetic and relentless

pursuit of doing what its best at that time!"

Marco Anunciação

This chapter will provide an analysis of the main target audience of this solution and its Accessibility, and a deeper analysis of Virtual Assistants, by talking about their history and referring to some of the most used. An explanation of Online Gambling and the Euro Millions is also provided and how the game works.

3.1 Visual Impairment

The term Visual Impairment refers to a loss of vision that cannot be rectified by glasses or contact lenses (Anon., s.d.). There are two types of Visual Impairment:

- Partially sighted, denotes that the level of sight impairment is moderate
- Blind, means there is extreme vision impairment, making it unable to carry out activities that require vision.

According to the Euroblind Organization (Anon., s.d.), there are estimated to be over 30 million people with Visual Impairment, which can be translated as 1 in each 30 European suffering from vision loss.

With numbers dated from 2010, the World Health Organization estimates that only 9% are blind people and the other 91% are people with low vision, or partially sighted people. Translating this percentage to numbers, in 2010 there were 2.550.000 and 23.800.000, giving a total of 26.350.000 visually impaired persons.

In Europe, the most common cause of sigh loss is age-related eye conditions. Conditions like macular degeneration and cataracts may impact negatively a senior's vision.

In Portugal, according to the numbers retrieved from CENSOS in 2011 (Anon., s.d.), there are about 900.000 citizens with visual impairment. Of this big number, only 28 thousand are blind. Knowing that CENSOS – "Recenseamentos da População e da Habitação" (Anon., s.d.), are the largest statistical operation carried out by a country, designed to obtain information about the entire resident population, where people fulfil a form, anonymously, with the answers to the questions in the form, the information retrieved from it is not 100% reliable. In 2021, another CENSOS was done, usually, there are made every 10 years, but the information about the visual impairment of a citizen was removed, and because of that, it is only possible to make predictions with the previous numbers.

According to ACAPO and the Portuguese Society of Ophthalmology, the three most common reasons for visual impairment are age-related macular degeneration (AMD), glaucoma and diabetic retinopathy.

But how can people with visual impairment do normal things like using a computer or a smartphone knowing that they need to increase the size of the text or to listen to what they are doing? The most common approach for blind people to access the Internet is with a browser and a screen reader. Some of the most used screen readers are "Microsoft Narrator" for Windows users and "VoiceOver" for Mac users. In Mobile devices, usually, impaired visually users tend to use apps for audio descriptions of elements. These are fives apps usually used (Anon., 2020):

- Be My Eyes;
- Eye-D;
- Ubook;
- CPqD Alcance;
- Google BrailleBack.

Apart from these applications, nowadays the Operative Systems (OS) bring resources that also help to simplify the usage of the phone by visually impaired people.

3.2 Accessibility

The answer to the question that finishes the previous sub-chapter is Accessibility. But why is this so important? Accessibility means that persons with disabilities can do what they need to do with the same amount of time and effort as people without disabilities. It means that people are empowered, can be self-sufficient, and are less likely to be irritated by badly designed or implemented products. In general, it means that we should have equal opportunities independently of the user's capacities.

The Portuguese government issued a law decree in 2018 aimed at the accessibility of websites and mobile applications (Ministros, 2018). After having already issued a decree law that aimed at accessibility in all platforms developed by them, the Portuguese government decided to expand borders and fight for accessibility for all. With this, they identified four accessibility requirements for websites and mobile applications.

According to the decree (Ministros, 2018):

- "Perceptibility, showing information and user interface components to users in a way that they can perceive them";
- "Operability, ensuring that user interface components and navigation are actionable";
- "Comprehensibility, ensuring that information and operation of the user interface is easy to understand";
- "Robustness, presenting content that is robust enough to be reliably interpreted by a wide range of user agents, including assistive technologies".

How to guarantee accessibility?

There are a few principles that should be followed in order to guarantee that what is being developed is accessible:

- Application of the Principles of Universal or Inclusive Design;
- Provision of a wide range of Products and Services, including Assistive Products and Services, covering the needs of different populations;
- Adaptation of existing products;

- Provide alternative means of information and/or communication.

There are also 10 principles of Accessibility that should be followed when developing for Web and Mobile (Spillers, 2021).

1. If you can't consider all disabilities, consider blindness;
2. Remember to create good ALT text (text that describes images);
3. Remember to tag hamburger menus so screen readers don't skip over them;
4. Don't place important content out of the way where screen readers won't find it;
5. You must test for accessibility with real users;
6. Don't disable zoom in mobile interfaces;
7. Accessibility is cheaper when it's done upfront – and easily learned;
8. Be aware of visual bias but remember that accessibility does not mean ugly design;
9. Check mobile accessibility separately;
10. Embrace the all-access attitude;

To verify if a website is accessible or not, it is possible to find an online tool called WAVE – Web Accessibility Evaluation Tool, available at https://wave.webaim.org/. In the next image is shown what an evaluation looks like on one gambling website.

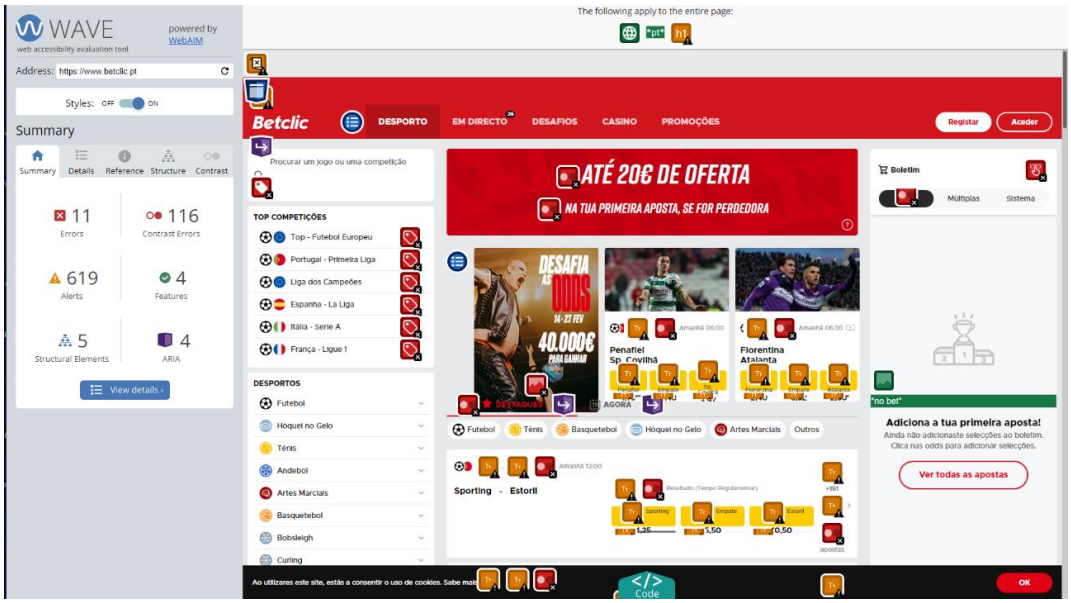

Figure 3 - WAVE example with Gambling website[1]

[1] Image available at: https://wave.webaim.org/report#/https://www.betclic.pt

3.3 Virtual Assistants History

Contrary to what most people think, it is necessary to go back a few decades, a little more than half a century, to find the first voice assistant. In 1961 IBM launched the IBM Shoebox, a voice assistant capable of recognizing up to 16 words and 9 digits. This was very primitive but was the beginning of emergent technology. (Mutchler, 2017)

Later, in 1990, Dragon released the first-ever consumer speech recognition software, the Dragon Dictate. The price of this product was just 9000$ for a "discrete speech recognition", which means that the user needed to say one word at a time [5]. Seven years later, Dragon announced a much-improved version of Dragon Dictate called Dragon NaturallySpeaking. This software could recognize continuous speaking and up to 100 words per minute. The price was drastically better, 695$ but they needed to spend 45min, at least, to train the program.

Figure 4 - Dragon Dictate[2]

In1996, Microsoft released their first assistant, Clippy. Clippy was much more than a voice assistant, but it had the capacity to get and recognize speech inputs using Microsoft's Speech Recognition Engine. (Mutchler, 2017)

[2] Image available at: https://www.thespeechgurus.com/dragondictate.html

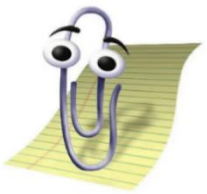

Figure 5 - Clippy[3]

About 15 years later, in 2011, what can be called the game changer of the Voice Assistant was released. Siri, Apple's Voice Assistant was the first of the new Voice Assistant Era to be released.

After Siri, Google released Google Now in 2012, in 2013 Microsoft released Cortana and in 2014 Amazon released Alexa. (Mutchler, 2017)

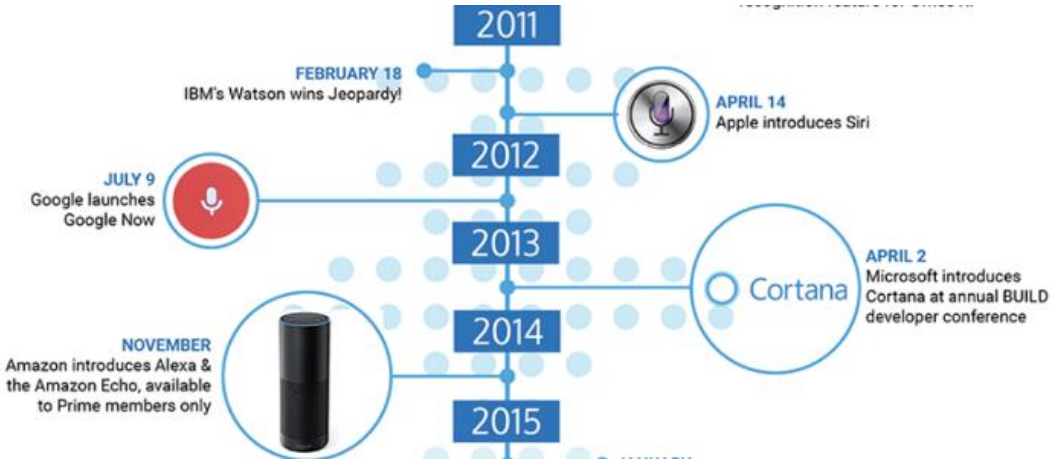

Figure 6 - Evolution of Voice Assistants between 2011 and 2015[4]

Nowadays, Voice Assistants are almost complete software, and they are able to understand almost everything that the user says. For example, Google increased speech recognition up to 95% and IFlytek's speech recognition has made it to up 98% accuracy rate.

[3] Image available at: https://www.mentalfloss.com/article/504767/tragic-life-clippy-worlds-most-hated-virtual-assistant

[4] Image available at: https://voicebot.ai/2017/07/14/timeline-voice-assistants-short-history-voice-revolution/

According to Kyle Wiggers (Wiggers, 2019), in 2019 there were around 133 million voice speakers in the world and 66.4 million in the U.S, almost half of the speakers in the world.

3.4 Siri

Known for being the most popular Virtual Assistant, Siri is the VA developed by apple that is only available for Apple users, which means that is only available for Apple products.

To start this Virtual Assistant, it is only necessary to say “Hey Siri” to one of the Apple products, for example, iPhone, iPad, Apple Watch, or HomePod (Apple Smart-sounding speaker designed to work only with Siri).

Siri as a special particularity has access to every built-in application on the personal Apple device – such as Mail, Contacts, Messages, etc – and will use such applications to display data or search their databases anytime she needs to (Britta, 2021).

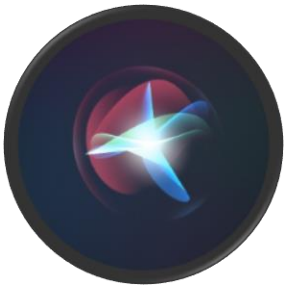

Figure 7 - Siri: Apple Voice Assistant[5]

3.5 Google Assistant

Google Assistant, as the name says, is Google's voice assistant. It was launched in 2016 and started by being an extension of Google Now. It was designed to be a personal VA while expanding on Google's existing "OK Google" voice controls (Tillman, 2021).

[5] Image available at: https://www.apple.com/siri/

Figure 8 - Google Home Logo[6]

Initially, Google Now intelligently gathered relevant information for you. The pulled information was for example where you worked, your meetings and travel plans, your favourite sports teams, and what interested you so that it could present you with information that was significant to you.

Google Now has been decommissioned for quite some time, but Assistant occupies the same territory, combining these personalized aspects with a wide range of voice control. Google Assistant accepts both text and voice input, and it will continue the discussion regardless of which form you use.

3.6 Alexa

Taking into consideration that Alexa is the chosen Virtual Assistant for this project development because is the one that I have the most experience with and is the equipment that I have available, a deeper analysis of this VA will be done

According to Amazon Alexa Developers Website (Anon., s.d.), “Alexa is Amazon’s cloud-based voice service available on more than 100 million devices from Amazon and third-party device manufacturers.”. Alexa offers the possibility to build natural voice experiences that give a more intuitive way for customers to interact with the technology they use every day. To be easier to develop for Alexa, Amazon offers a collection of tools, APIs, reference tools and very good documentation. Alexa allows the user to make simple tasks such as playing music,

[6] Image available at: https://assistant.google.com/

setting alarms or making to-do lists, or more complex ones that need real-time data as asking for the weather, news, or sports results. All these actions are Alexa Skills. To interact with Alexa it is necessary to say “Alexa” followed by the desired command.

Figure 9 - Alexa Logo[7]

3.6.1 Alexa Skills

Alexa skills are like applications for Alexa, and it is what allows users to interact with Alexa and do the desired actions. The skills are divided into two main components, the Skill Service and the Skill Interface.

