



# *senseable* city lab:...

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# R2

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## RIOTAP Rio de Janeiro's travel companion

by Aristodimos Komninos



## PROJECT DESCRIPTION

### INTRODUCTION

Cities are constantly generating and emitting real-time data and information. There are various ways to browse this data, but in most cases it is accessible only through digital devices and visible through their displays. The quantity and variety of data is of such magnitude that if it was possible to visualize it in a physical fashion, it would result in a spectacular visual constellation. Public display and access to this sea of information could constitute the contemporary monument for the city of tomorrow.

But, why is the information important to represent, extract, and interact with? Other than achieving unprecedented speeds and ease of access for our everyday tasks, the sharing of information on a digital platform makes possible: the retrieval of knowledge, data and commodities that would otherwise be over-expensive or even impossible to lay hands on. For example, a sophisticated part of machinery that is manufactured in Japan and is available only to local and specialized markets, that may not be available to the regular consumer without the existence of an on-line trading service.

The main advantage of the digital realm in contrast to the physical is the flexibility between the different means of interaction with spatial entities that are either difficult, or completely impossible to achieve as a regular observer from the ground level. Web browsing, for example, has established specific spatial standards on how we perceive the world and the market. For instance each time someone enters a web page, a digital space is generated that is perfectly rigid on a digital basis but which is totally unrelated to the physical world. That is, one recognizes and is familiar with the digital space of amazon.com, but never really enters a physical space with bookshelves or salesmen.

Today, it is possible to project that information on the physical world, through technologies like Augmented Reality (AR). However, the experience of “browsing” is narrowed down to the optical angle imposed by the street level as well as the display size of the digital device the observer is using (tablet, smartphone, etc.). Notably, this browsing experience is only possible if the observer owns such a digital device and the services necessary for this application. This limitation raises the question: Is there a way to activate a physical data browser, open to the public and as powerful and interactive as Google maps or amazon? Can this physical data browser be formalized as a new piece of urban infrastructure? The digital city could undertake the role of the medium between the formal and informal city. The city browser would act as an agent that would bridge the economic and social interaction between the two worlds.

In the last 40 years the world we live in has been transformed into an endless digital platform that co-exists with our physical world. The stuff that surrounds us have a personality. In fact, they have a double personality: their actual visual being and their digital duality. That means that other than being palpable, visible, colorful, ugly, stinky or tasty, they carry a package of metadata allowing them to be traceable, quantifiable and intractable entities within a secondary network overlapping the city.

The apotheosis of this process was achieved through the credit system and the card culture. A typical MIT student will make more than 70% of their financial transactions through cards (credit, debit, or TechCASH) Can this process be reversed? Is it possible for physical acts to interact with the digital world? How is it possible for behaviors and motions to combine enabling digital processes with limited use of digital devices?

RioTap is a platform that provides exciting travel services using the Bilhete Unico smartcard.



## RIOTAP

RioTap is a platform that uses the new transportation smartcard of Rio de Janeiro, also known as Bilhete Unico, to provide exciting travel services for every visitors to Rio.

RioTap is an idea that transforms a typical transportation smartcard into a guiding tool that, besides mobility, connects its holder to places, events and people. The main advantage of Bilhete Unico compared with other transportation cards is that it is exclusively linked to one person, since passport or similar identification is required for the purchase of the card. Therefore by collecting personal data on the individual user, the RioTap system can provide personalized recommendations for potential destinations around the city.

