Chart, diagram, pie chart

Description automatically generated

Interface to implement:

GET ~/api/v1/GeoDistance/latA/<latA>/longA/<longA>/latB/<latB>/longB/<longB>?unit=km

53.297975, -6.372663 – Spartan martial arts, Dublin

41.385101, -81.440440 – Chipotle Mexican grill food Cleveland

GET ~/api/v1/distance/latA/53.297975/longA/-6.372663/latB/41.385101/longB/-81.440440?unit=km

Map

Description automatically generated

Calculation method:

Method 1: Using provided formula

Applying [Law of cosines](https://en.wikipedia.org/wiki/Law_of_cosines): we can calculate

As we know:

We have everything to calculate for ideal sphere, but Earth is not ideal sphere, indeed it is spherical ellipse(spheroid)... Is there big difference for Earth?

Mu intuition tells me that for small angles p there is not much error, but for big there may be.

I forgot “[floating point](https://en.wikipedia.org/wiki/Floating_point) precision, the spherical law of cosines formula can have large [rounding errors](https://en.wikipedia.org/wiki/Rounding_error) if the distance is small” (<https://en.wikipedia.org/wiki/Great-circle_distance>), but:

“For modern [64-bit floating-point numbers](https://en.wikipedia.org/wiki/IEEE_754), the spherical law of cosines formula, given above, does not have serious rounding errors for distances larger than a few meters“

“So long as a spherical Earth is assumed, any single formula for distance on the Earth is only guaranteed correct within 0.5% (though better accuracy is possible if the formula is only intended to apply to a limited area).”

In my opinion this error does not matter for civil applications. It may matter for military systems for example to calculate trajectory for ballistic missile.

Remarks:

* google maps calculate 2 point distance without API call
* <https://gis.stackexchange.com/questions/25494/how-accurate-is-approximating-earth-as-sphere>