How to find the nearest bus station

The Real-time Passenger Information (RTPI) for Dublin Bus, Bus Eireann, Luas and Irish rail data source does not include a search function to locate the nearest bus stop.

It does however contain a method that returns data about bus stops when searched by stop number. This data includes street names and latitude and longitude co-ordinates.

Finding your own coordinates can be done via google maps. For applications on a working phone, rather than a desktop application, can use the Google Maps API to find the phones current co-ordinates. It can also find local area names.

Search by Road Name

The RTPI does allow searches by road name, in the following format:

http://[rtpiserver]/busstopinformation?stopid=[stopid]&stopname=[stopname]&format=[format]

with stopid, stopname and format all being optional (as is the inclusion of operator). Drumcondra Road for example returns 13 results:

Result

{"errorcode":"0","errormessage":"","numberofresults":13,"timestamp":"11/06/2018 14:23:29","results":[{"stopid":"17","displaystopid":"17","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36306694","longitude":"-6.258398056","lastupdated":"05/06/2018 12:05:39","operators":[{"name":"bac","routes":["1","41","41B","41C","44","33","16","11","13"]}]},{"stopid":"18","displaystopid":"18","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36584889","longitude":"-6.255931111","lastupdated":"05/06/2018 12:05:39","operators":[{"name":"bac","routes":["13","11","16","33","44","41C","41B","41","1"]}]},{"stopid":"19","displaystopid":"19","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36713806","longitude":"-6.255493056","lastupdated":"05/06/2018 12:05:39","operators":[{"name":"bac","routes":["1","41","41B","41C","44","33","16","11","13"]}]},{"stopid":"21","displaystopid":"21","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.37009194","longitude":"-6.254291111","lastupdated":"05/06/2018 12:05:39","operators":[{"name":"bac","routes":["13","11","16","44","41C","33","41B","41","1"]}]},{"stopid":"44","displaystopid":"44","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.37301611","longitude":"-6.25211","lastupdated":"05/06/2018 12:05:40","operators":[{"name":"bac","routes":["1","41","41B","41A","33","13","41C","44","16","16C","11"]}]},{"stopid":"45","displaystopid":"45","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36988111","longitude":"-6.254133056","lastupdated":"05/06/2018 12:05:40","operators":[{"name":"bac","routes":["11","16C","16","44","41C","13","33","41A","41B","41","1"]}]},{"stopid":"46","displaystopid":"46","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36714694","longitude":"-6.255358889","lastupdated":"05/06/2018 12:05:40","operators":[{"name":"bac","routes":["1","41","41B","41A","33","13","41C","44","16","16C","11"]}]},{"stopid":"47","displaystopid":"47","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36390889","longitude":"-6.257276111","lastupdated":"05/06/2018 12:05:40","operators":[{"name":"bac","routes":["11","16C","16","44","41C","13","33","41A","41B","41","1"]}]},{"stopid":"48","displaystopid":"48","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.36232194","longitude":"-6.258763889","lastupdated":"05/06/2018 12:05:40","operators":[{"name":"bac","routes":["1","41","41B","41A","33","13","41C","44","16","16C","11"]}]},{"stopid":"85","displaystopid":"85","shortname":"Drumcondra Rd","shortnamelocalized":"Br Dhroim Conrach","fullname":"Drumcondra Rd","fullnamelocalized":"","latitude":"53.3739","longitude":"-6.251858889","lastupdated":"11/06/2018 10:59:06","operators":[{"name":"bac","routes":

As streets are long and narrow, a street name is not a precise method of determining where you are in relation to the nearest stop. The next stop on your road might be half a kilometre away. The next stop might be 20 meters around the corner. Realistically the solution requires the co-ordinates.

Search by Co-ordinate

For a more accurate result, a simple brute force algorithm is possible. After obtaining the users current coordinates from their phone, the app could enter a busstopinformation method call with no perameters. This would return the full list of bus stops. Taking this list we can then

1. Set an initial *result* variable to 1.
2. Calculate the distance between the users coordinates and station 1's coordinates using the formula

```
function distance(lat1, lon1, lat2, lon2) {
  var p = 0.017453292519943295;    // Math.PI / 180
  var c = Math.cos;
  var a = 0.5 - c((lat2 - lat1) * p)/2 +
          c(lat1 * p) * c(lat2 * p) *
          (1 - c((lon2 - lon1) * p))/2;

  return 12742 * Math.asin(Math.sqrt(a)); // 2 * R; R = 6371 km
}
```

   record this a variable called *distance*.
3. Iterate through the rest of the list, comparing the distance between the user coordinate and the current stations coordinate. If the new distance is less than the recorded *distance* variable, set *distance* variable to the new result and *result* variable to the current station number.
4. At the end of the list, call busstopinformation again passing the stopid parameter equal to the *result* of the search.
5. Format the returned result for the user, showing the "stopname" and coordinates of the stop.
6. If desired, these coordinates could be used with the Google Maps API again to show the user directions to the nearest stop.

Links

Real-time Passenger Information (RTPI) for Dublin Bus, Bus Eireann, Luas and Irish

https://data.gov.ie/dataset/real-time-passenger-information-rtpi-for-dublin-bus-bus-eireann-luas-and-irish-rail/resource/4b9f2c4f-6bf5-4958-a43a-f12dab04cf61?inner_span=True

Google Maps JavaScript API

https://developers.google.com/maps/documentation/javascript/tutorial

https://developers.google.com/maps/documentation/javascript/examples/map-geolocation