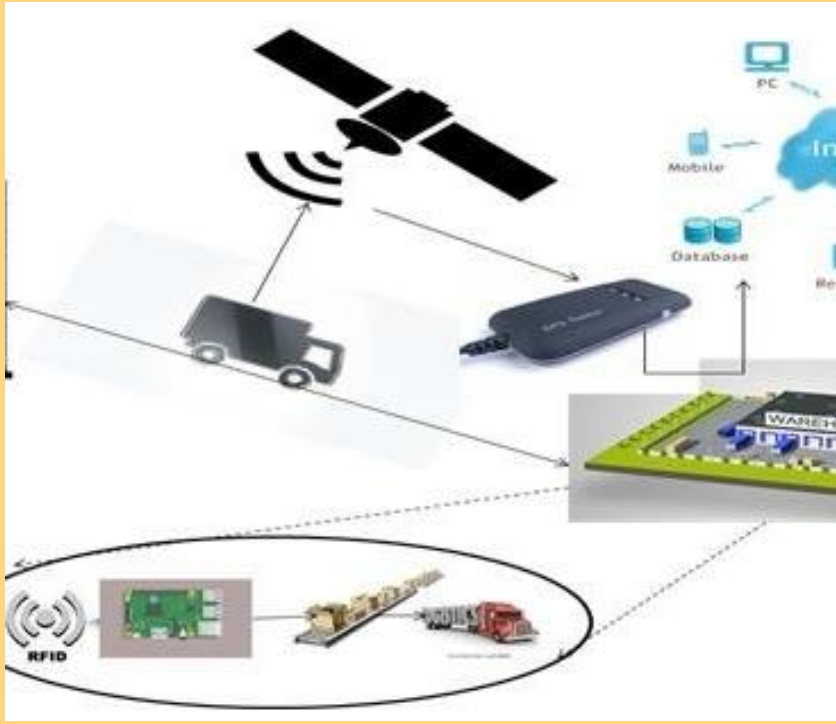


## Improving the shipment tracking system that utilizes mobile connectivity of Global positioning system(GPS) comparison with Geofencing Algorithm.

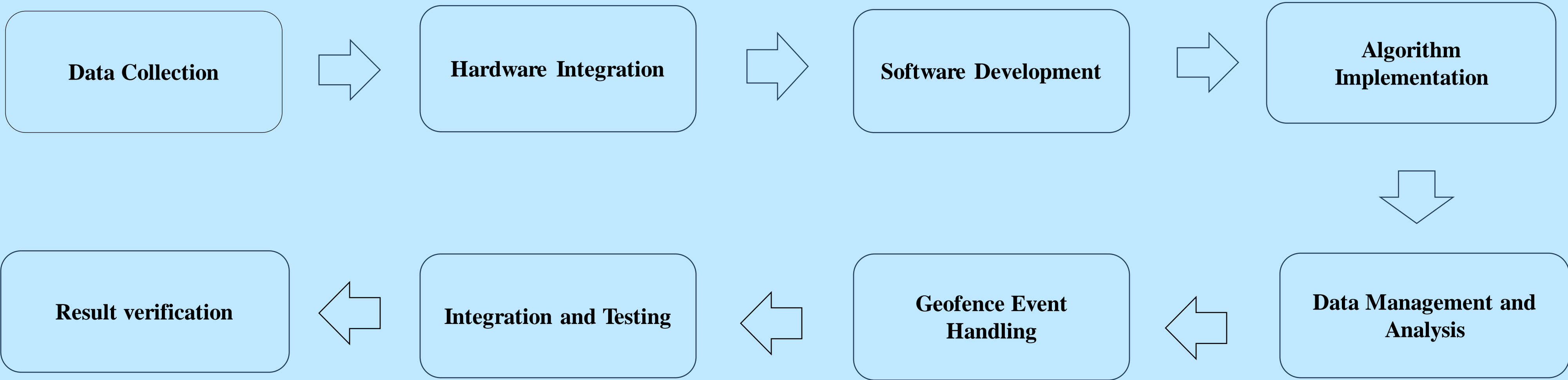
### INTRODUCTION

- This enhancement aims to improve efficiency, security, and proactive intervention capabilities in logistics and supply chain operations.
- Enhance the system's spatial awareness by defining virtual boundaries (geofences) around specific locations or routes, enabling better monitoring and management of shipments.
- Implement geofences around retail locations or delivery zones to optimize last-mile delivery operations and improve customer satisfaction.
- Define virtual boundaries (geofences) around specific locations or routes using GPS coordinates, polygons, or radius-based shapes.
- Historical records of shipments, including tracking numbers, routes, and delivery schedules.