Figure 10 - Skill Components

[7] Image Available at: https://developer.amazon.com/en-US/alexa/branding/alexa-guidelines/brand-guidelines/the-alexa-logo

3.6.2 Skill Service

This is the first component to be created when creating a Skill. It should handle all the business logic and is the part that needs to be developed. This component is hosted in a server and is the layer that manages the HTTP requests, user information, databases, information processing, etc... The skill service should implement event handlers and these handlers' methods should define how the Skill will react when the user triggers the event by talking to Alexa. (Ashish, s.d.)

This service can be built in any language, but it should have in consideration that can be hosted in an HTTPS server and return JSON responses. A good option can be Node.js running on AWS lambda – Amazon's serverless compute platform.

3.6.3 Skill Interface

The Skill interface is the top-level interface of the skill, which contains the general Alexa directives, response events, state reporting and error reporting. Basically, this is the place where the configuration is.

3.6.4 Skill Lifecycle

The next figure shows how a Skill lifecycle is. The example skill is triggered by the user when he says "Alexa, Ask Greeter to say Hello". Alexa is responsible to send the audio to the Interface to be processed and the Interface should call the Intent in Skill Service. The Skill Service is now responsible to process all the information and returning the output to the Skill Interface. The Skill Interface should return the output and the Alexa device should answer to the user, in this specific case, should say "Hello".

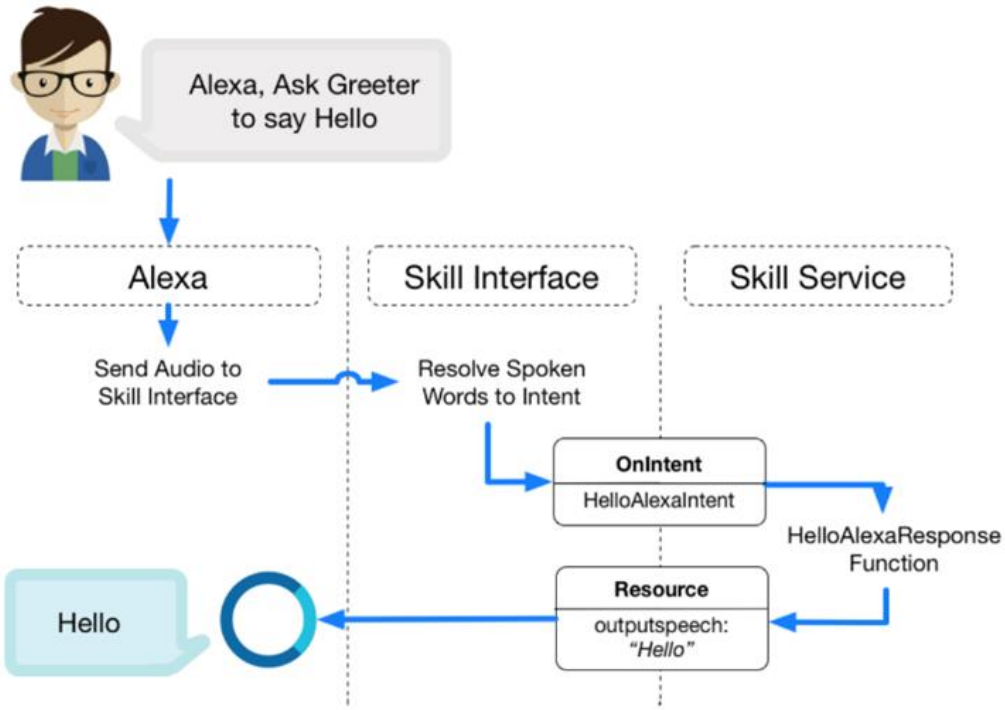

Figure 11 - Skill Lifecycle[8]

3.7 Sports Betting History

According to John Milton (Milton, 2017), "The first record of sports betting dates back more than 2,000 years ago". At the same time that Greeks introduced the Olympics to the world, their love to sports made them introduce sports betting as well.

After the Greeks, sports betting spread to Rome, where it was accepted and legalized. The betting passion increased among the Romans because they started to bet in gladiator games, and even when these games stop, this passion continued to spread among other kingdoms and gambling survived.

But years later, during medieval times, sports betting was forbidden. Some religious leaders made some laws against it, but instead of stopping betting, people kept betting underground

[8] Image Available at https://developer.amazon.com/en-GB/alexa

and during this time it was growing even more as new sports events were presented to the world.

Later in history, horse racing made sports betting very popular in England and the English spread this practice to the rest of the world, especially in the United States, where it quickly became one of the favourite pastimes for many people.

Nowadays, betting is constantly growing and is very popular. It is possible to bet on almost everything and an example of it is the 2020 US Elections where, for example, Betfair Exchange had around 600M£ betted in the Election market.

Currently, the top five countries that are considered the biggest gambling countries are (Anon., s.d.):

1. United Kingdom – with an overall gambling yield of 17.1€ billion
2. Australia – with an overall gambling yield of 16€ billion
3. Singapore - – with an overall gambling yield of 4.1€ billion
4. China – with an overall gambling yield of 3.2€ billion
5. India – with an overall gambling yield of 567.9€ million

Taking the top of the biggest online gambler, the United Kingdom, in the next image it is possible to see that Online Gambling is already 40% of the overall betting in the country and Sports betting is the most type of betting consumed in the online Share.

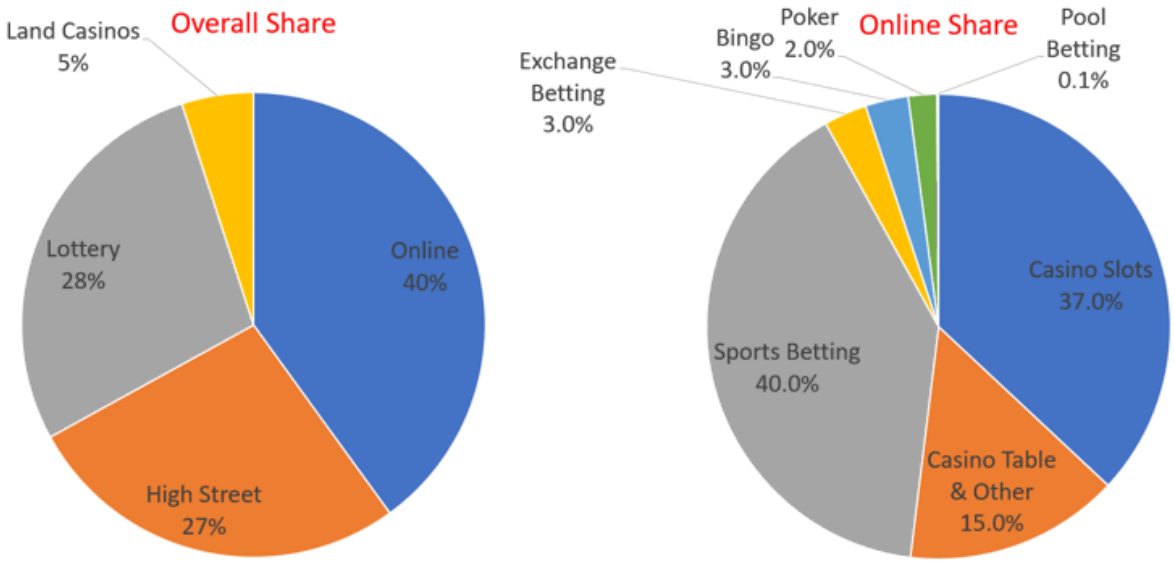

Figure 12 - Overall Share and Online Share - Gambling in UK[9]

The next image shows an overall overview of the most popular / betted sports type in the UK.

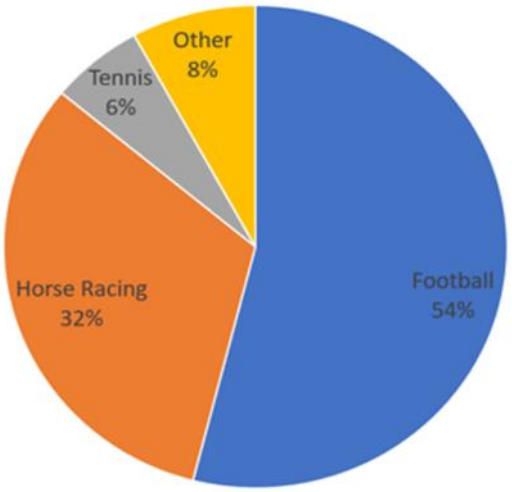

Figure 13 - Sports Distribution in Sports Betting[10]

[9] Image Available in https://www.onlinebetting.org.uk/betting-guides/biggest-gambling-countries.html

[10] Image Available in https://www.onlinebetting.org.uk/betting-guides/biggest-bookies.html

3.8 Online Gambling

As in many areas of business, the gambling market was revolutionized with the entrance of the internet into our lives. Considered one of the pioneers in this commercial change, it was in the early 90s that the first online betting sites appeared. (Lill , 2019)

In 1994 the first-ever Online Casino was launched, but there is no evidence about the name of the casino and if it still exists. Between 1994 and 1996 were created around 15 online gambling websites and between 1996 and 1997 the number of websites increased by 1333.33%, to around 200 websites, which represents a huge increase in the popularity of online gambling websites.

In the year 2000, what is called the Curious Case of Betfair, brought a new trend to the online sports betting history. Betfair created a new betting system where users are allowed to bet against each other. This invention put online gambling on a new level and is still a unique system in this industry.

Nowadays there are hundreds of thousands of Online Gambling websites and almost every country in the world has different gambling websites.

3.8.1 Online Gambling in Portugal

Portugal has really restricted rules regarding the Online Gambling System. In 2015 all Online Gambling Companies that were allowing the Portuguese to Bet or Gamble, closed due to a change in the Portuguese Laws for Online Gambling.

Only two years later, in 2017, appeared the first Online Gambling House, “Jogos Santa Casa” which curiously, is somehow managed by the government through the “Santa Casa da Misericórdia” of Lisbon.

Today, there are more than a dozen of Online Gambling houses such as:

- Betclic;
- Betano;
- Esc Online;

- Placard;
- Jogos Santa Casa.

Now-a-days, the Online Gambling in Portugal has been a growing market, as it is possible to see in the next graph.

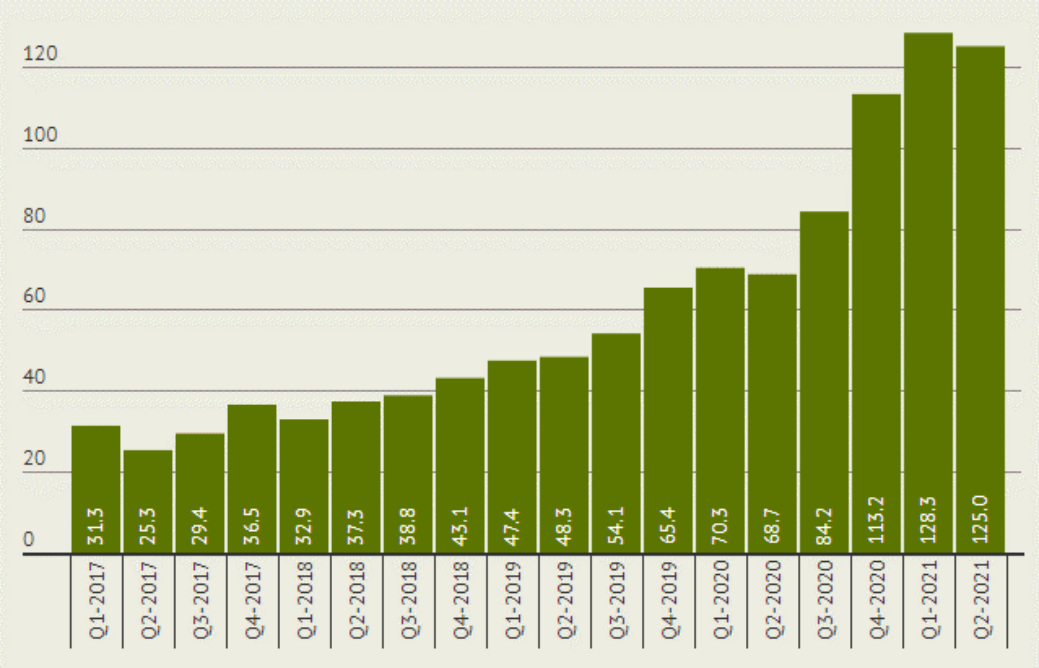

Figure 14 - Portugal regulated igaming GGR[11] by qtr (€m)[12]

In the next figure, a comparison between the most played online gambling types in the second quarter of 2021, the Sports betting and Gaming is provided, which shows that Sports betting is the favourite of the Portuguese.

[11] GGR – Gaming Gross Revenue

[12] Image Available at: https://igamingbusiness.com/portuguese-online-gambling-revenue-dips-from-record-highs-in-q2/

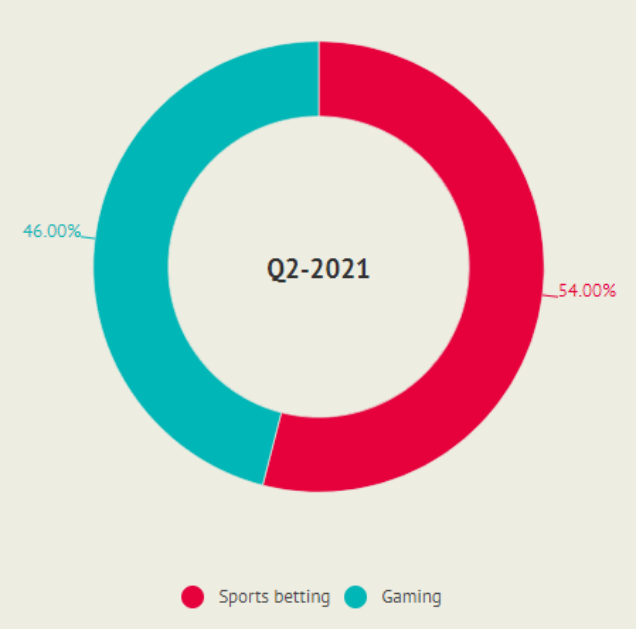

Figure 15 - Betting vs. Gaming in Portugal (GGR)[13]

To conclude the analysis of the Portuguese Online Gambling market, the next image provides information about the most betted sports in the second quarter of 2021, and it confirms that Portugal also has Football as the most betted sport.