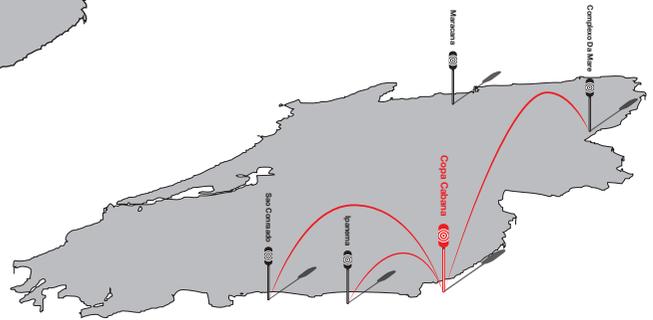
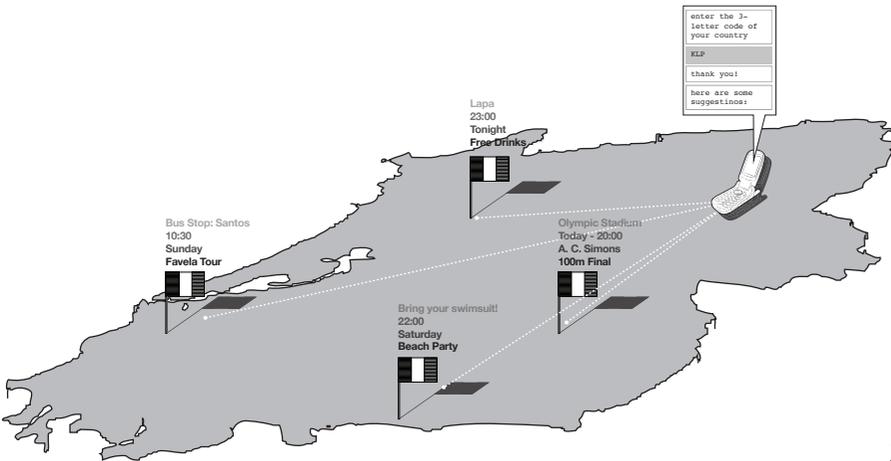
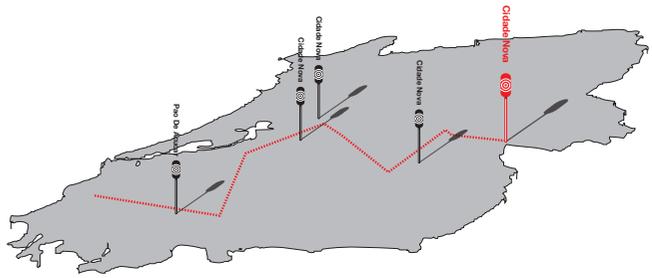
## HOW DOES RIOTAP WORK?

RioTap operates on two simultaneous levels:

1. It feeds the user with live information and updates about potential destinations that match their personal profile combined with their current activity or location.
2. It also collects all places, events, and people the user comes across, on a digital personal log, that can be accessed online and transformed into a state of the art travel photo book, binding the Rio experience into a single item.



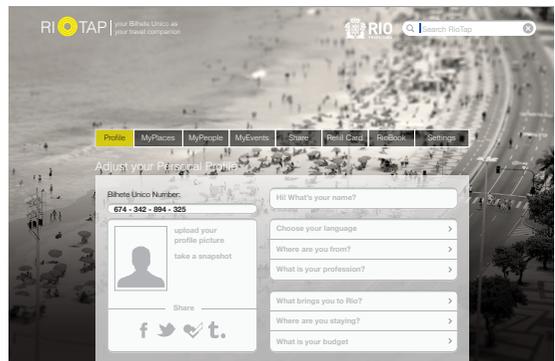
Tips will be sent to the user's device everytime the card is tapped on a place or used on a means of transport, encouraging the user to tap even more



## PERSONAL INTERACTIONS



The interface of RioTap platform: The account is activated by typing the number found on Bilhete Único Card.



The more personal data and preferences the user provides, the more personalized the RIOTAP recommendations will become.



### ACTIVATION & PERSONALIZATION

RioTap will be available to all visitors coming to Rio right when they arrive at the airport. The card will have a mobile number written on its surface, and just sending an sms text to this number will activate the account. The airport and other central public spaces will be equipped with RioTap display devices that will allow the user to activate and manage their account.

When activating their account, visitors will be asked to enter some personal data. According to the

profile and preferences selected by the user, the system will filter existing information, resulting in more personalized recommendations for potential destinations while associating the user with other registered visitors that have matching characteristics, building a network of people with common interests that are currently in Rio. For example a French visitor staying in the area of Santa Teresa for Rio's 2016 Olympic Games that registers into the system will receive information on how to optimize their trips between Santa Teresa and the sport venues that French athletes take part in. It will

also connect them to the network of other French visitors to the Olympics and keep them posted on relevant collective group events. Every time the user taps their card on a reader, tips will be sent to their device. Therefore the more you tap the more you get tipped. Moreover, when the card is used for commuting, the system, by recognizing the location and destination, will provide information about places along the route. Therefore, again, the more you trip the more you get tipped.



