Segmenting and Clustering Neighbourhoods in Toronto- Part 1

```
In [1]:
import pandas as pd
import requests
from bs4 import BeautifulSoup
print("Imported!")
Imported!
                                                                        In [2]:
url = "https://en.wikipedia.org/wiki/List of postal codes of Canada: M"
extracting data = requests.get(url).text
wiki data = BeautifulSoup(extracting data, 'lxml')
                                                                        In [3]:
wiki data
                                                                        Out[3]:
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w-editable page-List of postal codes of Canada M rootpage-List of postal c
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of Canada: M</h1>
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This is a list of <a href="/wiki/Postal codes in Canada" title="Postal</p>
codes in Canada">postal codes in Canada</a> where the first letter is M. P
ostal codes beginning with M are located within the city of <a href="/wiki"><a href="/wiki"><a
/Toronto" title="Toronto">Toronto</a> in the province of <a href="/wiki/On
tario" title="Ontario">Ontario</a>. Only the first three characters are li
sted, corresponding to the Forward Sortation Area.
<a href="/wiki/Canada Post" title="Canada Post">Canada Post</a> pro
vides a free postal code look-up tool on its website, <sup class="reference"
" id="cite ref-1"><a href="#cite note-1">[1]</a></sup> via its <a href="/w
iki/Mobile app" title="Mobile app">applications</a> for such <a class="mw-
redirect" href="/wiki/Smartphones" title="Smartphones">smartphones</a> as
the <a href="/wiki/IPhone" title="IPhone">iPhone</a> and <a href="/wiki/Bl
ackBerry" title="BlackBerry">BlackBerry</a>,<sup class="reference" id="cit
e ref-2"><a href="#cite note-2">[2]</a></sup> and sells hard-copy directo
ries and <a href="/wiki/CD-ROM" title="CD-ROM">CD-ROMs</a>. Many vendors a
lso sell validation tools, which allow customers to properly match address
es and postal codes. Hard-copy directories can also be consulted in all po
st offices, and some libraries.
<h2><span class="mw-headline" id="Toronto - 103 FSAs"><a href="/wiki/Toron
to" title="Toronto">Toronto</a> - 103 <a href="/wiki/Postal codes in Canad
a#Forward sortation areas" title="Postal codes in Canada">FSAs</a></span><
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a href="/w/index.php?title=List of postal codes of Canada: M&action=ed
it& section=1" title="Edit section: Toronto - 103 FSAs">edit</a><span c
lass="mw-editsection-bracket">]</span></span></h2>
Note: There are no rural FSAs in Toronto, hence no postal codes should
start with MO. However, the postal code MOR 8TO is assigned to an <a href=
"/wiki/Amazon (company)" title="Amazon (company)">Amazon</a> warehouse in
Mississauga, suggesting that Canada Post may have reserved the MO FSA for
high volume addresses.
```

```
Postal Code
Borough
Neighbourhood
M1A
Not assigned
Not assigned
M2A
Not assigned
Not assigned
M3A
North York
Parkwoods
M4A
North York
Victoria Village
M5A
Downtown Toronto
Regent Park, Harbourfront
M6A
North York
Lawrence Manor, Lawrence Heights
M7A
Downtown Toronto
```

```
Queen's Park, Ontario Provincial Government
M8A
Not assigned
Not assigned
M9A
Etobicoke
Islington Avenue, Humber Valley Village
M1B
Scarborough
Malvern, Rouge
M2B
Not assigned
Not assigned
M3B
North York
Don Mills
M4B
East York
Parkview Hill, Woodbine Gardens
M5B
Downtown Toronto
Garden District, Ryerson
<t.r>
M6B
```

```
North York
Glencairn
M7B
Not assigned
Not assigned
M8B
Not assigned
Not assigned
M9B
Etobicoke
West Deane Park, Princess Gardens, Martin Grove, Islington, Cloverdale
M1C
Scarborough
Rouge Hill, Port Union, Highland Creek
M2C
Not assigned
Not assigned
M3C
North York
Don Mills
M4C
East York
Woodbine Heights
```

```
M5C
Downtown Toronto
St. James Town
M6C
York
Humewood-Cedarvale
M7C
Not assigned
Not assigned
M8C
Not assigned
Not assigned
M9C
Etobicoke
Eringate, Bloordale Gardens, Old Burnhamthorpe, Markland Wood
M1E
Scarborough
Guildwood, Morningside, West Hill
M2E
Not assigned
Not assigned
M3E
Not assigned
Not assigned
```

```
M4E
East Toronto
The Beaches
M5E
Downtown Toronto
Berczy Park
M6E
York
Caledonia-Fairbanks
M7E
Not assigned
Not assigned
M8E
Not assigned
Not assigned
M9E
Not assigned
Not assigned
M1G
Scarborough
Woburn
M2G
Not assigned
```

```
Not assigned
M3G
Not assigned
Not assigned
M4G
East York
Leaside
M5G
Downtown Toronto
Central Bay Street
M6G
Downtown Toronto
Christie
M7G
Not assigned
Not assigned
M8G
Not assigned
Not assigned
M9G
Not assigned
Not assigned
M1H
```

```
Scarborough
Cedarbrae
M2H
North York
Hillcrest Village