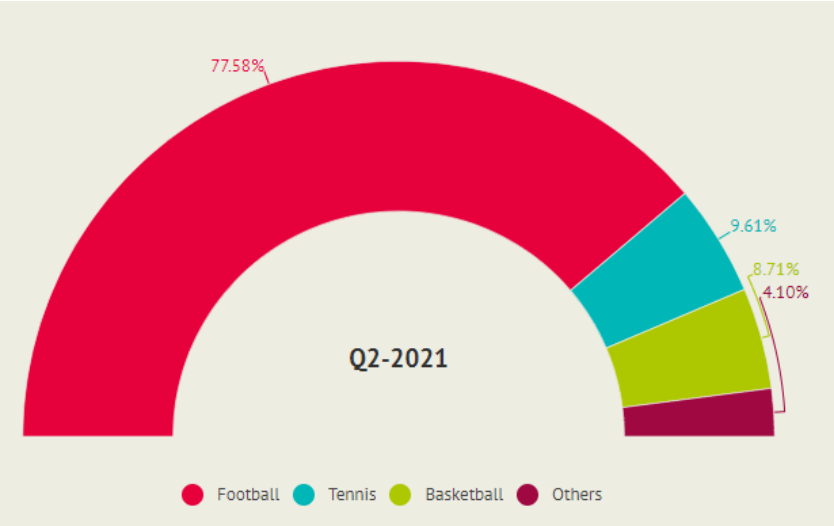

Figure 16 - Most betted Sports in Portugal[14]

[13] Image Available at: https://igamingbusiness.com/portuguese-online-gambling-revenue-dips-from-record-highs-in-q2/

3.9 Euro Millions

Knowing that this solution aims to develop an Alexa skill that will allow the user to play Euro Millions using just his voice, it is important to understand how it works and some of the technical terms that are used.

The next image illustrates what a Euro Millions bulletin looks like.

Figure 17 - Euro Millions Bulletin[15]

According to the official website (Anon., s.d.), three main rules should be followed in this game:

- Players must select five main numbers from 1 to 50, followed by the two additional Lucky Star numbers between 1 and 12;
- It is only allowed to play until the day of the draw at 20:30 CET;
- Every player should be 18 or more years old.

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[14] Image Available at: https://igamingbusiness.com/portuguese-online-gambling-revenue-dips-from-record-highs-in-q2/

[15] Image available at: https://jornaleconomico.pt/noticias/este-e-o-novo-boletim-do-euromilhoes-onde-o-premio-maximo-pode-atingir-250-milhoes-538111

A single ticket with 5 numbers and two stars has a price of 2,50€.

As is possible to imagine, there are some rules that prevent the players to play and selecting all the numbers and stars. The next table shows the maximum number of numbers and stars and the number of possible combinations.

	5 nos.	6 nos.	7 nos.	8 nos.	9 nos.	10 nos.	11 nos.
2 stars	1	6	21	56	126	252	462
3 stars	3	18	63	168	378	756	
4 stars	6	36	126	336	756		
5 stars	10	60	210	560			
6 stars	15	90	315				
7 stars	21	126	441				
8 stars	28	168	588				
9 stars	36	216	756				
10 stars	45	270					
11 stars	55	330					
12 stars	66	396					

Table 1 - Multiple Entrances in Euro Millions[16]

After analyzing the figure, it is possible to see that there is a max of 11 numbers when there are two stars and a max of 12 stars and 6 numbers. The max number of possible combinations is 756. Apart from the normal fee for play, when the user wants to add multiples, he must also pay 2.50€ for each combination he plays, which consists of five main numbers and two Stars. For example, if the user wants to register 6 numbers and 2 stars the price will be 15€ and on

[16] Data retrieved from: https://www.euro-millions.com/pt/como-jogar-no-euromilhoes

the other hand if the user wants to play 5 numbers and 3 stars the price will be 7,5€. The max value that the user can reach is 1890€.

To make these calculations there is a formula based on the possible number of combinations of the start multiplied by the possible number of combinations of the numbers.

$$\text{Eq. Total Combinations } = \frac{s!}{(2!\,(s-2)!)} * \frac{n!}{(5!\,(n-5)!)}$$

To understand the variables, “s” is the number of selected stars, and this value can variate between 2 and 12. The variable “n” represents the number of selected numbers, and the range of this value is between 5 and 11.

4 Design

"Make it simple, but significant."

Don Draper

In this chapter, the solution design process will be explained, more precisely, the process of requisite determination, the technologies that were chosen, the Architecture for this project and to conclude it will be prepared for the next chapter by explaining how to develop an Alexa Skill.

4.1 Design of the Solution

The design process of the solution begins with an initial phase of gathering where it was sought to understand the functional needs of the users. This initial phase aims to understand all the processes involved in the Euro Millions game and how it is played. During this process, it was understandable that all the actions that happen during this game are possible of being done with the usage of the voice.

At the end of this process, it was possible to obtain the following functional requisites:

- The system should be capable of
    - register a normal Euro Millions combination with the numbers and stars provided by the user
    - register a multiple Euro Millions combination with the numbers and stars provided by the user
    - provide a random number and start for the user and consequently ask if he wants to register that combination
    - let the user choose which date he wants to play for
    - say the last winning key to the user

- say the time remaining for the next draw
- provide an error message to the user when
  - the number of combinations is bigger than the allowed number of combinations – 756
  - the user repeats a number or a star

To be able to do all of the things mentioned above, the system should be ready for a login system with the usage of the Alexa application for mobile devices.

Apart from the functional requisites, it is important to define and fulfil non-functional requisites, such as:

- The user experience should be intuitive and didactic
- The system should be safe
- The system should have a high availability

With all the functional and non-functional requirements established, and to create the prototype as soon as possible, the requirements were analyzed, and the use cases were created with a priority attached to each one of them. This priority rank is between one and three where the number one means high priority, the number two means medium priority and finally, the number three means low priority.

In the next table is possible to see the Use Cases.

Use Cases		
ID	**Use Case**	**Priority**
1	Login through the Alexa Mobile App*	1
2	Register a normal Euro Millions combination*	1
3	Register a multiple Euro Millions combination*	2
4	Ask for the last drawn combination	1
5	Ask how much time remaining until the deadline for the next draw	1
6	Provide a normal random combination for Euro Millions	2
7	Allow the user to register the provided random combination	2
8	Edit or discard the combination that is currently being inputted	2
9	Provide error message to the user when he inputs a number that is not between the allowed range – 1 and 50	1
10	Provide error message to the user when he inputs a star that is not between the allowed range – 1 and 12	1
11	Provide error message to the user when he inputs the same number or star two times	1

Table 2 - Use Cases Table

*** Development Note**: This use cases are dependent on the collaboration of "Jogos Santa Casa". The use case 2 and 3 are possible to do without this collaboration by emulating the API behavior

The next figure shows the use cases where the user interacts with Alexa.

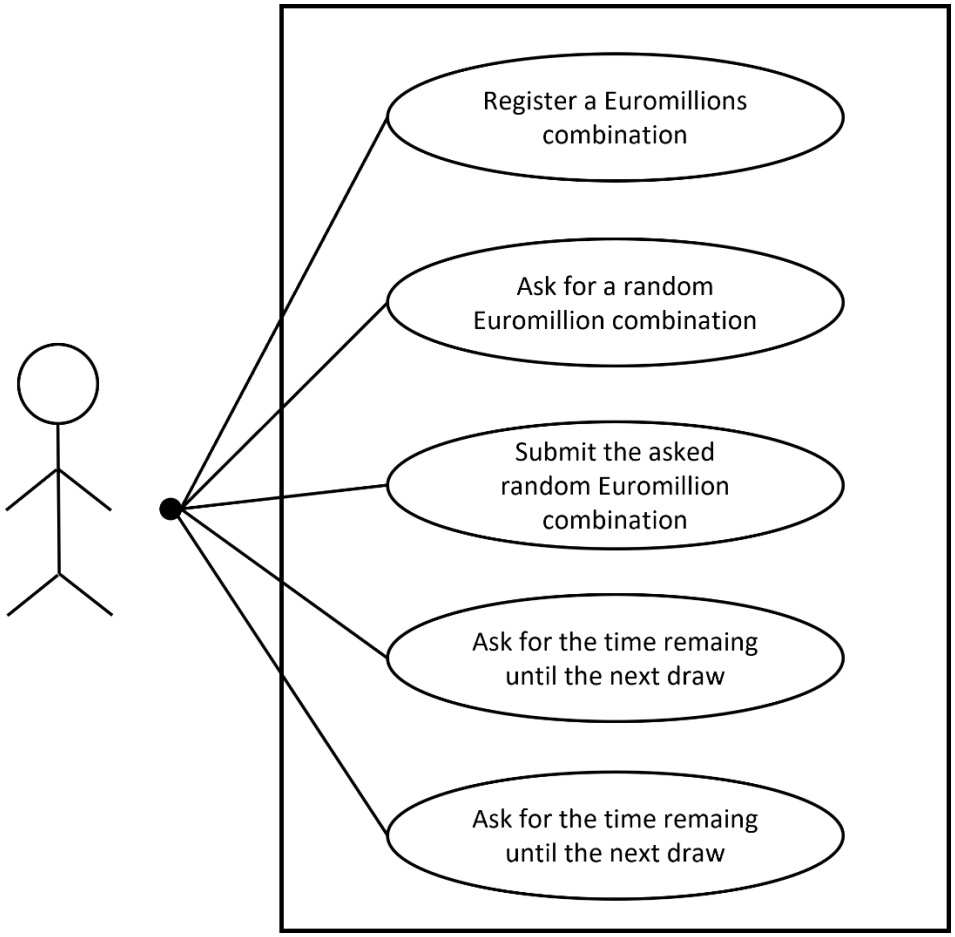

Figure 18 - Use Cases

4.2 Architecture

For the second step of the design of the solution, the architecture for this application was projected. The next image illustrates the architecture that I will follow in order to achieve the best result.

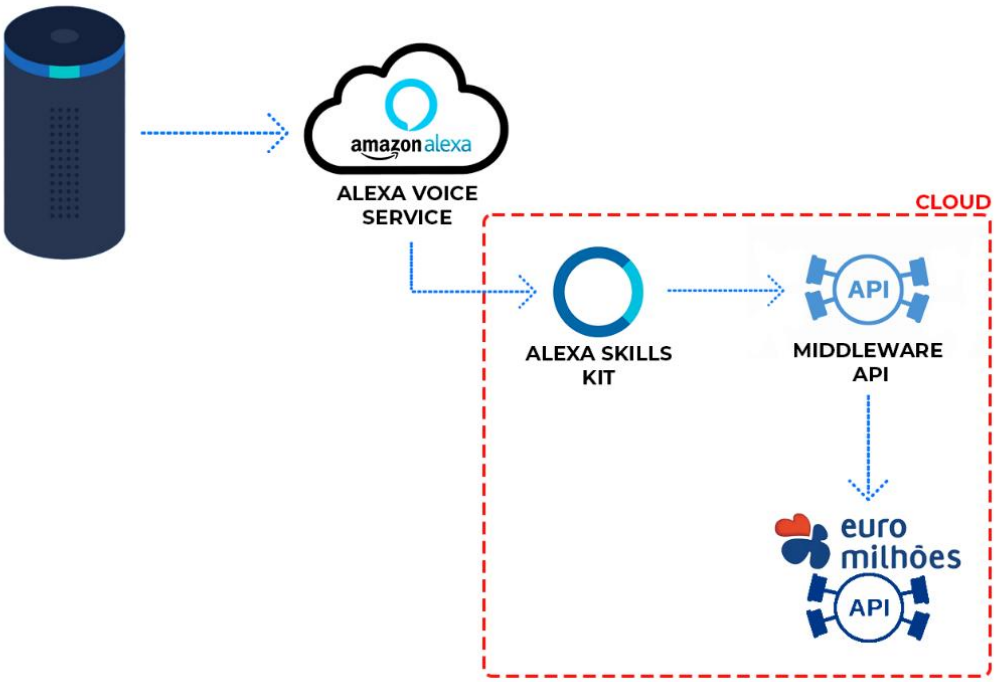

Figure 19 - Project Architecture

Is it possible to see, that the aim is to have three different contact points, the Alexa Skills Set that is in AWS Lambda (AWS Lambda is a serverless, event-driven compute service that lets you run code for virtually any type of application or backend service without provisioning or managing servers) that is the first contact point from the Alexa Voice Service, where the intents will be defined and consequently the Middleware API will be called. This Middleware API is responsible to handle most of the logic and interact with the Euro Millions API. I decided to do this middleware API because this way it is easier to keep the consistency between different products in the case in the future this solution is used for different purposes. Finally, we have the Euro Millions API that is responsible to submit our prediction. All of these three contact points will be developed to be in the cloud.

It is important to refer that if I don't have access to the Euromillions API I will do one to simulate the desired behaviour to be able to test the solution.