RioTap devices installed in the National Gallery. In such cases RioTap devices can undertake additional roles, such as audio guides for the visitors of the museum

## URBAN INTERACTIONS

### INFRASTRUCTURE

The city will be equipped with simple RFID readers where Bilhete Unico can be tapped. When that happens, the system will process the current location of the user in combination with their personal profile and log, and provide them with customized information about their current location, as well as potential destinations, and events. The recommendations and suggestion features of RioTap remain available through simple sms text but of course

the platform will be available also through smartphones, applications and the web.

### BILHETE UNICO SMART CARDS

Bilhete Unico is a typical transportation smartcard with RFID features that carry an identification code that is linked to the unique account of the cardholder. This identification code is activated every time a RFID reader reads the card.

### RFID CARD READERS

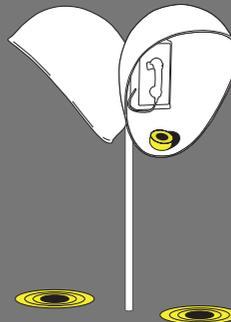
RFID card readers broadcast the identification codes of the cards that

are read through the device through cellular technology to a central server. The wireless cellular technology allows for the devices to be installed anywhere without the requirement of any existing infrastructure.

RioTap will make use of both new and existing RFID readers. The existing readers are located throughout the metropolitan transportation network such as in metro stations and buses. The new readers will be either installed in public spaces, institutions (museums) or privately owned spaces, like bars and restaurants. However, inspired by the yellow color and round shape of the existing RFID readers, all RioTap equipment and



Public-Existing: RioTap platform also integrates its features in the existing equipment found throughout the transportation network.



Public-Enhanced: Existing urban infrastructure, like phonebooths and street poles, can accommodate RioTap devices





Stand-Alone Device, in a bar.

interface will inherit and enhance this existing design.

RFID readers are also combined with displaying devices. Displaying devices allow users, who do not have access to smartphones or web browsers, to manage their online data. Displaying devices feature varying technologies depending on the place that they are installed. RFID Reader and Displaying Devices are either new or existing and according to their location, are distinguished into:

**Public**

Public RFID Readers are mainly located within the transportation network (metro stations, buses), and

on the streets (poles, phone booths and bus stations). The displaying devices that are found within the public spaces are designed in a way that offers protection from weather conditions and vandalism. Therefore RioTap makes use of both existing and new displaying devices, such as the ticket-purchasing machines found in the metro stations, the screen of buses' RFID readers and special screens that can be installed in the advertisement framing of the bus stations.