M3H
North York
Bathurst Manor, Wilson Heights, Downsview North
M4H
East York
Thorncliffe Park
M5H
Downtown Toronto
Richmond, Adelaide, King
M6H
West Toronto
Dufferin, Dovercourt Village
M7H
Not assigned
Not assigned
M8H
Not assigned
Not assigned
```

```
M9H
Not assigned
Not assigned
M1J
Scarborough
Scarborough Village
M2J
North York
Fairview, Henry Farm, Oriole
M3J
North York
Northwood Park, York University
M4J
East York
East Toronto, Broadview North (Old East York)
M5J
Downtown Toronto
Harbourfront East, Union Station, Toronto Islands
M6J
West Toronto
Little Portugal, Trinity
M7J
Not assigned
```

```
Not assigned
M8J
Not assigned
Not assigned
M9J
Not assigned
Not assigned
M1K
Scarborough
Kennedy Park, Ionview, East Birchmount Park
M2K
North York
Bayview Village
M3K
North York
Downsview
M4K
East Toronto
The Danforth West, Riverdale
M5K
Downtown Toronto
Toronto Dominion Centre, Design Exchange
M6K
```

```
West Toronto
Brockton, Parkdale Village, Exhibition Place
M7K
Not assigned
Not assigned
M8K
Not assigned
Not assigned
M9K
Not assigned
Not assigned
M1L
Scarborough
Golden Mile, Clairlea, Oakridge
M2L
North York
York Mills, Silver Hills
M3L
North York
Downsview
M4L
East Toronto
India Bazaar, The Beaches West
```

```
M5L
Downtown Toronto
Commerce Court, Victoria Hotel
M6L
North York
North Park, Maple Leaf Park, Upwood Park
M7L
Not assigned
Not assigned
M8L
Not assigned
Not assigned
M9L
North York
Humber Summit
M1M
Scarborough
Cliffside, Cliffcrest, Scarborough Village West
M2M
North York
Willowdale, Newtonbrook
M3M
North York
Downsview
```

```
M4M
East Toronto
Studio District
M5M
North York
Bedford Park, Lawrence Manor East
M6M
York
Del Ray, Mount Dennis, Keelsdale and Silverthorn
M7M
Not assigned
Not assigned
M8M
Not assigned
Not assigned
M9M
North York
Humberlea, Emery
M1N
Scarborough
Birch Cliff, Cliffside West
M2N
North York
```

```
Willowdale, Willowdale East
M3N
North York
Downsview
M4N
Central Toronto
Lawrence Park
M5N
Central Toronto
Roselawn
M6N
York
Runnymede, The Junction North
M7N
Not assigned
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M5L, 5
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M7A, 5
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id="cite_note-2">^ <cite class="citation web cs1">"Mobile Apps". Canada Post. Archived from the original on 2011-05-19.</cite>link href="mw-data: TemplateStyles:r982806391" rel="mw-deduplicated-inline-style"/>

^ ^{<i>a</i>} ^{<i>b></i>} <cite class="citation web cs1">"2006 Census

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Canada: V" title="List of postal codes of Canada: V">V</a>
<td align="center" style="border: 1px solid #A000FF; background-color: #E8
EOFF; font-size: 135%;" width="5%"><a href="/wiki/List of postal codes of
Canada: X" title="List of postal codes of Canada: X">X</a>
</t.d>
<td align="center" style="border: 1px solid #FF00FF; background-color: #FF
E0FF; font-size: 135%;" width="5%"><a href="/wiki/List of postal codes of
Canada: Y" title="List of postal codes of Canada: Y">Y</a>
<!--
NewPP limit report
Parsed by mw1278
Cached time: 20201222051228
Cache expiry: 2592000
Dynamic content: false
Complications: [vary-revision-sha1]
CPU time usage: 0.196 seconds
Real time usage: 0.248 seconds
```

```
Preprocessor visited node count: 279/1000000
Post-expand include size: 10828/2097152 bytes
Template argument size: 275/2097152 bytes
Highest expansion depth: 8/40
Expensive parser function count: 0/500
Unstrip recursion depth: 1/20
Unstrip post-expand size: 9622/5000000 bytes
Lua time usage: 0.102/10.000 seconds
Lua memory usage: 3008404/52428800 bytes
Number of Wikibase entities loaded: 0/400
-->
<!--
Transclusion expansion time report (%, ms, calls, template)
100.00% 196.534
                     1 -total
 61.06% 119.999
                     3 Template:Cite web
31.47% 61.842
                     1 Template: Short description
17.26% 33.916
                     1 Template: Pagetype
 8.07% 15.856
                     2 Template: Main other
  6.07% 11.930
                     1 Template:SDcat
                     1 Template: Canadian postal codes
  2.71%
         5.333
<!-- Saved in parser cache with key enwiki:pcache:idhash:539066-0!canonica
1 and timestamp 20201222051228 and revision id 995657573. Serialized with
JSON.
-->
</div><noscript><img alt="" height="1" src="//en.wikipedia.org/wiki/Specia
l:CentralAutoLogin/start?type=1x1" style="border: none; position: absolute
;" title="" width="1"/></noscript>
<div class="printfooter">Retrieved from "<a dir="ltr" href="https://en.wik</pre>
ipedia.org/w/index.php?title=List of postal codes of Canada: M&oldid=9
95657573">https://en.wikipedia.org/w/index.php?title=List of postal codes