4.3 Technologies

To conclude the design of the solution it was decided which technologies should be used. For the Middleware API and the Alexa Skill kits project I will be using Node.js as the development framework. According to the official Node.js website (Anon., s.d.), Node.js is a JavaScript runtime built on Chrome's V8 JavaScript engine that allows the execution of Javascript code outside of a web browser.

In order to guarantee the quality of the code and that every function works as expected – unit testing - in the Middleware API, tools like Eslint and Mocha will be used, respectively.

Figure 20 - Used Technologies[17]

4.4 Development

4.4.1 How to develop an Alexa Skill

Before demonstrating some development requirements, it is important to understand how to build an Amazon Alexa Skill. According to the official Amazon developer website, this is how the Skill should be built, in 6 steps. (Anon., s.d.)

4.4.1.1 Plan and design the skill

Before writing any code, it is important to do the following steps:

1. Determine the value that the Skill that is going to be developed will have to the user

[17] Images Available at: https://pt.wikipedia.org/wiki/JavaScript, https://nodejs.org/en/, https://mochajs.org/ and https://eslint.org/

2. How this is going to improve the user experience
3. Think in the voice interface
    a. Storyboard - It is important to have the linear progression through time simulated as if it is a conversation. In the next figure, it is possible to find a good example of how to do it.

Figure 21 - Storyboard Example[18]

    b. User interaction - This is where we should consider what users can say, which should be considered an Utterance, and how this information is going to be transformed into Intents. In figure 7 there is an example of how an Utterance can be found in a sentence and it is transformed into an Intent There are some important words in a sentence said to Alexa, such as:

[18] Image available at: https://developer.amazon.com/en-GB/alexa

i. Wake Word – This is the word that will make Alexa start listening to the user, normally the word is “Alexa”
ii. Invocation Name – this is the custom word or phrase that will invoke the skill
iii. Utterance – this is the phrase that defines what the user wants to do with the skill
iv. Slot value – a variable part of an utterance, normally defines time, location, and others.

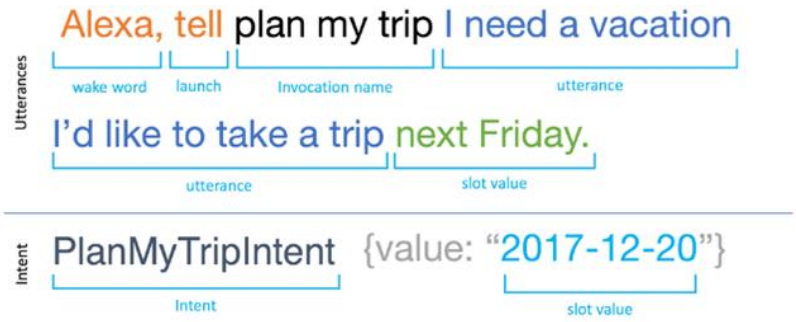

Figure 22 - User Interaction example[19]

4.4.1.2 Setup skill in the developer console – Create a new Skill

Now that all the pre-requisites are all full field and done, it is time to go to the developer console - https://developer.amazon.com/alexa - and start creating a new Skill. In the Developer Console is necessary to define:

1. Skill Name
2. Default / Initial Language
3. Interaction Model
    a. The interaction model is what defines how users will interact with the Skill, for example:
        i. Smart Home – Skill that controls smart home devices - “Alexa, turn on the desk lights”
        ii. Video – Skill that lets users find a consumed video - “Alexa, play Manchester by the Sea”

[19] Image available at: https://developer.amazon.com/en-GB/alexa

iii. Custom – This custom interaction model gives full control of the experience and of allows to create a custom voice interface for the skill

4.4.1.3 Use the Voice Design to Build Your Interaction Model

In this step Interaction Model refers to the collection of Intents, the sample utterances, and the dialogue model:

1. **Intents** are the requests that the skill can handle
2. Optionally intents can have arguments and they are called **Slots**
3. Sample utterances map the intents to the words or sentences users can say to interact with the skill
4. The dialogue model is responsible to identify information that the skill needs and the prompts that Alexa can use to collect and confirm the information in a regular conversation with the user. There are two ways to create these components:
    a. Using the developer console, which provides an updated console for the entire skill-building process, including the interaction model
    b. Create the JSON file for the interaction model and create/update the skill with the Skill management API or the ASK Command Line Interface.

4.4.1.4 Write and test the code

This is one of, if not the most important step of all when creating an Amazon Skill. This step is where the service that can accept requests and send responses from/to the Alexa Service should be created. In this Service will be implemented all the business logic of the Skill.

Amazon provides the Alexa Skills Kit (ASK) which is a software development framework that enables you to create content for the skills. The ASKs include Software Development Kits (SDKs) and these SDKs are available in Node.js, Java, Python, C#, or Go.

In JavaScript, a default code is automatically generated like a node.js project.

In the next paragraph is possible to see an example of how the requests and Intents are handled in JavaScript.

```
const Alexa = require('ask-sdk-core');

const LaunchRequestHandler = {
    canHandle(handlerInput) {
        return Alexa.getRequestType(handlerInput.requestEnvelope) ===
'LaunchRequest';
    },
    handle(handlerInput) {
        const speakOutput = 'Welcome, you can say Hello or Help. Which
would you like to try?';

        return handlerInput.responseBuilder
            .speak(speakOutput)
            .reprompt(speakOutput)
            .getResponse();
    }
};
```

Code 1 - Example of code for Alexa Skill

As it is possible to see in the first line there is the most important import of the file. This line of code imports the Alexa functions that will help the Skill to understand what to do with the code. In each handler, we have the `canHandle` and `handle` functions. These functions are responsible to check if this is the desired intent and if is the intent, it will execute the code in it, respectively.

4.4.1.5 Beta test the Skill

This is an optional step, once the skill is ready it can be submitted to a beta test. In this test, the skill will be available to restrict the group of users, selected by the creator, to test the application.

4.4.1.6 Submit Skill for Certification

When everything is ready and working it is time to submit the Skill for certification, and this means it is time to:

1. Access the Certification page in the developer console and run the Validation and Functional Tests. These tests will help to identify possible issues that need to be fixed before submitting the skill
2. Review the submission checklist
3. Finally, submit the skill for certification

5 Development

"Imagination is your invisible

power to produce all things powerful."

Hiral Nagda

This chapter will demonstrate how the solution was implemented and all the problems encountered during its development. Knowing that in the previous chapter we described step by step how an Alexa Skill should be developed, in this chapter we will take each of these steps and briefly describe what was done to achieve a final result that fulfilled all the requirements of the solution.

Unfortunately, after contacting "Jogos Santa Casa", like is possible to see in the email in "Attachment 1", and have a meeting with them to explain the project and the need to obtain a test environment or a simple endpoint to simulate the whole process of submitting a Euromillions key, they said they could not give in due to privacy and security issues. With this in mind, the middleware API will be connected to a DB in order to store the data of the submitted combinations.

All the code developed in this phase can be found in the following GitHub repo: https://github.com/miguelsousaams/tese_OnlineGamblingWithVA

5.1 Implementation of the Alexa Skill

To implement the Alexa skill is necessary to go through all the steps referred to in the previous chapter.

5.1.1 Plan and design the skill

Looking at the value that this solution intends to offer to all those who may use it, as mentioned before, the main goal is to enable all those who have visual impairment the opportunity to do something that can be considered "normal", such as playing or submitting a Euromillions ticket.
This way, the user experience will be improved to a new level, because, until the day that I am writing this thesis it was never done this way.

The next images will show the storyboards for our solution, depending on the interactions that the user has with Alexa.

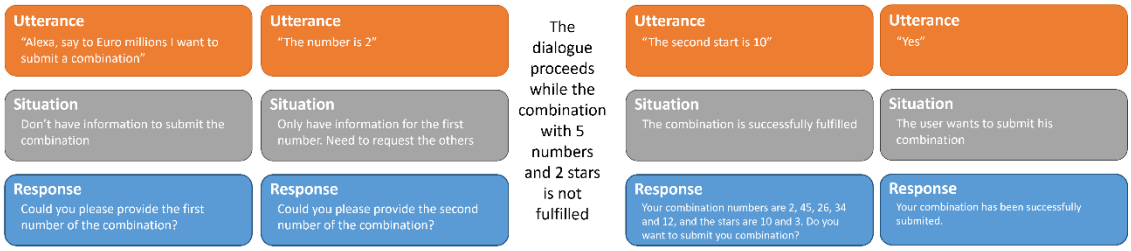

Figure 23 - Storyboard for Combination submission

In Figure 22, it is possible to see the representation of the dialogue between the user and Alexa in order to successfully submit a Euromillions Combination. Alexa starts by having no information about the necessary numbers or starts to fulfil the combination, and with that, starts to ask the user, number by number and star by star, until it fills the five numbers and two stars needed to fulfil the combination.

In the next figure, Figure 23, the dialogue between the user and Alexa is demonstrated when the user wants to know the last winning key. In this specific case, Alexa will not need any specific data to be able to answer.

Figure 24 - Last Winning Key Storyboard

In the next figure, it is possible to find the storyboard that represents the dialogue between the user and Alexa, when the user asks for a random combination and, if he wants, the submission of it.

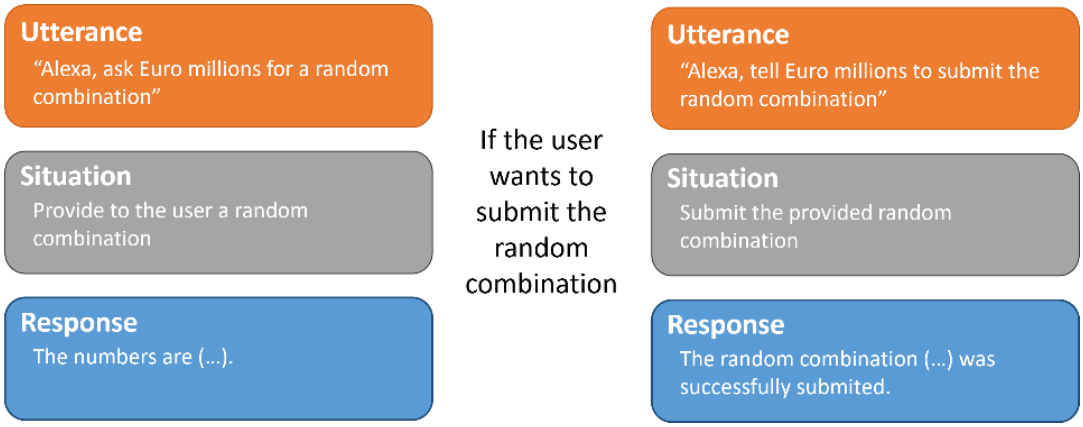

Figure 25 - Request and Submit a random combination storyboard

To conclude, the next image shows the storyboard when the user wants to know the remaining time until the next draw.

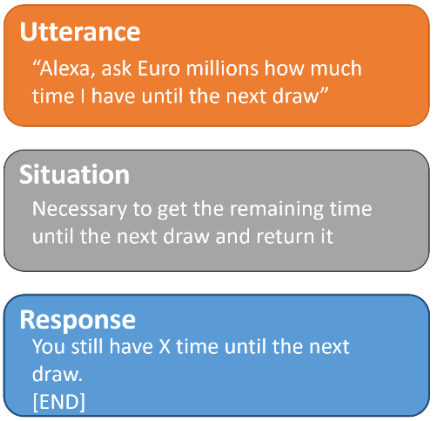

Figure 26 - Time to the next draw storyboard

Looking at user interaction and how user input is going to be transformed into intents, it will provide how each sentence is interpreted by Alexa so that it can transform into Intents and consequently interact with the user depending on their needs. The wake word will always be Alexa, since this is the default of the virtual assistant and it will not be changed, as Invocation Name, the Skill will be invoked through the words "Euro millions". As there is the need to have at least two words as Invocation Name and in order to be as concise and direct as possible, it was decided that the best approach would be to split the word "Euromillions" in two.

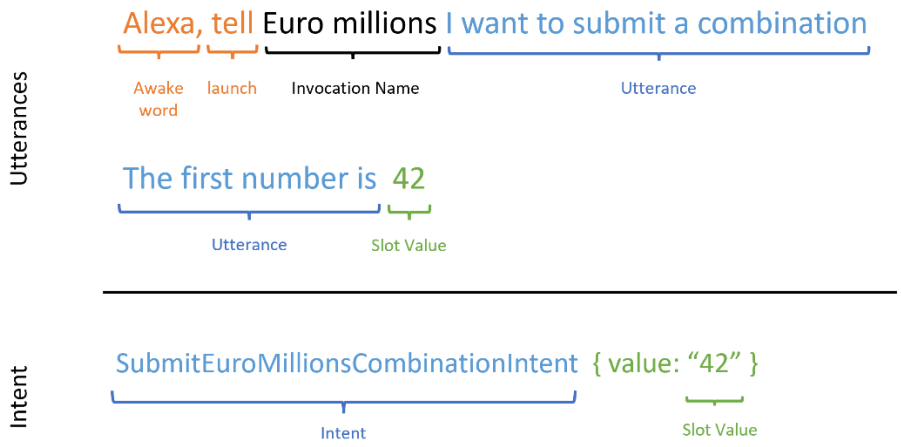

Figure 27 - Submit Euromillions combination - User interaction

In the previous figure, Figure 27 - Submit Euromillions combination - User interaction it is possible to see how the Alexa skill will convert the user sentence to an Utterance and consequently into an Intent. In this case, when the user wants to submit a Euromillions key, he starts by “waking” Alexa and saying the skill invocation name, “Euro millions” and finishes

with the action that he wants to perform. The skill translated the utterance “I want to submit a combination” into the “*SubmitEuroMillionsCombination*” intent and noticed that some information is missing. Alexa will ask it the user, and as seen in the second sentence, “The first number is 42”, the user will be saying the numbers and stars to fulfil the necessary slots.

