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Augmented reality in favor of alternative urban mobility development

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ABSTRACT *With the increase of the population, impacts are visible in many situations of certain areas, such as in urban mobility. Problems arising from unsustainable automobile means, and their continued use. Therefore, the constant need of updating and social development is essential. The solution is presented as a proposal to encourage people to get around in an alternative way, with the principle of operating with its main protagonist, an application, that will interact with specific points located in the city through a smart card, which will be identified through image recognition, devoid of augmented reality, it will result in a bonus for the user arriving at the place and interacting with the image using the device. A bonus that rebounds a considerable impact that cities with great urban flow have, besides stimulating tourism with the novelty of augmented reality, interact with images, informational videos and promotional tickets, which provide the opportunity to be remunerated for the initiative of having used an alternative way of sustainable mobility. Based on this principle, high propagation must reach several points, some of them being the increase of the alternative flow, the expansion of the infrastructure and the consciousness of the people involved, which is indispensable. With a socio environmental vision, we seek to motivate and initiate changes to, consequently, get the communities attention in mobility issues and carry out projects related to the cities infrastructure.*

1. Introduction

Today, to imagine a world without systems, without the computerized and distributed networks that we use daily, we would be regressing in an incalculable, almost immeasurable way. Peter Drucker, in his Post-Capitalist Society work of 1993, emphasizes that knowledge has become an essential resource in economy and that the decisive factor of production is neither capital nor labor, but knowledge. (DRUCKER, 1993). The ease with which mobile devices and their applications

brought to the global context of development and mobility, has resulted in a major impact on personal daily deeds, from ordering a snack, lunch or dinner to asking for a ride.

It is included within the context of tourism and urban mobility, technologies developed and designed to help the users and the citizens, which proposes a totally different perspective about the way we used to do some things, bringing innovative ideas, citing as an example, Uber. The ease that these technologies bring to peoples lifes, is an attraction for them to embrace new ideas, as well as the agility it can managed to solve some daily tasks, therefore, tourism is closely related to technological development. Every year we can see the amount of people, that use social networks and applications to simplify their travels and make them more productive, rising. With this idea, it is possible to exalt the necessary use of technology in favor of tourism and urban development, as a way to encourage people to gradually become aware about three crucial factors, tourism, urban mobility and technology.

With the development of the cities, the need to deepen applications and facilities to social interaction has been perceived, providing ease and availability for people, having a specific and crucial point, their urban mobility, which is increasingly critical , with routine problems such as: traffic, pollution and safety. Aiming at these problems that, with the indispensable help of technology, it became possible to analyze the stimulus of people, when using alternative methods of mobility through moral and personal stimulation, to seek a sustainable development since the event suggests these types of approach.

Providing a project that seeks to involve the user with the idea of alternative mobility, making it possible to view information and even be subsidized

2.Development

2.1. Urban mobility

According to Campos (2006), urban mobility is defined as:

> Sustainable mobility in the socio-economic context of the urban area that can be seen through actions on land use and occupation and on transport management, aiming to provide access to goods and services in an efficient way for all inhabitants, and thus maintaining or improving the quality of life of the current population without harming the future generation.

Urban mobility has been emphasized as the population progresses, so it is necessary to innovate and use in a way that it is possible to reeducate and promote other means of locomotion. It will also have a great impact in the cities in the future, aiming at emerging issues. One of these issues is the possible scenario where it is no longer attainable to produce enough fuel to everyone’s cars, some socio-environmental solution are being developed in some countries and making itself visible in the market, while showing the comunity what is there for us in the future.

2.1.1. Smart cards

In order to be able to perform the process of image recognition and work with augmented reality, a research was made to make some objects accessible to anyone who would practice the activity proposed by the application.

Thus, the use of plaques with a series of information, which would facilitate the implementation to use augmented reality, has been analyzed and targeted, since it has features that would facilitate the recognition of these plaques, which are called "Smart Plaques". These objects were specifically designed for both visual and digital use.

The use of these plaques proposes the idea of working with an informative board when you look at it with bare eye and with the use of augmented reality, expanding the range of people this

application can reach. Containing local information that, at the time it is scanned, it will make it possible to obtain digital tickets and information about this process.

This article shows a conceptual project, it also shows that it can be applied in future projects, making clear its uses and its application. It seeks to identify the related image in the framework, doing a process of recognition, and transformation of image at the mobile device, along with these processes, it will also gather data about mobility and informations about the locations, addressing tourism issues and related learning.

2.1.2. Technology and mobility

Increasingly, technology and mobility work together to find innovative ideas to reach more people and achieve one of the main goals of technology, facilitate daily tasks. Some examples of these facilitators, that has a combination of technology and urban mobility, are Uber, Field Trip and an infinity of other proposals.

To contextualize the idea, we used Field Trip as an example: An application for Android and iOS, one of its functionality is to notify the user as he passes nearby a place of interest, according to the categories the user selected (Figure 1). When the user approaches the location the application can read the information available through headset or Bluetooth, if you are driving. You can share discovered places on the following social networks: Facebook, Twitter or Google+ (NIANTIC,2018). Currently, a few locations have information available, which makes the application coverage area restricted.