of Canada: M& oldid=995657573</a>"</div></div>
<div class="catlinks" data-mw="interface" id="catlinks"><div class="mw-nor</pre>
mal-catlinks" id="mw-normal-catlinks"><a href="/wiki/Help:Category" title=
"Help:Category">Categories</a>: <a href="/wiki/Category:Communicat">Communicat</a>
ions in Ontario" title="Category:Communications in Ontario">Communications
in Ontario</a><a href="/wiki/Category:Postal codes in Canada" tit
le="Category:Postal codes in Canada">Postal codes in Canada</a><a
href="/wiki/Category:Toronto" title="Category:Toronto">Toronto</a>
><a href="/wiki/Category:Ontario-related lists" title="Category:Ontario-re</pre>
lated lists">Ontario-related lists</a></div></div class="mw-hidde"
n-catlinks mw-hidden-cats-hidden" id="mw-hidden-catlinks">Hidden categorie
s: <a href="/wiki/Category:Articles with short description" title=
"Category: Articles with short description">Articles with short description
</a><a href="/wiki/Category:Short description is different from W
ikidata" title="Category: Short description is different from Wikidata"> Sho
rt description is different from Wikidata</a></div></div>
</div>
</div>
<div id="mw-data-after-content">
<div class="read-more-container"></div>
</div>
<div id="mw-navigation">
<h2>Navigation menu</h2>
```

```
<div id="mw-head">
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
->
<nav aria-labelledby="p-personal-label" class="mw-portlet mw-portlet-perso</pre>
nal vector-menu" id="p-personal" role="navigation">
<h3 id="p-personal-label">
<span>Personal tools</span>
</h3>
<div class="vector-menu-content">
Not logged i
n<a accesskey="n" href="/wiki/Special:MyTalk" ti
tle="Discussion about edits from this IP address [n]">Talk</a>id=
"pt-anoncontribs"><a accesskey="y" href="/wiki/Special:MyContributions" ti
tle="A list of edits made from this IP address [y]">Contributions</a>
<a href="/w/index.php?title=Special:CreateAccoun">
t&returnto=List+of+postal+codes+of+Canada%3A+M" title="You are encoura
ged to create an account and log in; however, it is not mandatory">Create
account</a><a accesskey="o" href="/w/index.php?titl
e=Special:UserLogin&returnto=List+of+postal+codes+of+Canada%3A+M" titl
e="You're encouraged to log in; however, it's not mandatory. [o]">Log in</
a>
</div>
</nav>
<div id="left-navigation">
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
<nav aria-labelledby="p-namespaces-label" class="mw-portlet mw-portlet-nam</pre>
espaces vector-menu vector-menu-tabs" id="p-namespaces" role="navigation">
<h3 id="p-namespaces-label">
<span>Namespaces
</h3>
<div class="vector-menu-content">
n"><a accesskey="c" href="/wiki/List of postal codes of Canada: M" title="
View the content page [c]">Article</a><a accesskey="
t" href="/wiki/Talk:List of postal codes of Canada: M" rel="discussion" ti
tle="Discuss improvements to the content page [t]">Talk</a>
</div>
</nav>
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
->
<nav aria-labelledby="p-variants-label" class="mw-portlet mw-portlet-varia</pre>
nts emptyPortlet vector-menu vector-menu-dropdown" id="p-variants" role="n
avigation">
<input aria-labelledby="p-variants-label" class="vector-menu-checkbox" typ</pre>
e="checkbox"/>
<h3 id="p-variants-label">
<span>Variants
</h3>
<div class="vector-menu-content">
</div>
</nav>
</div>
```

```
<div id="right-navigation">
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
->
<nav aria-labelledby="p-views-label" class="mw-portlet mw-portlet-views ve</pre>
ctor-menu vector-menu-tabs" id="p-views" role="navigation">
<h3 id="p-views-label">
<span>Views</span>
</h3>
<div class="vector-menu-content">
<a</pre>
href="/wiki/List_of_postal_codes of Canada: M">Read</a>id="ca-edi
t"><a accesskey="e" href="/w/index.php?title=List of postal codes of Canad
a: M&action=edit" title="Edit this page [e]">Edit</a>id="ca-h
istory"><a accesskey="h" href="/w/index.php?title=List of postal codes of
Canada: M& action=history" title="Past revisions of this page [h]">View
history</a>
</div>
</nav>
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
<nav aria-labelledby="p-cactions-label" class="mw-portlet mw-portlet-cacti</pre>
ons emptyPortlet vector-menu vector-menu-dropdown" id="p-cactions" role="n
avigation">
<input aria-labelledby="p-cactions-label" class="vector-menu-checkbox" typ</pre>
e="checkbox"/>
<h3 id="p-cactions-label">
<span>More</span>
<div class="vector-menu-content">
</div>
</nav>
<div id="p-search" role="search">
<label for="searchInput">Search</label>
</h3>
<form action="/w/index.php" id="searchform">
<div data-search-loc="header-navigation" id="simpleSearch">
<input accesskey="f" autocapitalize="sentences" id="searchInput" name="sea</pre>