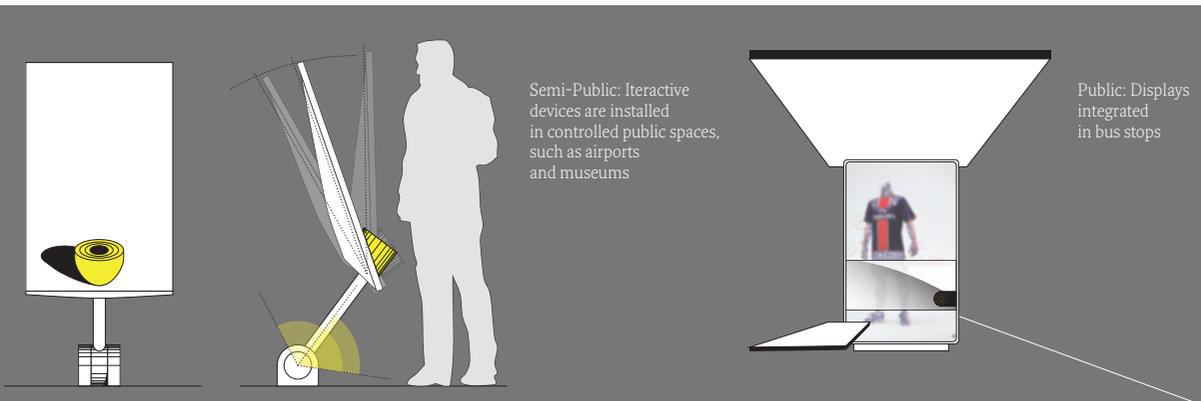
**Semi-Public**

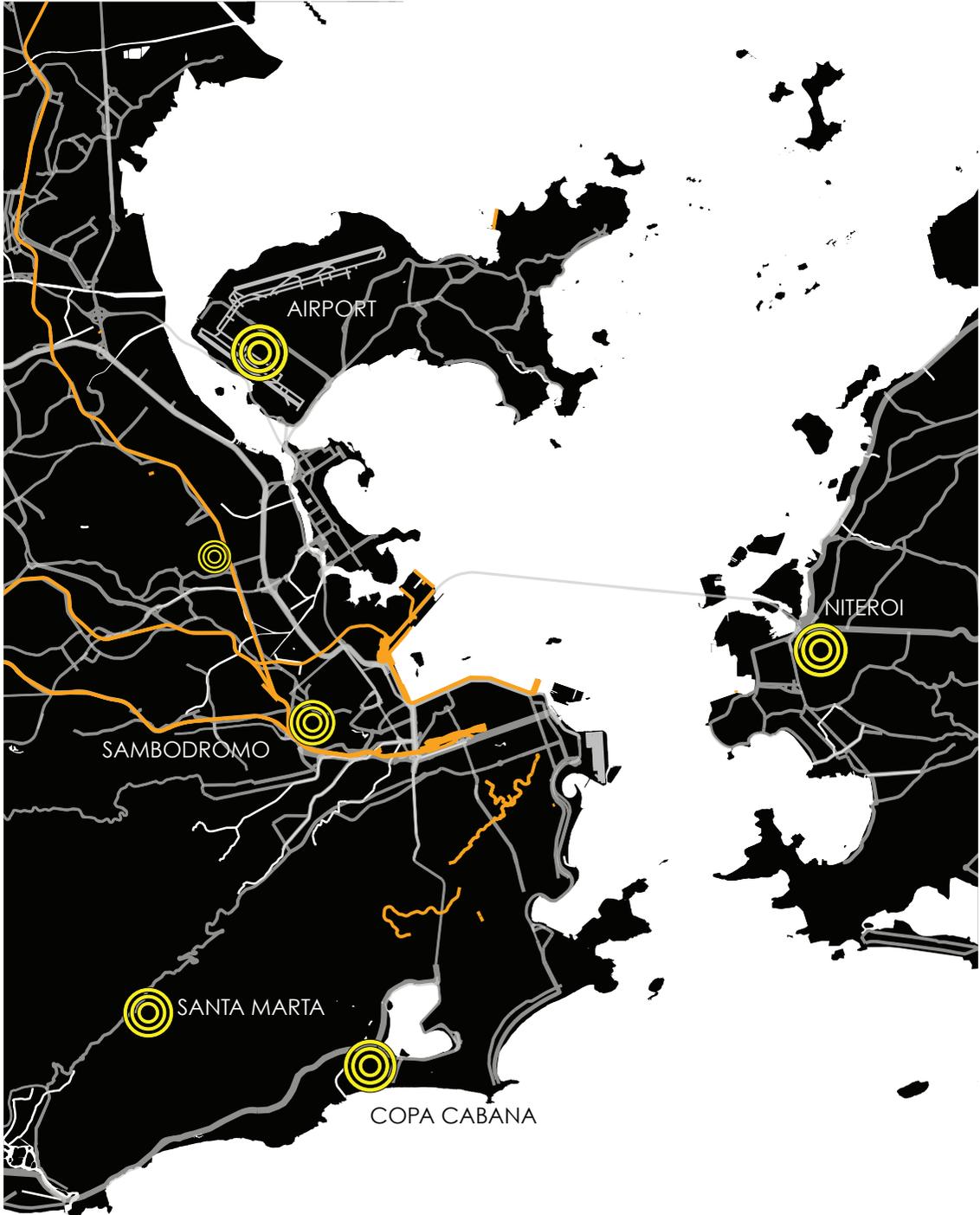
In public spaces like airports and museums, which are at the same

time closed and controlled, more sophisticated devices can be installed. The project proposes a stand-alone touch screen with recognizable form and sophisticated ergonometics.