Figure 28, is illustrated how is the request and submit a random combination utterances, and what is transformed into an intent from what the user said. This specific case was divided into two different intents because the user may or not submit the random combination.

Figure 28 - Request and submit random combination - User interaction

To conclude the user's interaction and how it is converted to intents, the next image provides an overview of how the request for the last winning combination and the time left until the next draw utterances. They are very similar because they don’t need any slot type.

Figure 29 - Last Winner Combination and Time Left to next draw - User interaction

5.1.2 Setup Skill in the Developer Console

This is the initial step where the skill is created and will be defined some important things like the skill name, its initial language and its Interaction Model.

- **Name**: Euromillions
- **Initial Language**: English
- **Interaction Model**: Custom

In the Interaction Model, the decision to make it Custom is to make it fully customizable and have full control of the user experience.

5.1.3 Use the Voice Design to Build Your Interaction Model

This is the step where everything that was previously defined in chapter 5.1.1 will be turned into "reality".

5.1.3.1 Defining Intents

When a new skill is created, the default intents are automatically generated. In the next figure is possible to see the default Intents.

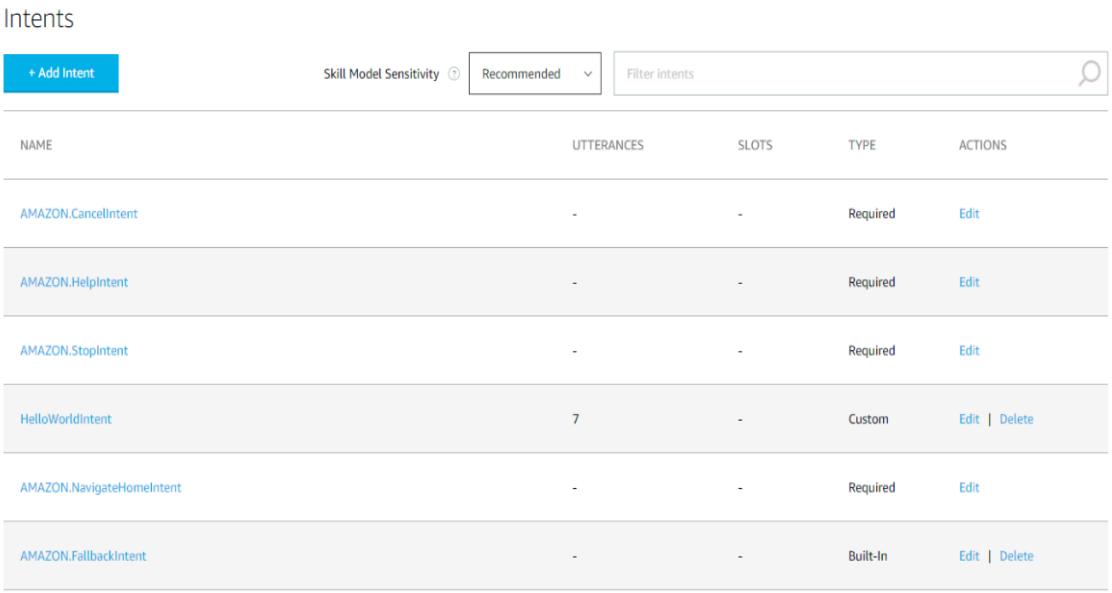

Figure 30 - Alexa Skill Default Intents

All of these default Intents can and should be configured in order to give the best user experience. The “HelloWorldIntent” is the only one that should or can be deleted.

Taking into consideration all the intents that are necessary to fulfil the requirements proposed for this solution, Figure 31 illustrates the final list of intents.

NAME	UTTERANCES	SLOTS	TYPE	ACTIONS
AMAZON.CancelIntent	-	-	Required	Edit
AMAZON.HelpIntent	-	-	Required	Edit
AMAZON.StopIntent	-	-	Required	Edit
AMAZON.NavigateHomeIntent	-	-	Required	Edit
AMAZON.FallbackIntent	-	-	Built-In	Edit | Delete
LastWinnerKey	8	-	Custom	Edit | Delete
DoEuromillionsCombination	5	7	Custom	Edit | Delete
GetRandomCombination	5	-	Custom	Edit | Delete
SubmitRandomCombination	2	-	Custom	Edit | Delete
GetTimeLeftUntilNextDraw	3	-	Custom	Edit | Delete

Figure 31 - Final List of Intents

Inside of each Intent is where is defined the list of utterances. The more utterances inserted, the more accurate will be the action that the user wants to do to Alexa.

In the "***LastWinnerKey***" Intent were defined eight different Utterances and no Slots. The list of Utterances is:

- "last winner key";
- "last winner combination";
- "winner combination";
- "What is the last combination";
- "the last winning key";
- "What is the last key";
- "the last winning combination";
- "What is the last winning key";

For the "***DoEuroMillionsCombination***" Intent, five Uterrances were defined and five different slots need to be fulfilled. The list of Intents is:

- “submit a euromillions combination”;
- “I want to submit a euromillions combination”;
- “I want to submit a combination”;
- “I will submit a combination”;
- “I want to play”;

The slots required to fulfil this Intent are:

- “*number_one*”;
- “*number_two*”;
- “*number_three*”;
- “*number_four*”;
- “*number_five*”;
- “*star_one*”;
- *“star_two”.*

All of these slots are necessary to fill a normal Euromillions combination.

In the “***GetRandomCombination***” Intent no slots were configured and the following utterances were inserted:

- “random euromillions key”;
- “random euromillions combination”;
- “provide a random key”;
- “provide a random combination”;
- “random combination”.

For the "***SubmitRandomCombination*** " Intent, which is linked to the previous Intent, the following Utterances have been defined:

- “I want to submit the random combination”;
- “submit the random combination”.

To conclude the Intents created, in the “***GetTimeLeftUntilNextDraw***” Intent were defined three Utterances:

- “time left to next draw”;
- “time left until the next draw”;
- “how much time do I have until the next draw”.

5.1.4 Write and test the code

Now that all the Intents, Utterances and slots are defined, is time to write the code that will interact with the middleware *API* in order to guarantee the correct functioning of the Alexa Skill.

5.1.4.1 Submit Euromillions Combination Intent

Initially, as you can see in 4.1 Design of the Solution, the idea was to implement a solution that was dynamic and allowed the user to enter as many numbers and stars as they wanted, and Alexa Skill would do the necessary checks that the user was submitting a valid combination.

After the beginning of the development, it became apparent that this was not going to be possible, at least not yet, because when I allowed the Skill to accept multiple values within the same slot, most of the time it would bring wrong values. For example, if the user said "Alexa I want to submit a combination with the numbers 1 34 49 21 2 and the stars 4 and 6", in the numbers slot this would be translated to something like "1 344 9 212" which made it impossible to understand which numbers the user was entering. With this problem, I decided to allow only what is considered the traditional key, composed by five numbers and two stars, and the interaction to get numbers and stars is done by Alexa, asking number by number and star by star.

Taking this into consideration, after all the dialogue between the user and Alexa, that is being managed by the Skill, the Skill will go through the Skill Service and search if any of the Intent Handlers. In this case, will find the Intent Handler shown in Code 2.

```
const DoEuromillionsCombinationIntentHandler = {
    canHandle(handlerInput) {
        return Alexa.getRequestType(handlerInput.requestEnvelope) ===
'IntentRequest'
            && Alexa.getIntentName(handlerInput.requestEnvelope) ===
'DoEuromillionsCombination';
```

```
    },
    async handle(handlerInput) {
        let speakOutput = '';
        const slots = handlerInput.requestEnvelope.request.intent.slots;

        // get the numbers and starts from the slots
        const numbers = [slots['number_one'].value,
slots['number_two'].value, slots['number_three'].value,
slots['number_four'].value, slots['number_five'].value];
        const stars = [slots['star_one'].value, slots['star_two'].value];

        //check if any of the numbers is similar
        if(hasDuplicates(numbers) || hasDuplicates(stars)){
            speakOutput = 'We found one or more duplicate numbers or stars.
Please start again!';
        } else {
            await axios
            .post("https://095260bde8.execute-api.eu-west-
1.amazonaws.com/dev/euromillions",
            {
                numbers,
                stars
            })
            .then(response => {
                speakOutput = 'The random combination with the numbers '
                let combination = response.data;

                combination.numbers.map(number => {
                    speakOutput += `${number} `
                });

                speakOutput += 'and the stars are ';

                combination.stars.map(number => {
                    speakOutput += `${number} `
                });

                speakOutput += 'has been succesfully submited';
```

```
            }).catch((err) => speakOutput = `Unexpected Error`)
        }

        return handlerInput.responseBuilder
            .speak(speakOutput)
            .getResponse();
    }
};
```

Code 2 – DoEuromillionsCombinationIntentHandler

Looking at Code 2, you can see that this piece of code is only executed after the conversation between the user and Alexa is over, as mentioned before. All the necessary information is taken from the "slots" object that comes inside the "handlerInput.requestEnvelope.request.intent". This way, it is possible to check if any of the numbers or stars are repeated, and if so, the user is told that he made a mistake while entering the numbers or stars and therefore should try to submit the combination again. Otherwise, a request is made to the middleware API, so that it handles the data and is able to submit the combination. In a subchapter of this chapter, the API middleware and how it was developed will be described.
If all goes well, the API will return the object with the combination and other data, so that a response can be formulated for the user.

5.1.4.2 Get Last Winner Key Intent

This Intent does not need any type of information, consequently, the only necessary action, as it is possible to see in Code 3, is to request the last winning combination to the middleware API, by making a GET request. With the information retrieved by the API, the answer is formulated for the user.

```
const LastWinnerKeyIntentHandler = {
    canHandle(handlerInput) {
        return Alexa.getRequestType(handlerInput.requestEnvelope) ===
'IntentRequest'
            && Alexa.getIntentName(handlerInput.requestEnvelope) ===
'LastWinnerKey';
    },
    async handle(handlerInput) {
```

```
        let speakOutput = '';

        await axios
            .get("https://095260bde8.execute-api.eu-west-
1.amazonaws.com/dev/euromillions")
            .then(response => {
                speakOutput = 'The numbers are '
                let combination = response.data;

                combination.numbers.map(number => {
                    speakOutput += `${number} `
                });

                speakOutput += 'and the stars are ';

                combination.stars.map(number => {
                    speakOutput += `${number} `
                });

            }).catch((err) => speakOutput = `Unexpected Error`)

            return handlerInput.responseBuilder
                .speak(speakOutput)
                //.reprompt('add a reprompt if you want to keep the session
open for the user to respond')
                .getResponse();
        }
};
```

Code 3 – LastWinnerKeyIntentHandler

5.1.4.3 Get and Submit a Random combination Intents

Knowing that these Intents are connected, and their logic is connected because if the user does not request a random combination, it is easier to understand their logic together, but two different blocks of code will be presented, Code 4 and Code 5.

```
const GetRandomCombinationIntentHandler = {
    canHandle(handlerInput) {
```

```
        return Alexa.getRequestType(handlerInput.requestEnvelope) ===
'IntentRequest'
            && Alexa.getIntentName(handlerInput.requestEnvelope) ===
'GetRandomCombination'
    },
    async handle(handlerInput) {

        let speakOutput = '';


        const numbersArray = [];
        const starsArray = []

        // Generate Random Numbers
        for(let i = 0; i < 5; i++){
            let randomNumber = generateRandomIntegerInRange(1, 50);
            if(numbersArray.indexOf(randomNumber) === -1){
                numbersArray.push(randomNumber);
            }else{
                --i;
            }
        }

        // Generate Random Stars
        for(let j = 0; j < 2; j++){
            let randomStar = generateRandomIntegerInRange(1, 12);
            if(starsArray.indexOf(randomStar) === -1){
                starsArray.push(randomStar);
            }else{
                --j;
            }
        }

        // Generate Output
        speakOutput = 'The numbers are '

        numbersArray.map(number => {
            speakOutput += `${number} `
        });
```

```
        speakOutput += 'and the stars are ';

        starsArray.map(star => {
            speakOutput += `${star} `
        });

        await axios.post("https://095260bde8.execute-api.eu-west-
1.amazonaws.com/dev/randomEuromillionsKey", {
                numbers: numbersArray,
                stars: starsArray
            }).then((response) => {
                console.log(response)
            }).catch((err) => {
                console.log(err);
                speakOutput = 'There was an error'
            })

        return handlerInput.responseBuilder
            .speak(speakOutput)
            //.reprompt('add a reprompt if you want to keep the session
open for the user to respond')
            .getResponse();
    }
};
```

Code 4 – GetRandomCombinationIntentHandler

```
const SubmitRandomCombinationIntentHandler = {
    canHandle(handlerInput) {
        return Alexa.getRequestType(handlerInput.requestEnvelope) ===
'IntentRequest'
            && Alexa.getIntentName(handlerInput.requestEnvelope) ===
'SubmitRandomCombination'

    },
    async handle(handlerInput) {
        let speakOutput = '';
```

```
        await axios.get("https://095260bde8.execute-api.eu-west-
1.amazonaws.com/dev/randomEuromillionsKey")
            .then(response => {
                // speakOutput = JSON.stringify(response.data)

                if(response.success){
                    speakOutput = 'The random combination with the numbers
'
                    let combination = response.data;

                    combination.numbers.map(number => {
                        speakOutput += `${number} `
                    });

                    speakOutput += 'and the stars ';

                    combination.stars.map(number => {
                        speakOutput += `${number} `
                    });

                    speakOutput += 'has been succesfully submited';
                }else{
                    speakOutput = response.errorMessage;
                }


            }).catch((err) => speakOutput = `Unexpected Error`)

        return handlerInput.responseBuilder
            .speak(speakOutput)
            //.reprompt('add a reprompt if you want to keep the session
open for the user to respond')
            .getResponse();
    }
};
```

Code 5 – SubmitRandomCombinationIntentHandler

In Code 4, which refers to getting a random combination intent, we can see that the combination is generated on the Skill Service side and, after the response is formulated for

the user, the combination is sent to the middleware API in order to be stored, for approximately 5 min, so that, during this time, if the user wishes to submit this combination, they can do so.