rch" placeholder="Search Wikipedia" title="Search Wikipedia [f]" type="sea
rch"/>
<input name="title" type="hidden" value="Special:Search"/>
<input class="searchButton mw-fallbackSearchButton" id="mw-searchButton" n</pre>
ame="fulltext" title="Search Wikipedia for this text" type="submit" value=
"Search"/>
<input class="searchButton" id="searchButton" name="go" title="Go to a pag</pre>
e with this exact name if it exists" type="submit" value="Go"/>
</div>
</form>
</div>
</div>
</div>
<div id="mw-panel">
<div id="p-logo" role="banner">
```

```
<a class="mw-wiki-logo" href="/wiki/Main Page" title="Visit the main page"</pre>
></a>
</div>
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
<nav aria-labelledby="p-navigation-label" class="mw-portlet mw-portlet-nav</pre>
igation vector-menu vector-menu-portal portal-first" id="p-navigati
on" role="navigation">
<h3 id="p-navigation-label">
<span>Navigation</span>
</h3>
<div class="vector-menu-content">
<a ac</pre>
cesskey="z" href="/wiki/Main Page" title="Visit the main page [z]">Main pa
ge</a><a href="/wiki/Wikipedia:Contents" title="G
uides to browsing Wikipedia">Contents</a>id="n-currentevents"><a
href="/wiki/Portal:Current events" title="Articles related to current even
ts">Current events</a><a accesskey="x" href="/w
iki/Special:Random" title="Visit a randomly selected article [x]">Random a
rticle</a><a href="/wiki/Wikipedia:About" title=
"Learn about Wikipedia and how it works">About Wikipedia</a>id="n
-contactpage"><a href="//en.wikipedia.org/wiki/Wikipedia:Contact us" title
="How to contact Wikipedia">Contact us</a>id="n-sitesupport"><a h
ref="https://donate.wikimedia.org/wiki/Special:FundraiserRedirector?utm so
urce=donate&utm medium=sidebar&utm campaign=C13 en.wikipedia.org&a
mp; uselang=en" title="Support us by donating to the Wikimedia Foundation">
Donate</a>
</div>
</nav>
<!-- Please do not use role attribute as CSS selector, it is deprecated. -
<nav aria-labelledby="p-interaction-label" class="mw-portlet mw-portlet-in</pre>
teraction vector-menu vector-menu-portal portal id="p-interaction" role="
navigation">
<h3 id="p-interaction-label">
images\/wmf-hor-googpub.png"}},"datePublished":"2004-03-20T10:02:13Z","dateMo
dified":"2020-12-22T05:12:28Z", "headline": "Wikimedia list article"} </script>
<script>(RLQ=window.RLQ||[]).push(function() {mw.config.set({"wgBackendRespons")
eTime":150, "wgHostname": "mw1364"}); }); </script>
</body></html>
                                                               In [4]:
column names = ['Postalcode', 'Borough', 'Neighborhood']
toronto = pd.DataFrame(columns = column names)
content = wiki data.find('div', class ='mw-parser-output')
table = content.table.tbody
postcode = 0
borough = 0
neighborhood = 0
```

```
i = 0
    for td in tr.find all('td'):
        if i == 0:
            postcode = td.text
            i = i + 1
        elif i == 1:
            borough = td.text
            i = i + 1
        elif i == 2:
            neighborhood = td.text.strip('\n').replace(']','')
    toronto = toronto.append({'Postalcode': postcode, 'Borough': borough, 'Neig
hborhood': neighborhood}, ignore index=True)
                                                                         In [5]:
# clean dataframe
toronto = toronto[toronto.Borough!='Not assigned']
toronto = toronto[toronto.Borough!= 0]
toronto.reset index(drop = True, inplace = True)
i = 0
for i in range(0,toronto.shape[0]):
    if toronto.iloc[i][2] == 'Not assigned':
        toronto.iloc[i][2] = toronto.iloc[i][1]
        i = i+1
                                                                         In [6]:
df = toronto.groupby(['Postalcode', 'Borough'])['Neighborhood'].apply(', '.joi
n).reset index()
df
                                                                         Out[6]:
                        Po
                                                                  Neig
                        sta
                                            Boro
                                                                  hbor
                        lco
                                            ugh
                                                                  hood
                        de
                                                                  Not
                        M
                                            Not
        0
                        1A
                                            assig
                                                                  assig
                        \n
                                            ned\n
                                                                  ned\n
```