**Stand alone devices.**

These devices are small items that can be easily installed in any private or public space, such as restaurants, bars, or libraries, however they maintain the characteristic yellow color and round shape of the RioTap RFID readers.





Everytime the user taps their Bilhete Unico Card, a new record is created on their digital account. All the places are stored and remain available to review, while they record the visitor's itinerary and shape their personal Rio Map.

## TECHNOLOGY DESCRIPTION

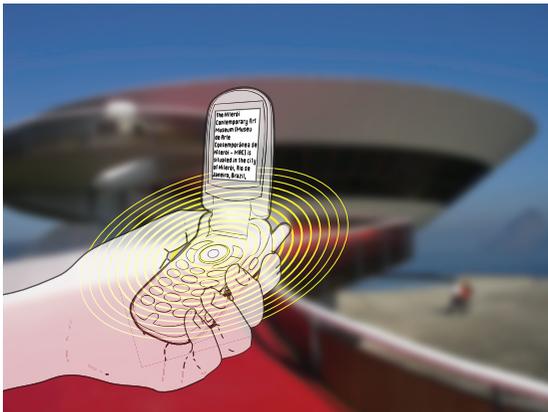
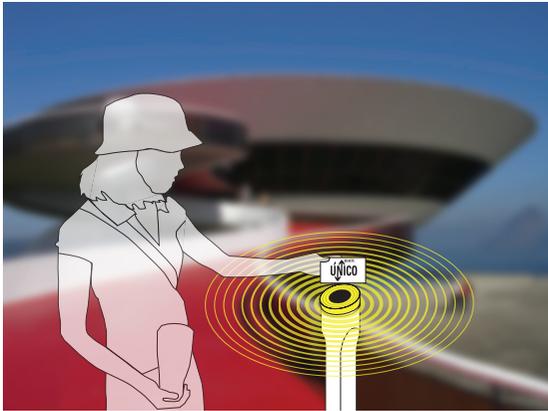
### THE CENTRAL SERVER

The central server receives the data from the RFID readers. The data are stored and updated in users' digital accounts and the server's central database. Finally, the data are processed in combination with the existing datasets of all the registered users and places and the system generates feedback data that are sent to the user in the form of sms messages or application notifications.

### USERS INTERFACE

**SMS**  
SMS messages will be the basic interface between the user and RioTap platform. The interface will provide most of the possibilities offered through successional sms messages and replies from the user.

**Smartphone application**  
The smartphone application will encompass all the interaction made possible through sms, however, there will be additional features such as live snapshots and commentary on the locations the user has tapped their Bilhete Único. This data will be automatically stored on their digital account and can be later processed or embedded in their RioBook. The application will also offer full access to the web interface of their account.



Tapping a place: 1. Tap Bilhete Único on the device, 2. An SMS reaches your phone showing information on this location as well as additional recommendation for relevant places. In case of smartphones the information some in the form of new log on user's account, while allowing users to add on-spot pictures and comments