Image 1. Field Trip app.

Source: NIANTIC, 2018

After visualizing an example of how technology can benefit its users, aiming at mobility, we conclude that technologies are present in most of our day, with a high growth and greater access to all, as shown in the graph below by Hootsuite and We Are Social.

Image 2. We Are Social graph.

Source: Q3 Global Digital Statshot, 2018

Based on these information, we can conclude that is is viable to invest in mobile technology, since it has a considerable penetration around the world, therefore, we can reach our goal of awareness of the user using urban mobility as a guide.

2.2.1. Augmented Reality

The use of augmented reality comes to make the difference, it brings a new market trend with a dynamic concept of integration with the end user in order to enchant and captivate attention to a goal. Activated when the user scan the information board, making this process something dynamic.

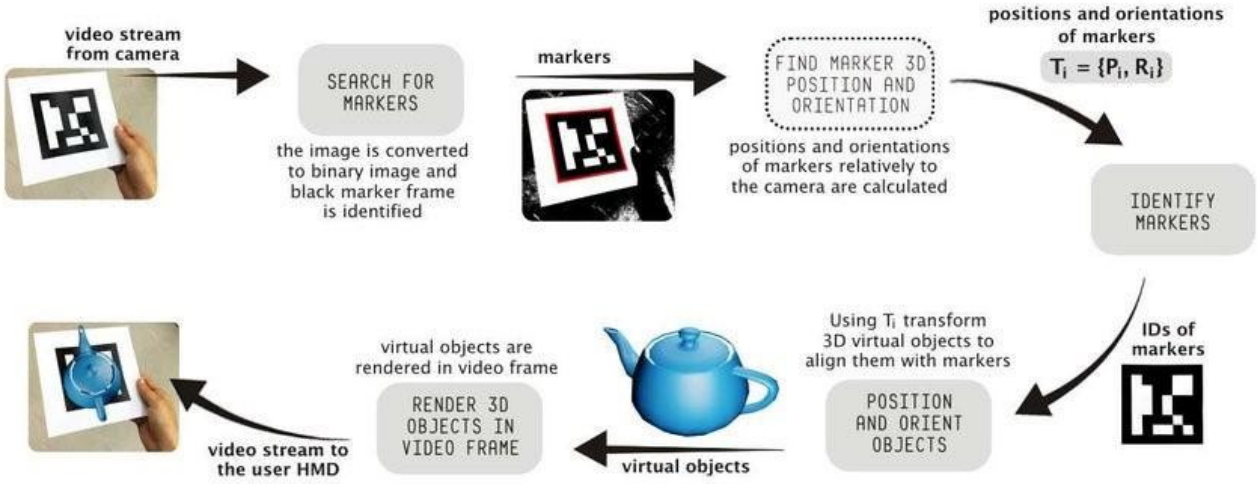
After this step, it is possible to obtain information from the marker , which will be defined in two parts:

Tickets: The user can obtain the ticket by scanning the card using the application, but there will be a usage algorithm that will not allow the same ticket to be obtained twice in a period of 30 days after getting it the first time.

Informational: The second step, after the plate being scanned, will present a series of information about the location, with an educational objective. All sorts of information can be shown to the user, for example: Curiosities, the locations history and folk tales. This is a non-profit project with the goal of stimulate tourism and to attract and enchant the users with interaction.

All this sequence of routines, will allow us to implement the technology of augmented reality, whose marker would be an image that, through the algorithm analyzed in it, will define a location so it is possible to formulate a projection using identification. Details of the process in the following image.

Image 3. AR pipeline.



SOURCE: https://www.researchgate.net/figure/Figura-2-Pipeline-de-RA_fig2_239928586.

Aiming at its functioning, we can attribute a definition that Romão and Gonsalves carry out in their article.

> Augmented Reality is used in different virtual environments and can be used by any area, since it is based on the insertion of texts, images and virtual objects into three dimensions in a physical environment with which the user interacts. (ROMÃO and GONÇALVES; 2013)

Its operation works with the pattern that is presented in Figure 3, with a sequential operation that is included within an analysis algorithm that will verify the plaques and their images. To be able to define an image above the modifier according to its images, the user aims at local information and regulates the algorithm, while earning tickets when you use the application. To ensure security, there is a data and image validation operation, identifying and showing the user when an image is scanned, but not always providing the bonus, and alternatively providing information about the location.

The application will work in a similar way to the image below.

Image 4. Example of AR usage.

Source: www.kioskedamaca.com/?author=556f1722e4b0c8464425e33a"Miguel Regouga.https://www.kioskedamaca.com/?author=556f1722e4b0c8464425e33a

From the moment a ticket is provided, as a bonus, this reference will bring dynamic informations to the app, similar to the figure 4.

The analysis of identification will use a map and geolocation. It will gather information about distance and speed of the activity, performing a calculation algorithm to identify if the user is walking or using some alternative form of locomotion.

