Where to deploy an ATM (Automated Teller Machine)?

Marcelo Quiroga

August, 2020

1. Introduction

The city of Cochabamba is a small city in the center of Bolivia with a population near to 1 million; this city has the service of different banking entities which have branches and ATMs in the city. Approximately 30 years ago ATMs began to be deployed in this city, along with the inevitable growth of businesses and places of interest, ATMs were accompanying this growth to provide cash to users in a safe and reliable way. Despite the existence of POS for the payment of services or online payments recently deployed, ATMs continue to provide service to customers and their use will be recurrent in the medium term.

The relevance of these devices is given because *"ATMs were designed as simple cash withdrawal terminals. However, with the creation of first multifunctional self-service devices with the deposit function, the role of the banking self-service channel had to be reconsidered. Financial institutions quickly realized that cash-in/cash-out ATMs could be a valid touchpoint for end-customers. The user is granted with the ability to top-up a bank account or an e-wallet, pay fines, fees, utility bills, and various taxes via an ATM".*[1]

1.1. Business Problem

The costs of acquisition, deployment and maintenance of ATMs make it necessary to evaluate where they will be implemented. Poor geographic location results in excessive costs and poor service for end-customers.

1.2. Interest

Any bank can take advantage of the data provided by geolocation tools, which provide updated information on companies or businesses used or recommended by consumers in real time.

This data is useful for every financial institution that is considering expand his ATMs or branch locations

[1] https://www.bs2.lt/en/news-about-products/how-to-deploy-seamless-payment-infrastructure-across-atm-and-kiosk-fleets/

1.3. Scope

In the city of Cochabamba there are different banks, some with many clients and some with few clients. This project is limited to evaluating the availability of ATMs of a single bank[2], however this analysis can be extended to other entities.

2. Data

2.1. Data Sources

The initial source of data will be the current location of the ATMs, this is restricted to the city of Cochabamba and data from other cities within Bolivia will not be used. The data source is found on the bank's website within the branches section where it is necessary to use the filter "Current Location" and "Category". The total data obtained will be recorded as a Python dictionary where the name of the site and the current address are recorded.

```
bank_addresses

{'HIPERMAXI CIRCUNVALACION': 'Hipermaxi Circunvalacion',
 'AG. AMERICA': 'Banco Ganadero Central',
 'AG. LA CANCHA': 'Calle Honduras',
 'HIPERMAXI PRADO': 'Avenida Ballivian 753',
 'OF. CENTRAL': 'Correos',
 'TORRES SOFER': 'Torres Sofer',
 'BLANCO GALINDO': 'Rotonda Peru',
 'SERVICIO DE CAMINOS': 'Avenida Eliodoro Villazón',
 'SURTIDOR EL CRISTO': 'Clinica Los Angeles',
 'IC NORTE': 'Avenida América 817',
 'AMERICA Y MELCHOR': 'Melchor Perez Olguin',
 'HIPER MAXI JUAN DE LA ROSA': 'Hipermaxi Juan Rosa',
 'AEROPUERTO': 'Aeropuerto',
 'U. CATOLICA': 'Plaza Tarija'}
```

Figure 1

By creating a dataframe with Pandas and using the GeoPy library, these addresses will be used to obtain the latitude and longitude corresponding to each ATM. It was necessary to verify and correct the addresses for some ATMs more than once because the results of GeoPy were not always accurate, in some cases when the address was not known by GeoPy it was necessary to use a close address (50 meters) to get as close as possible to the actual location of the ATM. Knowing the latitude and longitude data, we worked with Foursquare to find the greatest number of venues around each ATM. It is necessary to consider that when working in a small city (Cochabamba) the number of venues was not always a large number.

[2] https://www.bg.com.bo/