Shipment Tracking system

### MATERIALS AND METHODS



### RESULTS

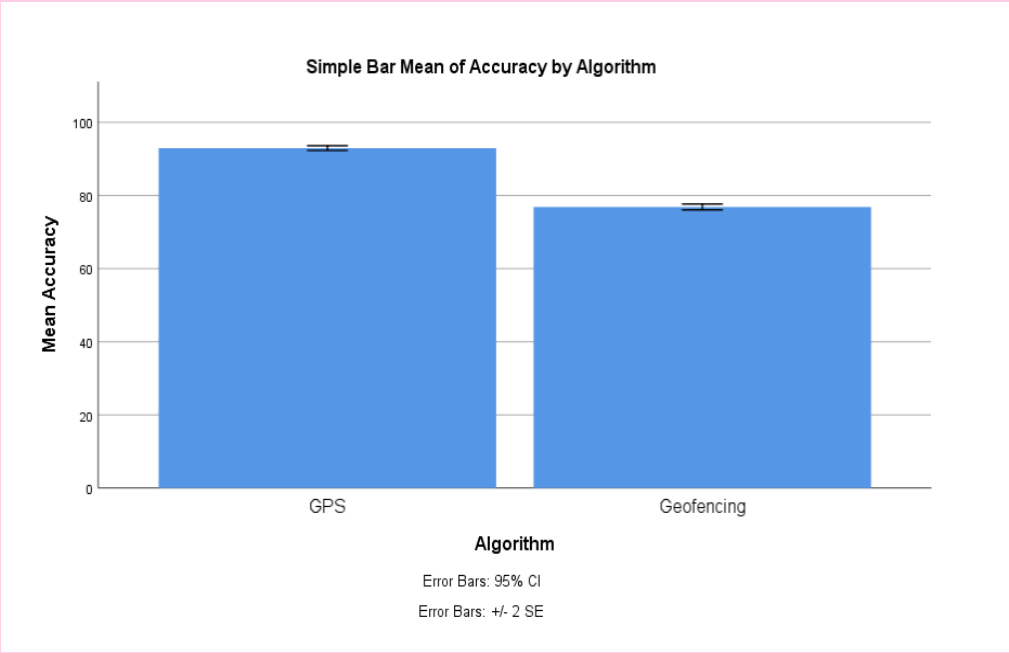


Figure1: The bar graph illustrates distinctive variations in mean accuracy between the GPS and Geofencing algorithms.

	Algorithm	N	Mean	std.Deviation	Std.Error Mean
Accuracy	GPS	20	92.95	1.468	.328
	Geofencing	20	76.85	1.785	.399

Table 1 provides insights into two algorithms: GPS and Geofencing. The mean value achieved by the Global Positioning System (GPS) was 92.95, surpassing the mean of 76.85% obtained by the Geofencing algorithm.

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	F	Sig.	T	Diff	sig(2-tailed)	Mean Difference	std.Error difference	95% Confidence Interval of the Difference	
								lower	upper
Equal variances assumed	1.507	0.227	31.152	38	0.000	16.100	0.517	15.054	17.146
Equal variances not assumed	-	-	31.152	36.63	0.000	16.100	.517	15.052	17.148

Table 2 :presents the results of an Independent Sample T-Test conducted on the sample collections, employing a 95% confidence interval. Utilizing SPSS for the Global Positioning System (GPS) Algorithm, this statistical test systematically contrasts means between two distinct groups.

### DISCUSSION AND CONCLUSION

- The statistical analysis further confirms the superiority of the GPS algorithm over Geofencing, with the independent sample t-test revealing a statistically significant difference between the two algorithms at a 95% confidence interval ( $p < 0.05$ ).
- The mean accuracy achieved by the GPS algorithm is significantly higher (92.95) compared to the Geofencing algorithm (76.85), indicating that GPS technology provides more precise location data for tracking shipments.
- When both algorithms compared GPS algorithm provides more accuracy then compared to Geofencing algorithm.
- Geofencing relies on predefined static boundaries, limiting its flexibility to adapt to dynamic or changing delivery routes or destinations. Geofencing algorithms may trigger false alarms due to GPS inaccuracies, signal fluctuations, or delays in updating the geofence boundaries, leading to unnecessary alerts or notifications.

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