In Code 5, which refers to the submission of the random combination intent, a unique API call is made to try to submit a random combination and all the verification, for example, if there is an available random combination, is made in the middleware API.

5.1.4.4 Get time left until the next draw Intent

This is the only Intent where all the logic is handled by the Skill Service. As it is possible to see in Code 6, it is calculated if the draw will happen on the following Tuesday or Friday, and depending on the user's current date, it is calculated how much time is left until the next draw date.

```
const GetTimeLeftUntilNextDrawIntentHandler = {
    canHandle(handlerInput) {
        return Alexa.getRequestType(handlerInput.requestEnvelope) === 
'IntentRequest'
            && Alexa.getIntentName(handlerInput.requestEnvelope) === 
'GetTimeLeftUntilNextDraw';
    },
    handle(handlerInput) {
        let speakOutput = '';

        const nextFridayOrTuesday = () => {
            const nextFriday = getNextFriday();
            const nextTuesday = getNextTuesday();
            return nextFriday > nextTuesday ? nextTuesday : nextFriday;
        }

        const nextDraw = new Date(nextFridayOrTuesday().setHours(19, 30, 0, 0));

        const timeToNextDraw = showRemaining(nextDraw);

        speakOutput = 'You still have ' + timeToNextDraw.days + 'days, ' + 
timeToNextDraw.hours + 'hours and ' + timeToNextDraw.minutes + 'minutes to 
submit your combination.'
```

```
        return handlerInput.responseBuilder
            .speak(speakOutput)
            //.reprompt(speakOutput)
            .getResponse();
    }
};
```

Code 6 – GetTimeLeftUntilNextDrawIntentHandler

5.2 Developing the Middleware API

To develop the middleware API, and as described in the project architecture, the goal was to have it in the cloud, to make the interaction between the Alexa Skill and the API easier. In order to do it, the approach was to go with AWS Lambda[20] functions, which would be exposed through an endpoint.

During the development, a framework called Serverless[21] was used to deploy the code in AWS Lambda. To be able to do it, first is necessary to establish the connection between the local machine and AWS using serverless and specifying the credentials, in the middleware API Javascript project add the configurations in a '***serverless.yml***' file to be able to create the necessary endpoints, as you can see in Figure 32, define the Node version, etc., and to execute this file is necessary to run the command '***serverless deploy***'. After every change to the code, the same command should be executed, so a new package is generated, and the new changes deployed.

[20] AWS Lambda - AWS Lambda is a serverless, event-driven compute service that lets you run code for virtually any type of application or backend service without provisioning or managing servers.

[21] Serverless – Framework to develop and monitor auto-scalling applications on AWS Lambda.

```yaml
functions:
  winnerKey:
    handler: src/handler/winnerKey.winnerKey
    events:
      - http:
          path: euromillions
          method: get
          cors: false

  submitEuromillionsKey:
    handler: src/handler/submitEuromillionsKey.submitEuromillionsKey
    events:
      - http:
          path: euromillions
          method: post
          cors: false

  saveRandomKey:
    handler: src/handler/saveRandomKey.saveRandomKey
    events:
      - http:
          path: randomEuromillionsKey
          method: post
          cors: false

  submitRandomKey:
    handler: src/handler/submitRandomKey.submitRandomKey
    events:
      - http:
          path: randomEuromillionsKey
          method: get
          cors: false
```

Figure 32 - Serverless Config File – Endpoints

To be able to save the combinations submitted by the user, it was used MongoDB[22], a non-relational database. The connection is made by URI with the help of a library called "mongodb". In the URI should be specified access credentials and each time that is necessary to read or write in the database the connection should be established or reused. The next figure shows how this connection is done.

[22] MongoDB - MongoDB is a free, open source, cross-platform document-oriented database software written in the C++ language.

```
const MongoClient = require("mongodb").MongoClient;  710.4k (gzip

async function connectToDatabase() {
    if (cachedDb) {
        return cachedDb;
    }

    // Connect to our MongoDB database hosted on MongoDB Atlas
    const client = await MongoClient.connect(MONGODB_URI);

    // Specify which database we want to use
    const db = await client.db("euromillions");

    cachedDb = db;
    return db;
}

const db = await connectToDatabase();
```

Figure 33 - Connection to MongoDB

As is possible to see in Figure 33, the database name is “euromillions” and in this DB there are two collections. The ‘euromillionsCombinationsSubmited’ and the ‘randomEuromillionsKey’ collections are used to save the submitted combinations and the randomly generated combinations, respectively.

5.2.1 Submit Euromillions Combination

This is the main feature of this skill, which requires some verifications that should be done in the API instead of the Skill Service. For example, the number of combinations or which draw is the combination being submitted for.

The next block of code shows how is checked the max of combinations and if the maximum number, 756, is exceeded, the Skill Service will receive an error and prompt it to the user.

```
function combinationsCalculator(numberOfPossibilities, minPossibilities) {
    return Math.pow(numberOfPossibilities) / (Math.pow(minPossibilities) *
Math.pow(numberOfPossibilities - minPossibilities))
}

function checkMaxNumberOfCombinations(numberOfNumbers, numberOfStars) {
    return combinationsCalculator(numberOfStars) *
combinationsCalculator(numberOfNumbers)
}
```

```
if (checkMaxNumberOfCombinations(data.numbers.length, data.stars.length) >
756) {
        const response = {
            statusCode: 400,
            body: JSON.stringify({ "message": "The amount of combinations
is not valid!" })
        }

        return response;
    }
```

Code 7 - Check the number of combinations

If everything goes as expected and the combination is saved in the database, the Skill service will receive a successful response with the necessary fields to give a correct answer to the user. The next image shows the combination object that is saved in the database and is returned to the Skill service with the success message.

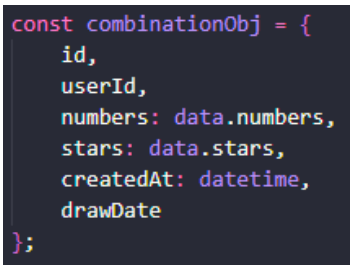

Figure 34 - Combination Object

5.2.2 Get and submit a random combination

Once again, like in the explanation of the development of the Skill service, these two features are connected. They use the same endpoint, the only thing that changes is the request type. When the user requests a random combination the request type is a POST, because the combination is generated by the Skill Service and is sent to the API to be stored for 5 min in the DB, in case the user wants to use it. When the user wants to submit a random combination, it makes a GET request. Here the DB is asked for the last saved combination and it is checked if the combination is still within the 5 minutes before it expires. If both checks are

successful, the user receives confirmation that the combination has been submitted, otherwise, the user will be prompted to request a new random combination.

In the next two pieces of code, Code 8 and Code 9, it is possible to see how the data is requested to the database and how the data is saved in the database.

```
await db.collection("randomEuromillionsKey").find().sort([['createdAt', -
1]]).limit(1).toArray();
```

Code 8 - Get a combination from the database

```
await
db.collection("euromillionsCombinationsSubmited").insertOne(combinationObj);
```

Code 9 - Insert combination in database

In Code 8, there is a filter, "***sort([['createdAt', -1]])***", to guarantee that we get the last item introduced in the database.

5.2.3 Get the last winning combination

This is the only request that has no interaction with the database and makes an external request to be able to provide the last winning combination to the Skill service. This request is made to *https://euro-millions.p.rapidapi.com/results/lastresult* and a special API Key is necessary in order to use this API.

In Code 10, it is possible to see how the request is done and the data is managed before being sent to the user.

```
module.exports.winnerKey = async (_event, _context, callback) => {
    let answer;
    const options = {
        method: 'GET',
        url: 'https://euro-millions.p.rapidapi.com/results/lastresult',
        headers: {
            'X-RapidAPI-Host': 'euro-millions.p.rapidapi.com',
            'X-RapidAPI-Key': '<API_KEY>'
        }
    };
```

```
    await axios.request(options).then(function (response) {
        answer = response.data;

        callback(null, {
            statusCode: 200,
            headers: {
                "Access-Control-Allow-Headers": "Content-Type",
                "Access-Control-Allow-Origin": "*",
                "Access-Control-Allow-Methods": "OPTIONS,POST,GET"
            },
            body: JSON.stringify(answer)
        });
    }).catch(function (error) {
        console.error(error);
    });
}
```

Code 10 - Get Winner Key

6 Tests and Prototype Evaluation

"Discovering the unexpected is more

important than confirming the known"

George E. P. Box

This chapter aims to explain how the evaluation of the solution will be made with the help of a questionary and two different control groups and the results of it.

6.1 Solution Evaluation

Taking into consideration that this project aims to solve the problem indicated above with the usage of the voice and a Virtual Assistant, the tests will be done considering the accuracy of the voice recognition by the VA and the usability of the solution.

To test the solution, it will be provided with a list of the executable commands/instructions for the Virtual Assistant to a specific group to test and to the other group a demonstration will be done, and the instructions will be provided. With this test, it is possible to guarantee that even without the demonstration the solution is easy to use. The user experience with Virtual Assistants is not relevant to the tests.

To get feedback from the users each group will be provided with a questionary and the answers will be analyzed.

6.2 Experiments Description

As mentioned in the previous section, the tests aim to test how easy to use – usability - and the Voice Assistant performance when the user is "talking" with him.

In order to do these tests and as mentioned previously, there will be two different groups:

- **Group 1** – People that only have access to a list of possible commands to execute the necessary functionalities
- **Group 2** - People that will see a demonstration and will have access to the list of possible commands to execute the necessary functionalities

In both groups the intention is to use the people with the previously referred disabilities but knowing that the intention of the solution is not just to help to solve the referred problem but bring innovation to the online gambling world, people without these disabilities will be added to the testing groups.

Knowing that the main goal is to test the solution, and as mentioned previously, the users will be divided into two different groups to test the two different possibilities. Both groups will have a small introduction to how the Euro Millions work and how to register a combination. To differentiate the groups, the Group 1 will only receive a list of the possible commands that can be executed to be able to test every functionality enumerated in the questionary, and the Group 2 will also have access to the list of possible commands, but they will also have a demonstration to see a complete flow of every functionality that they need to test to answer every question in the questionary.

When all the functionalities are tested, the users will have to fulfil a questionary with some questions regarding the difficulty of the actions that they've done and the difficulty of using a VA and the interaction with him. The answer to these two questions is really important to define how easy is to use the solution and if the usage of a VA is viable for this solution or if there is a better / different approach that can improve the usability of the user. In order to answer the questions, the user will have to answer if they managed to do the necessary rate between 1 and 5, where 1 means that it is "Difficult to do" or "Bad" and 5 means "Easy to Do" or "Very Good".

Questionary		
ID	**Functionality**	**Grade**
1	Register a normal Euro Millions combination	1-5
2	Ask for the last drawn combination	1-5
3	Ask how much time is left until the deadline for the next draw	1-5
4	Provide a normal random combination for Euro Millions	1-5
5	Allow the user to register the provided random combination	1-5
6	Edit or discard the combination that is currently being inputted	1-5
7	Interaction with the VA / application	1-5
8	Difficulty using the VA	1-5
9	VA number recognition	1-5

Table 3 - Usage of Solution Questionary

After the realization of the tests, the data obtained from them will be used to get conclusions with the statistics of the ratings provided to each function. The questionary is attached in the end of the file as “Attachment B”.

6.3 Testing the solution

To evaluate the solution, and as previously mentioned, 10 different persons were used, divided in two focus groups with 5 elements each, with ages varying between 22 and 50 years old, who had as minimum requirements to be able to speak English in order to be able to interact with Alexa, and to have some contact with technology in their daily life, so that they could understand what was being done.

Before each user could test it was explained how Euromillions work and how the interaction between the user and Alexa is made so that they understood what was necessary to do. As mentioned previously, one of the groups had an explanation of how they could use the Alexa Skill, and the commands they could use to achieve the goals, and the other group was only aware of the questions they needed to answer in the end and needed to find out how they could use the Skill.

6.3.1 Questionary results

The results of the questionary were very good. The majority of the users were able to fully experience the features provided by this solution, and taking a deep look at every answer, only two of them, from the group that did not receive the explanation of how the Skill works, had problems finding out how.

6.3.1.1 Question 1 - Could you register a normal Euromillions combination?

The next figure, Figure 35, shows that every user was able to perform the main feature of this solution, submit a Euromillions combination.