Analysis of identification will use map and geolocation. It will gather information about distance and speed by running a calculation algorithm to identify whether the user is walking or using some alternative form of locomotion.

Its algorithm also intends to avoid any kind of fraud or action that does not have the same purpose as the project. It is a matter of security and conservation of an initiative that seeks to protect and assure the sponsors of the tickets that are involved in the project.

2.3.1. Tickets generated

The tickets generated from the augmented reality will be adjusted according to their model so that they are expired and their use will depend on employees, who are seeking a solution to current problems. Their primal objective would be to be used in bicycle parking lots, and rentals, in order to provide convenience and ease, as well as encouraging people to seek new ways to get around, making it a habit and not just a physical exercise.

These same tickets will be adjusted according to their models so that they expire and are not used improperly or handed over from user to user, according to the requests of the suppliers. The focus of this project is ,initially, on its area of application, leaving a proposal to companies and shops to collaborate, in order to make the ideas of re-education of the citizens and awareness more consistent and real.

It is important to emphasize that, the bonus tickets are merely an extra stimulus, despite being one of its main differentials, the project seeks to raise awareness to people through a mobile application, which tries to persuade the user to use alternative methods of transportation, thus earning an award in the format of a bonus, rewarding the users actions.

3. Materials and methods

This topic refers to the methodological procedures and techniques adopted in the research, demonstrating how it was performed, the purpose, the method applied, its main point and sample.

The research done to carry out this article was exploratory research, according to Oliveria(1999, p.134) which says, exploratory research, is the emphasis given to the discovery of practices or guidelines that need to be modified in the elaboration of alternatives that may be replaced.

The research aimed to provide greater familiarity with the use of technology in the field of urban mobility, to make it more evident, deepened in a specific reality, trying to interpret what happens when stimulating a movement from a novelty.

Before beginning the article, research with data collections was put into practice to know the problems faced in the analysis of cost and benefit of remuneration through bonus and calculations to stimulate comparatives.

3.1 Research categorization

Based on the classification proposed by [SILVA, 2005], this monograph falls as follows:

3.1.1 Based on Objectives

Exploratory and Explanatory. In order to improve ideas, a bibliographical research and analysis of examples were carried out, presenting, at the end, explanatory characteristics.

3.1.2 Based on Technical Procedures

Bibliographic and Experimental. Since it was initially elaborated based on existing material (articles and books) and evaluated experimentally through simulations.

3.1.3 Based on the Nature of the Research

Applied. The research generates knowledge with immediate purposes, for example, the application application of the tourism industry.

3.1.4 Based on Problem Approach

Quantitative. The statistical parameters of the simulations were used for analysis and qualification of the proposed model.

4. Results and discussion

The project counts with a great help of augmented reality. It brings the proposal to start a new movement in the cities, both for smart cities, that are already adequate and structured for alternative mobility, as well as for cities that are starting their work, bringing a new concept, renewing thinking, showing alternative ways of mobility, especially cycling, so that it can have the attention it deserves. To incentivize people, the application has a bonus policy by access and progressive reward program by indication, using an integrated UX growth techniques, which will enhance the popularity of the application.

Transforming the idea of alternative mobility an exercise and become a mean of transportation. This project is based on an evolutionary process, which over time, its self evolution and municipal investment, seeks to develop the site and makes this idea the first step in the implementation for the coming alternative mobility.

It is proposed, as an expansion and updates of the application, the idea to integrate other modules. Performing exclusive modules for certain cities, it will work strongly with the concept of

smart cities, promoting facilities and working with an advertisement promotion, administered by the local city hall.

In addition to the mobile software, the boards also have the possibility of upgrades. The board could inform routes, distances but mainly comparatives of mobility considering the current traffic of the city. With the idea of integrated modules, it would be necessary to collect data about the local traffic, calculate and compare routes using cars and alternatives means of transportation, with the aid of augmented reality and, possibly, machine learning.

5. Conclusion

It is determined that remuneration and attractiveness of technology, can help changing the local scenario, related to what the objective of the event has as its theme. The goal of this project is to mobilize as many people as possible, to initiate change by raising awareness, with great help of artificial intelligence for image recognition.

The main idea is to work with peoples mindsets in order to stimulate them to use alternative mobility, especially cycling, in order to rearrange traffic where the urban flow is very large, and causes environmental and moral disorders every day. This project is directed at cycling activities within the context of sustainable mobility, in order to become a routine activity.

Consequently, the idea of cycling as a physical activity pretext is transformed, not making it less important but rather a consequence of an alternative mean of transportation. By the time people realize the benefits of the idea, other problems begin to be perceived and resolved, such as bicycle parking lots for example.

This project is based on an evolutionary process which over time, with the application evolution and municipal funds, can accelerate its financial process allowing it to create more bonuses, even discounts in partners companies, so that this stimulus is increased, making this an evolution and a first step towards the primal goal of this project, which is incentive alternative mobility.

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