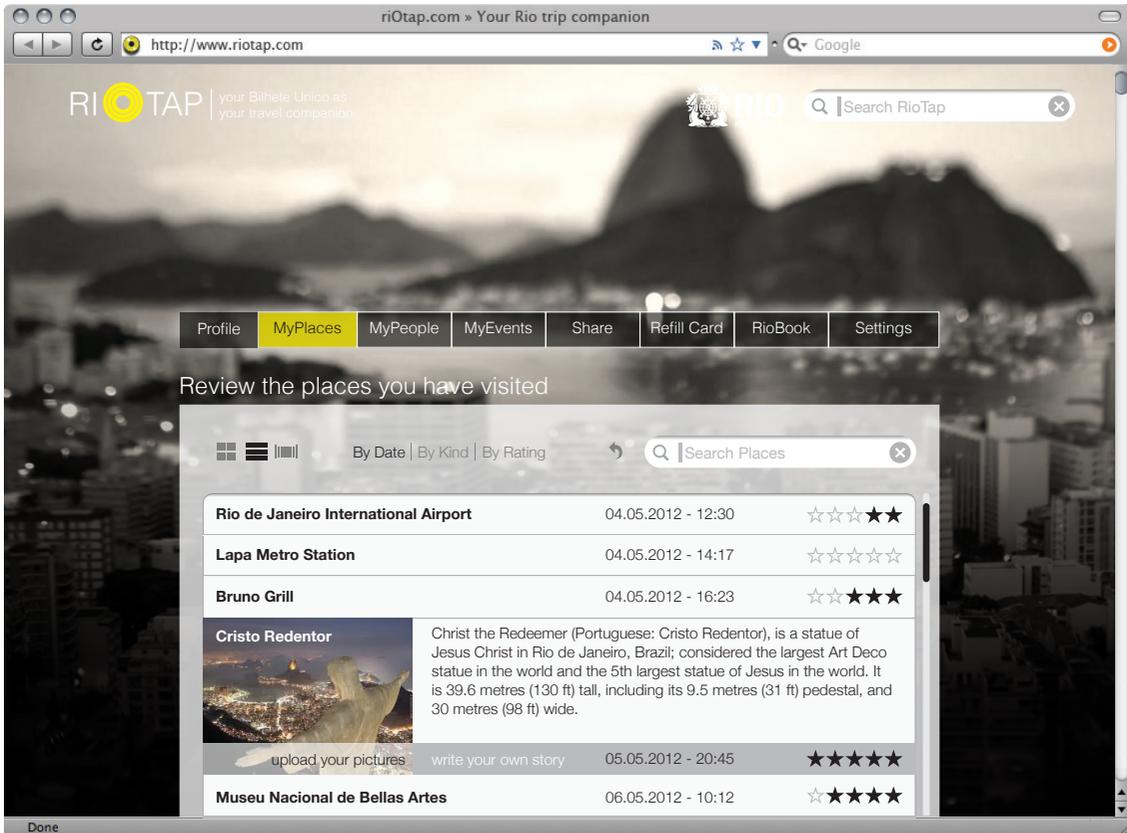
## WEB INTERFACE

Web interface can either be accessed through a regular web browser or a smartphone. It offers an overview of the user's preferences, log of places, related people and RioBook page. Through the web interface the user can add or edit their personal profile, post-process their log of places, interact with their network of peers and edit or purchase their personal RioBook.

## RioBook

On a second level, all the places and events attended by the user, will be stored on their personal digital account. That will allow the visitor to review all the places they have been and, most importantly, will give them the possibility to print their personal RioBook. RioBook is a customizable print edition that illustrates all the places where Bilhete Unico has been tapped, using either pictures from existing digital libraries (like Picassa

and Panoramio) but mainly from the pictures uploaded by the user. The platform will also allow the user to customize the description of each place, their personal reflections, the chapter order and more. RioBook is an additional incentive that encourages visitors to tap their Bilhete Unico card. It makes sure that all the Rio experience is gathered in a single place and can be revisited or reproduced at anytime!



Review and edit your place log.

## ADVANTAGES & MOTIVATIONS

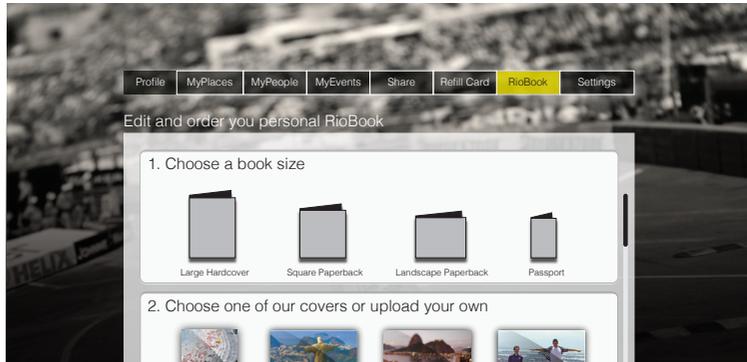
The motivations for visitors to tap their cards are also translated into motivations for owners and institutions to install RioTap readers in the places that they manage. Tapping a place will attract more and more Bilhete Unico holders, making this place more and more popular. The main advantage of RioTap platform against already existing digital platforms that are also related to

places (like Foursquare, Facebook, Google, or Yelp) is that it is digital but local at the same time. It features most of the characteristics of the known social media but, having as a given that anyone in Rio owns that card, filters places and people much more efficiently. Besides that, only basic digital devices are required, such as conventional mobile phones, since the basic interaction is realized through simple sms messages. Finally, it addresses all of Rio's visitors