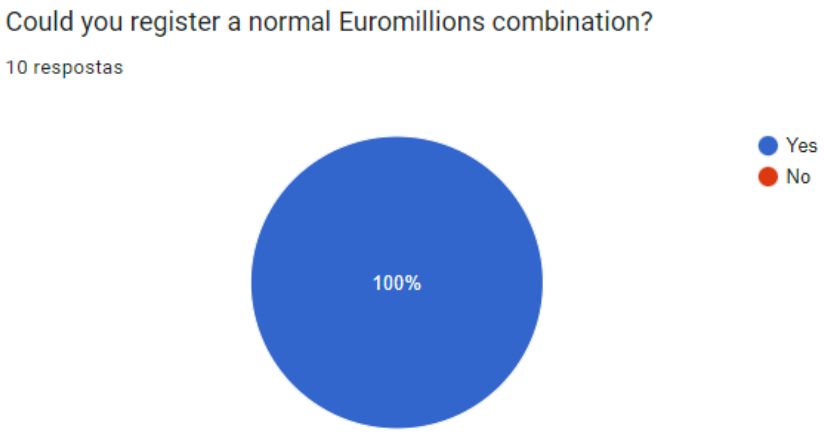

Figure 35 - Percentage of users that could submit a Euromillions combination

6.3.1.2 Question 2 - Could you request the last winning combination?

This was the first question where a user was not able to perform the necessary action, as is shown in Figure 36. This user had no explanation of the commands that he could use to interact with the Skill.

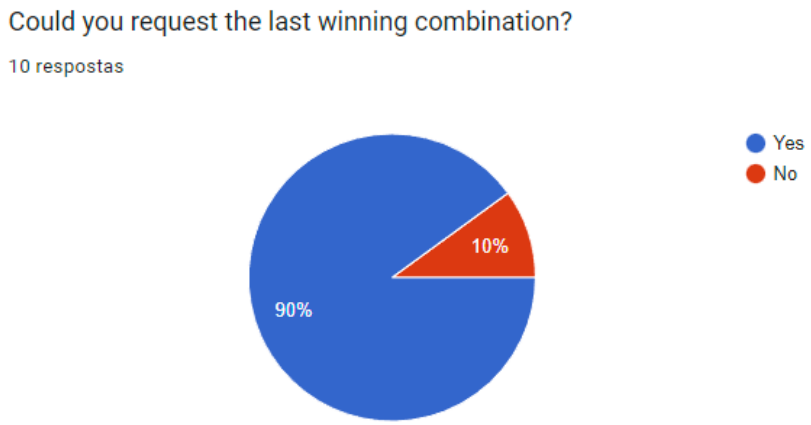

Figure 36 - Percentage of users that could request for the last winning combination

6.3.1.3 Question 3 – Could you ask for the remaining time until the next draw?

As the next figure illustrates, this was the question with the higher percentage of "No" answers. In a world of entire participants, only two of them were not able to perform this action, but once again, they were part of the first group of control.

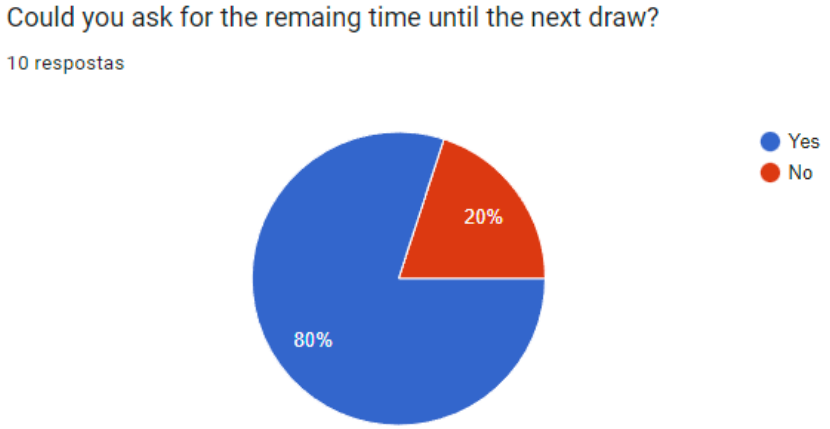

Figure 37 - Percentage of users that could ask for the remaining time until the next draw

6.3.1.4 Question 4 - Could you request a random combination?

Figure 38 shows that all the users were able to request a random combination to the Alexa skill and it was successfully returned.

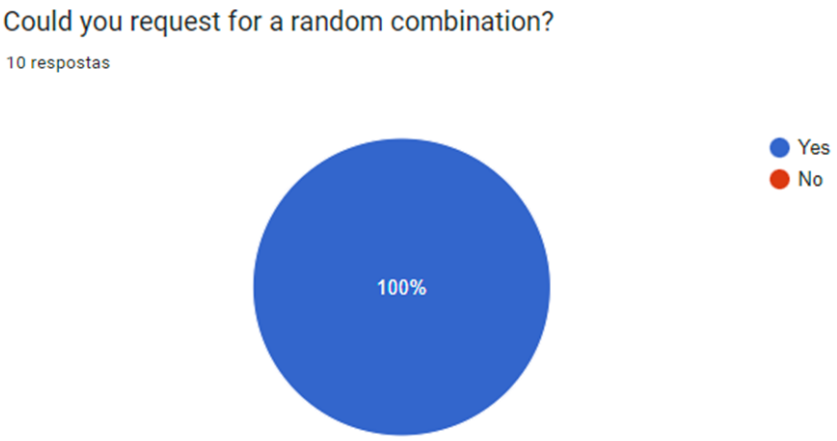

Figure 38 - Percentage of users that could request for a random combination

6.3.1.5 Question 5 – Could you submit the random combination?

As expected, because the previous question is related to this one and all the users were able to request the random key, the next figure, Figure 39, shows that all the users were able to submit the requested random key.

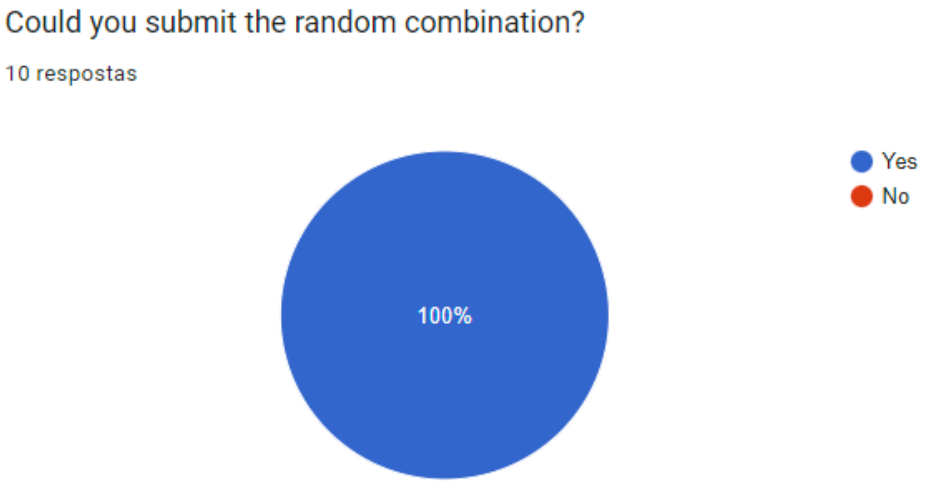

Figure 39 - Percentage of users that could submit the random combination

6.3.1.6 Question 6 – Could you discard or edit the combination that you were inputting?

The next image shows that the user was only able to only discard the combination that he was inputting. The edit functionality was not implemented so, the users were only able to discard the combination.

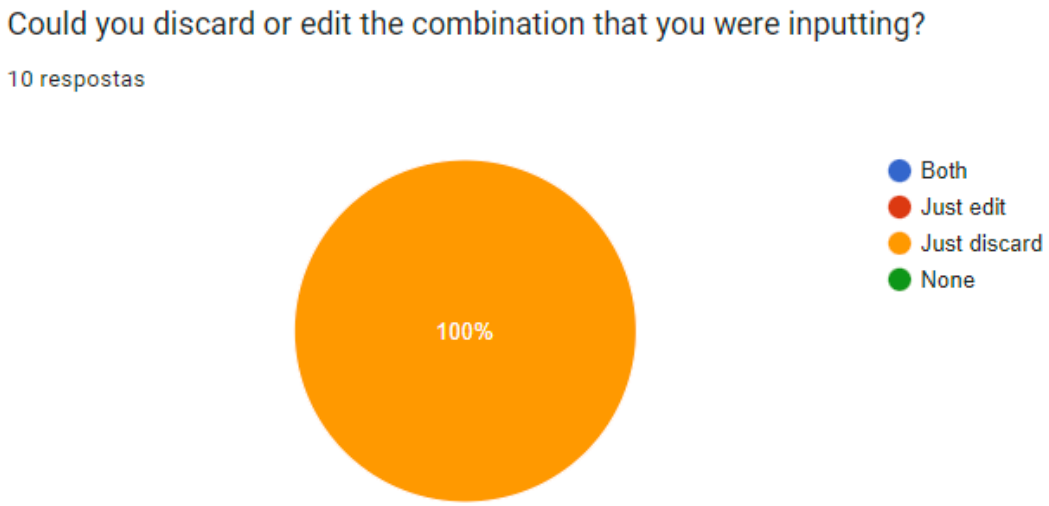

Figure 40 - Percentage of users that could discard or edit the combination that they were inputting

6.3.1.7 Question 7 - How was the interaction with the Virtual Assistant / Euromillions Skill?

This is the first question related to usability and the user experience with Alexa and the prototype. Overall, and as is possible to see in the next figure, the users add had good and easy interaction with the Alexa Skill.

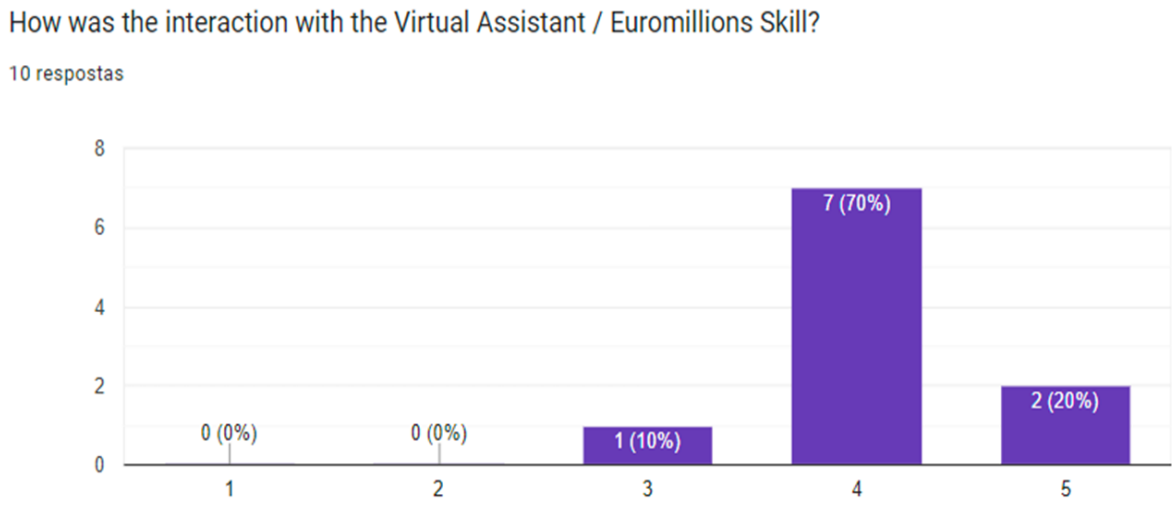

Figure 41 - Interaction between user and Virtual Assistant / Euromillions skill

6.3.1.8 Question 8 – How difficult is to use the Virtual Assistant?

This question was more related to the experience that the user had with the Virtual Assistant and is very important to understand how comfortable users are, with or without experience with virtual assistants, dealing with Vas. Figure 42 shows that overall, the users had a good experience dealing with the Virtual Assistant.

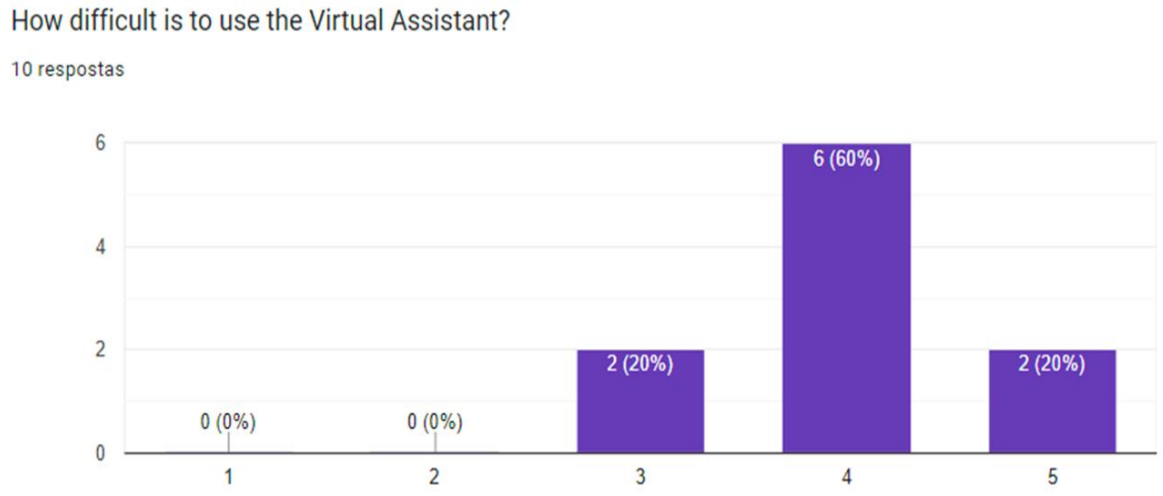

Figure 42 - Evaluation of the difficulty of using the Virtual Assistant

6.3.1.9 Question 9 – How was the Virtual Assistant number recognition?

The Virtual Assistant number recognition, in this specific case, Alexa, is a key point for this solution to be viable. With this, it was important to understand if all the users had a good experience with it, and as the next figure shows, the numbers spelt by the users were, in their majority, understood by Alexa.

