Accuracy of GPS in Pokémon GO

Question: The accuracy of distance recorded to hatch an egg.

GPS

GPS stands for global positioning system. They are typically used for communication and navigation. The two main types are geostationary and geosynchronous. Each has characteristics that make them useful for particular tracking situations.

How It works?

Pokémon GO uses the geostationary satellites that orbit the earth around 35,000km above earth. These satellites stay stationary and rotate around the earth in 24 hrs. It's it so close to the earth it has the same orbit time as the earth it self. Being stationary it is much more accurate and can communicate better than other satellites.

What GPS is used?

•Pokémon GO is a reality based game that involves moving around in order to catch these Pokemon. The game uses GPS on the selected device to locate specific location the game mixes the virtual world and reality using geostationary satellites. It incorporates the use of several satellites to pinpoint an accurate location.

Why we did it?

We did it because we were interested in how the geostationary system woks alongside Pokemon Go.

Aim

To work collaborative in a team to investigate the accuracy recorded to hatch an egg

Hypothesis

The accuracy of the distance recorded to hatch an egg would be inaccurate by 10%

Method:

- Get a 2km egg
- Place the egg in an incubator and walk 500m.
- Record distance travelled after 500m on trundle wheel compared to Pokémon go, Fit Bit and Step tracker.
- Repeat Step 3 three more times.
- Until the 2km egg has hatched record distances every 500m.
- Repeat Step 1-5 for four more eggs.
- Collect results and average off to come to a final answer.

Analysis

Pokemon go had a very accurate distance to hatch an egg, the step tracker wasn't as accurate and the fit bit was very inaccurate.

We have learnt that the geostationary GPS system is a very accurate and a reliable source.

Pokemon Go was only 2.21% off of the actual distance, step tracker was 11.39% off and fit bit was 42.81% off.

Our hypothesis was quite close but Pokemon Go was 7.79% better than expected.

Errors

Walkers didn't directly follow the route of the trundle wheel.

Didn't count the first lot of trundle wheel clicks correctly.

When we reach the 500 metres mark the walkers continued to walk then turned around and walked back, making the km distance higher..

Further experiments

Use Pokemon Go in different areas for different results.

Use different egg types or distances to see if the percentage error declines or increases.

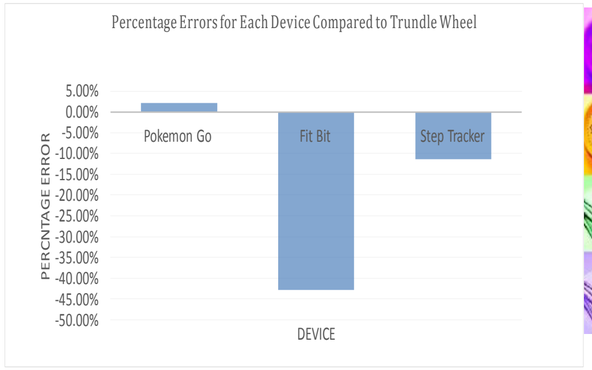
Conclusion

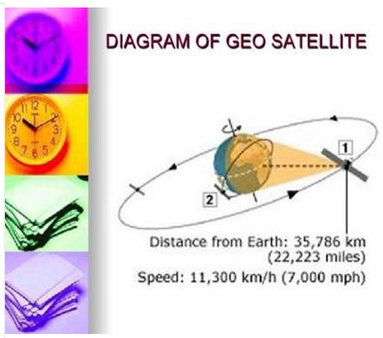
Our results showed Pokemon Go to be more accurate than our hypothesis as the distance to hatch an egg was only incorrect by 2.21%.

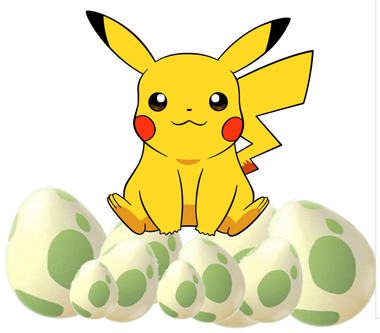
Improvements

Walkers could directly follow the route of the trundle wheel or attach phones to the trundle wheel.

Use a trundle wheel that counts the distance travelled automatically.







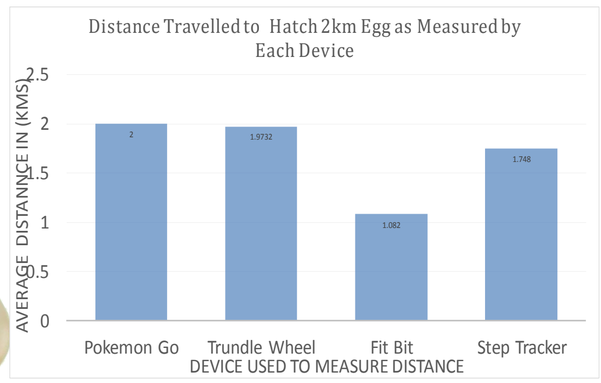


Table 1 - Distance travelled to hatch a 2km egg

	Distances (km)			
Egg Number	**Pokemon Go**	**Trundle Wheel**	**Fit Bit**	**Step Tracker**
1	2	1.94	0.83	1.75
2	2	1.685	1.83	1.51
3	2	2	1.83	1.51
4	2	2	0.37	1.97
5	2	2.241	0.55	2
Average	**2**	**1.9732**	**1.082**	**1.748**

Table 2 - Percentage Errors (measured against trundle wheel as being accurate measure)

Egg Number	**Pokemon Go**	**Trundle Wheel**	**Fit Bit**	**Step Tracker**
1	3.09%	0.00%	-57.22%	-9.79%
2	18.69%	0.00%	8.61%	-10.39%
3	0.00%	0.00%	-8.50%	-24.50%
4	0.00%	0.00%	-81.50%	-1.50%
5	-10.75%	0.00%	-75.46%	-10.75%
Average	**2.21%**	**0.00%**	**-42.81%**	**-11.39%**