Base station locations for bike share start-up in Bengaluru

# Introduction

## 1.1 Background

Public transport has come a long way in India. From the early days of buses and trains, to the current age of metro mass transit systems and on-demand taxis like *Ola*, *Uber*, the transport options have expanded significantly and improved connectivity like never before. However, last mile connectivity transport is still a pain point due to relatively higher prices of on demand taxis and non-availability of other forms of transport. Navigating traffic in the much congested Indian metro cities is also a huge pain point for the modern commuter. To address such problems, a slew of new start-ups like *Bounce* and *Vogo* have come up in India, starting with the Indian start-up hub of Bengaluru. They provide IoT enabled bikes or scooters at various locations throughout a city. The user just has to download an app and use it to ‘unlock’ the bike and start their ride. Upon reaching their destination, they use the app to ‘lock’ the bike again. The need addressed by these start-ups is evident from the fact that *Bounce* became one of the fastest growing start-ups in India, clocking up to 60,000 rides a day.

## 1.2 The Problem

The problem at hand for these start-ups is deciding on the locations for the base stations at which to place their bikes. While *Bounce* operates on a dockless model i.e. the bikes can be parked anywhere as they have a GPS tracker and are IoT enabled to show their location in real time to prospective users, they still have base stations at which the bikes can be picked up. Foursquare location data can be very useful in identifying spots for where to have the base stations in a given locality. This can be done by looking at important mass transit points like metro stations and bus stations from where most users either take these bikes or arrive with these bikes. I will perform this exercise for the Indian metro city of Bengaluru.

# Data

## 2.2 Data Sources

Data on the localities and their pin codes for the city of Bengaluru were obtained from this link [here](https://www.mapsofindia.com/pincode/india/karnataka/bangalore/). The co-ordinates for these localities and their boundaries were acquired using Google Maps API for geocoding. A dataframe was made containing the pincode, corresponding localities under that pincode, and geographical co-ordinates for that pincode.

Using the co-ordinates of each pincode from the dataframe, the area was explored for major transit points like bus stations and metro stations. The co-ordinates of these transit points were then used in a K-Means clustering algorithm with the number of clusters set to 5,indicating 5 base stations per pincode. Using the co-ordinates of the centres of these clusters, the addresses of the locations which can be used as base stations were obtained by reverse geocoding using Google Maps API for each pincode.This was done for the top 10 pincodes containing at least 20 transit points.