for tr in table.find_all('tr'):

	Po sta lco de	Boro ugh	Neig hbor hood
1	M 1B \n	Scar boro ugh\ n	Malv ern, Roug e
2	M 1C \n	Scar boro ugh\ n	Roug e Hill, Port Unio n, Highl and Creek
3	M 1E \n	Scar boro ugh\ n	Guild wood , Morn ingsi de, West Hill
4	M 1G \n	Scar boro ugh\ n	Wob urn
•			

	Po sta lco de	Boro ugh	Neig hbor hood
1	M	Etobi	South Steel es, Silver stone, Hum berga te, Jame st
7	9V	coke\	
5	\n	n	
1 7 6	M 9 W∖ n	Etobi coke\ n	North west, West Hum ber - Clair ville
1	M	Not	Not
7	9X	assig	assig
7	\n	ned\n	ned\n
1	M	Not	Not
7	9Y	assig	assig
8	\n	ned\n	ned\n
1	M	Not	Not
7	9Z	assig	assig
9	\n	ned\n	ned\n

Out[7]:

		T	Out[/]:
	Po sta Ico de	B or ou gh	Neig hbor hood
c o u n t	18 0	18 0	180
u n i q u e	18 0	11	100
t o p	M 6G \n	N ot as si gn ed \n	Not assig ned\n
f r e q	1	77	77

```
In [8]:
```

```
df = df.dropna()
empty = 'Not assigned'
df = df[(df.Postalcode != empty ) & (df.Borough != empty) & (df.Neighborhood
!= empty)]
```

Out[9]:

			Out[9]:
	Po sta lco de	Boro ugh	Neigh borho od
0	M1 A\ n	Not assig ned\n	Not assign ed\n
1	M1 B\n	Scarb oroug h\n	Malve rn, Rouge
2	M1 C∖n	Scarb oroug h\n	Rouge Hill, Port Union , Highl and Creek
3	M1 E∖n	Scarb oroug h\n	Guild wood, Morni ngside , West Hill
4	M1 G\ n	Scarb oroug h\n	Wobu rn

In [10]:

Out[11]:

	1	1	Out[II]:
	Po sta lco de	B or ou gh	Neig hbor hood
c o u n t	18 0	18 0	180
u n i q u e	18 0	11	100
t o p	M 6G \n	N ot as si gn ed \n	Not assig ned\n
f r e q	1	77	77

(180, 3)

		Out [12]		
	Po sta lco de	Boro ugh	Neigh borho od	
0	M1 A\ n	Not assig ned\n	Not assign ed∖n	
1	M1 B\n	Scarb oroug h\n	Malve rn, Rouge	
2	M1 C\n	Scarb oroug h\n	Rouge Hill, Port Union , Highl and Creek	
3	M1 E\n	Scarb oroug h\n	Guild wood, Morni ngside , West Hill	
4	M1 G\ n	Scarb oroug h\n	Wobu rn	