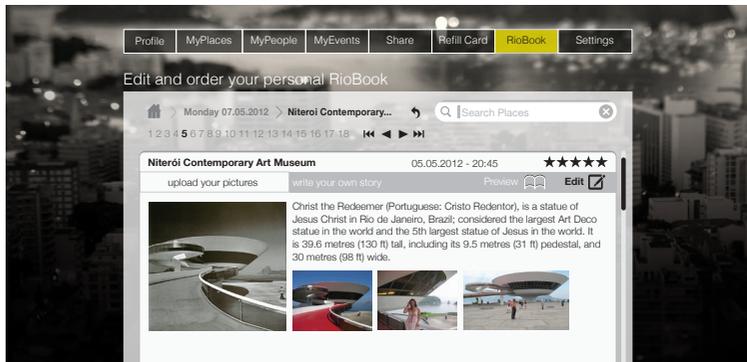
regardless of age or technical skill and does not require the user to be familiar with any social media technology.

## EDIT AND PURCHASE YOUR PERSONAL RIOBOOK:

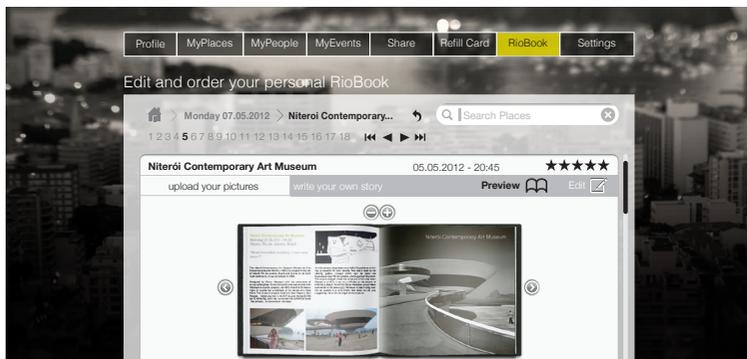
1. Choose format



2. Edit content



3. Preview and order.



### ARISTODIMOS KOMNINOS

Aristodimos Komninos was born in June, 1984 in Athens. He studied Architecture at the National Technical University of Athens, and he holds a Diploma of Architect-Engineer. He has lived for a year in Porto, Portugal, where he studied Architecture in the “Universidade Fernando Pessoa” through the Erasmus Program. He has worked for several design and architecture firms, NGOs and a bar. He is currently a SMArchS - Architecture and Urbanism Candidate at the Massachusetts Institute of Technology. He has visited over 20 countries around the world and there are about 175 more to go. He still thinks it is possible to visit all of them.



#### Niterói Contemporary Art Museum

Monday 07.05.012 - 14:32  
Niterói, Rio de Janeiro, Brazil

“Most incredible building I have ever seen!”



The Niterói Contemporary Art Museum (Museu de Arte Contemporânea de Niterói — MAC) is situated in the city of Niterói, Rio de Janeiro, Brazil, and is one of the city's main landmarks. It was completed in 1998.

Designed by Oscar Niemeyer with the assistance of architectural firm Bruno Zevi Architects, who had worked with Niemeyer on earlier projects, the MAC Niterói is 16 meters high. Its cupola has a diameter of 50 meters with three floors. The museum projects itself over Boa Viagem (Boa Viagem, Good Journey), the 617 square meters (6,790 sq ft) reflecting pool that surrounds the cylindrical base like a flower. In the words of Niemeyer:

A white access slope leads to a Hall of Exhibitions, which has a capacity for sixty people. Two doors lead to the viewing gallery, through which can be seen the Guanabara Bay, Rio de Janeiro, and Sugarloaf Mountain. The saucer-shaped modern structure, which has been likened to a UFO, is set on a cliff side, at the bottom of which is a beach. In the film Oscar Niemeyer, a architect committed to his country.[1] Niemeyer is seen flying over Rio de Janeiro in a UFO which then lands on the site, suggesting this to be the origin of the museum.



#### Niterói Contemporary Art Museum