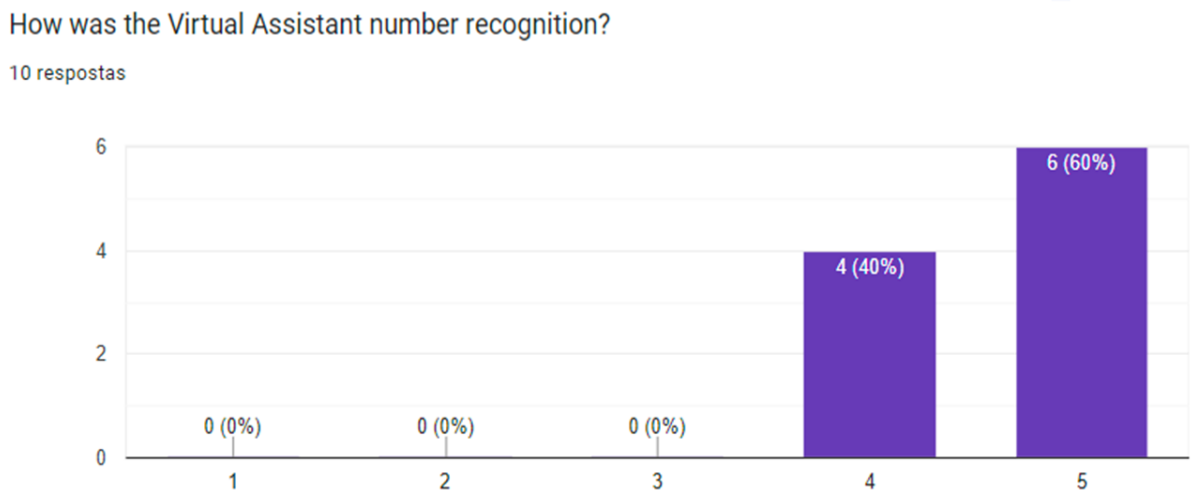

Figure 43 - Evaluation of the VA number recognition

6.3.1.10 Question 10 - Could you please share feedback about your experience? Example if was a good experience, easy to use, interactive, etc.

This was the last and one of the key questions of this questionary. Understanding how the user felt during this experience gives the possibility to understand the liability of this solution and how it can be improved in future work.

In general, the users enjoyed the experience and looked at this solution as a good but different way of doing the Euromillions. Some sentences that can be highlighted said by the users are:

“The experience was nice and different. For someone that has never used a virtual assistant, and only heard about what they could do, I think that overall, this is a very different way of submitting a Euromillions combination. "Very different" is a good way, because it was never done this way.”

“Knowing that I have experience with a Virtual Assistant, even without any instructions, I found it easy to interact with this Skill”

“Good Experience brings commodity for the user and increases the player engagement on the online betting”

7 Conclusions and Future Work

“That's one small step for man,

one giant leap for mankind”

Neil Armstrong

In the present chapter, we set out the conclusions and future work on this prototype. The conclusions will be made taking into consideration the results of the evaluation of the prototype presented in the previous chapter.

7.1 Conclusion

Nowadays online gaming is increasingly relevant both financially and socially. The exponential growth of this market becomes expressive when considering the Portuguese culture and its strong tradition in online gambling. At the same time, inclusion and good practices of digital accessibility are social and legal imperatives, so critical thinking and the development of inclusive online gaming platforms, namely for people with visual impairments, is imperative.

Even taking into consideration that the final prototype presented in this document is somehow conditioned by the fact that it is not a real simulation of how it would be to play Euromillions through the use of a virtual assistant, since the entity that regulates Euromillions in Portugal - "Jogos Santa Casa" - have not provided an API or testing environment, which meant that some functionalities have not been implemented yet, namely login. Due to the fact that virtual assistants are constantly developing, and voice recognition is not yet 100% feasible, it was not possible to implement the functionality of user identification by the voice recognition, since the submission of a Euromillions combination has an associated cost.

Even considering the challenges encountered during the prototype development, the results obtained in the testing of the solution were exceptionally good which gives great viability to this prototype.

Inclusion is key for human evolution. This thesis aims to be a starting point for the online gambling inclusive design by default, which means, bringing inclusive patterns and best practices when creating something new in this scientific field.

Using a similar sentence to the one that was used to introduce this chapter, this is one small step for the man, one great leap for equality in mankind!

7.2 Future Work

In the near future, some additional work should be elaborated in order to complement and validate the work done so far in this prototype. They have been already named in the conclusion, but there are three main goals to pursue.

The first future work to be developed and the most important one is related to security issues that the user experience because if someone is close to their Virtual Assistant, they are able to submit a combination for them. Knowing that the submission of a combination has an associated cost, and this is a future work that is directly linked to the evolution of Virtual Assistants because nowadays they can recognize voices, but is something that is being developed and improved and is not 100% liable to this day.

Secondly, another possible future work and a big plus for this solution would be the possibility of allowing the user to dynamically input the numbers and stars that he desires. This was a problem found during that development that made it impossible to allow the user to submit multiple combinations in this prototype.

To conclude, the third action that would take place to complete and finalize this study in dept and make this prototype usable and 100% testable in real life, would be the integration of an API that would allow the user to the full experience Online Gambling with the usage of a Virtual Assistant.

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Attachments

Attachment A

Re: Colaboração Tese de Mestrado - Miguel Sousa

Miguel Sousa (1200171) <1200171@isep.ipp.pt>
ter, 17/05/2022 10:14
Para: Paula Magalhaes <paula.magalhaes@jogossantacasa.pt>
Cc: Rita Patrocinio <rita.patrocinio@scml.pt>

Bom dia,
Pode ser!

Obrigado,

Miguel Sousa

Get Outlook for iOS

From: Paula Magalhaes <paula.magalhaes@jogossantacasa.pt>
Sent: Monday, May 16, 2022 5:27:11 PM
To: Miguel Sousa (1200171) <1200171@isep.ipp.pt>
Cc: Rita Patrocinio <rita.patrocinio@scml.pt>
Subject: RE: Colaboração Tese de Mestrado - Miguel Sousa

Olá boa tarde Miguel,

O seu pedido chegou à nossa equipa e estamos disponivel para uma pequena reunião com um dos nossos colegas da área de IT.
Tem disponibilidade para esta quinta-feira, pelas 11h00?

Obrigada,

Coordenadora de Projeto – Plataformas Multicanal
Unidade de Marketing Digital | Direção de Marketing
Departamento de Jogos da SCML
Avenida da Liberdade, 194 – 1269-275 Lisboa
www.jogossantacasa.pt

SANTA CASA Misericórdia de Lisboa — 523 ANOS POR BOAS CAUSAS

De: Miguel Sousa (1200171) <1200171@isep.ipp.pt>
Enviada: 9 de maio de 2022 21:36
Para: Jogos Santa Casa <jogos@jogossantacasa.pt>
Assunto: RE: Colaboração Tese de Mestrado - Miguel Sousa - ISEP[1-61X7QK]

Boa noite caro Fábio,

Segue em anexo o comprovativo de matricula para este ano letivo.

Grato pela S/Melhor atenção.
Melhores cumprimentos,

Miguel Sousa

De: Jogos Santa Casa <jogos@jogossantacasa.pt>
Enviado: 9 de maio de 2022 21:32
Para: Miguel Sousa (1200171) <1200171@isep.ipp.pt>
Assunto: Colaboração Tese de Mestrado - Miguel Sousa - ISEP[1-61X7QK]

JOGOS SANTACASA uma boa aposta

Exmo. Sr. Miguel Sousa,

Para que nos seja possível analisar devidamente o seu pedido e viabilidade de resposta ao mesmo, agradecemos que nos envie o comprovativo atual de frequência do referido curso.

Agradecemos o seu contacto. Ficamos disponíveis para qualquer esclarecimento adicional através da Linha Direta Jogos, 808 203 377 das 8h00 às 24h00 todos os dias da semana.

Fábio Domingos

Jogos Santa Casa, uma boa aposta!

DEPARTAMENTO DE JOGOS DA SCML
Av. da Liberdade, 194 - 1269-275 Lisboa
☎ 808 203 377
E-mail: jogos@jogossantacasa.pt
Site: www.jogossantacasa.pt

[THREAD ID:1-61X7QK] -----Original Message----- From: 1200171@isep.ipp.pt Sent: 5/9/2022 04:26:27 PM To: "jogos@jogossantacasa.pt" Subject: Colaboração Tese de Mestrado - Miguel Sousa - ISEP

Boa tarde,

O meu nome é Miguel Sousa e atualmente estou a frequentar o 2º ano do Mestrado de Engenharia Informática, no ramo de Sistemas Gráficos e Multimédia, no Insituto Superior de Engenharia do Porto.
Para a realização da minha tese, propus o tema "Online Gambling with a Virtual Assistant" que tem como objetivo construir um protótipo de uma aplicação para um assistente virtual, neste caso especifico a Alexa - o assistente virtual da Amazon, onde é possivel jogar o Euromilhões.
Se possível, eu gostaria de apresentar melhor este projeto numa reunião, preferencialmente virtual.

Com isto, o objetivo deste email é solicitar a V/ ajuda, de forma a que consiga realizar um prototipo real onde os utilizadores possam ter a experiência de jogo real. Para que seja possivel proporcionar este tipo de experiência, necessito que, se possivel, seja facultado um ambiente simulado para poder fazer testes e se há potencial para tornar numa solução real.

Grato pela V/Melhor atenção.
Melhores cumprimentos,

Miguel Sousa

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Rua Dr. António Bernardino de Almeida, 431
4249-015 Porto - PORTUGAL
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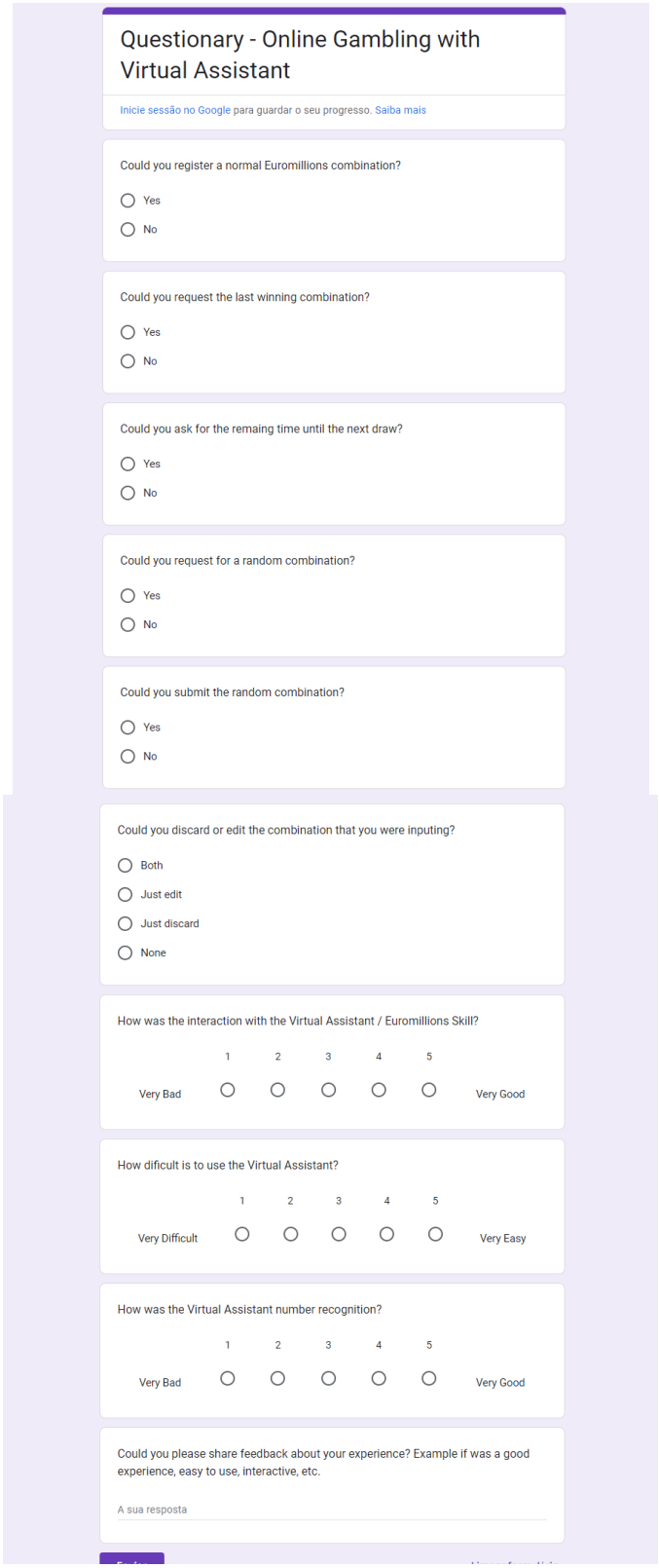
Attachment B



Questionary - Online Gambling with Virtual Assistant

Inicie sessão no Google para guardar o seu progresso. Saiba mais

Could you register a normal Euromillions combination?

- Yes
- No

Could you request the last winning combination?

- Yes
- No

Could you ask for the remaing time until the next draw?

- Yes
- No

Could you request for a random combination?

- Yes
- No

Could you submit the random combination?

- Yes
- No

Could you discard or edit the combination that you were inputing?

- Both
- Just edit
- Just discard
- None

How was the interaction with the Virtual Assistant / Euromillions Skill?

	1	2	3	4	5	
Very Bad	○	○	○	○	○	Very Good

How dificult is to use the Virtual Assistant?

	1	2	3	4	5	
Very Difficult	○	○	○	○	○	Very Easy

How was the Virtual Assistant number recognition?

	1	2	3	4	5	
Very Bad	○	○	○	○	○	Very Good

Could you please share feedback about your experience? Example if was a good experience, easy to use, interactive, etc.

A sua resposta