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Altitude Geo Hash Method for Location Based Systematized Billing for Packers and Movers

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Abstract: Maps play an important role in representing spatial and temporal locations and producing large volumes of data. Today's world is connected to many Internet devices with GPS (Global Positioning System) and IoT (Internet of Things) to collect and analyze massive amounts of data. A Geo-hash code is an alphanumeric code that expresses each location for unique identification. Location based services identify mobile locations geographically. We can generate a Geo-hash code with latitude and longitude as well as the altitude of a location. A Geo-hash with altitude generates secure code for location-based devices to identify a particular user. A method is generated to identify the distance between two locations by using the Haversine distance, which is distance between two points of a sphere on the surface of Earth in angular length and can identify the payment charges for packers and movers. This manuscript provides a detailed description of the Geo-hash with altitude (Alt Geo Hash) unique code and a feasible payment method for users to relocate items from one location to another. LBS (Location Based Services) play an essential role in maintaining public life structure, leakage of credentials from lack of standardized apps and maintaining the security of order payments. This method provides an agreeable payment to users for shifting goods and avoiding fraudsters from unwanted minor parties.

Keywords: *Geo-Hash, Location Based Services, Latitude, Longitude, Altitude, City, and region*

1. INTRODUCTION

This Geographic data can be obtained from the internet as a telecommunication network. The combination of Geographic Information System (GIS) technologies and the Internet is used to access more location data to identify a person's existence. Mobile GIS technology will solve handheld device problems such as bandwidth, limitations of application, color resolution, small screen display and storage capability. Geo spatial data describes information about a particular location on the Earth's surface. GIS data include a variety of categories such as remote sensing, Geo visualization and spatial analysis. LiDaR (Light Ranging and Detection), a method to find the surface of Earth in remote sensing for analysis such as the number of heat strokes in an area due to high temperature.

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The Feature Manipulation Engine (FME) is used to overcome many problems associated with translation models such as the generation of geographical data in different formats. Geo hashing is a Geo encoding method used to encode coordinate points of latitude and longitude into a string of numbers and characters describe an area of a point called a pixel. Many alphabets in the string result in an accurate precise location published.

Many applications are based on location-based services, ecision making systems, route Global navigation systems, transportation chart systems, and geographical information systems (GIS). Objects change depending on time in two ways. First, some objects slowly change shape on time, which effects other objects. Second, trajectory objects do not change their shapes, but their locations change over time. Geo spatial objects can be static or dynamic [2, 3]. Time relevant features are appended with spatial data to represent spatial-temporal databases. The indexing of spatial data is a major challenge currently faced with massive and complex data. Indexing is a mechanism for optimizing query accuracy by decreasing disk rotation number used to process a query.

An index takes the input of the finding key and it returns results records as the output. The highest available data structure hierarchical spatial that holds the information and divides space in grid codes and capture the data by using space filling curves, such as Z-order, Hilbert and Piano curves. Geo-hash method offers a precision value prefix to the string and gradually eliminates the last part of the data as suffix to reduce the size of the actual point data. It gives a longer prefix for two Geo codes which are occupationally closer together at a pace [2]. The Euclidean distance and Manhattan distance can identify the closeness of two points but there is no common prefix for the two points. In the Geo hash, only two nearer points have a common prefix. This may generate Geo unique code for each location by a given latitude and longitude points. Altitude is another parameter that identifies location based services for the order and delivery of products. A Geo-hash is a unique identifier that is used to represent point data. It is proposed for use in Geo tagging. It is the process of appending Geo coordinates to media based mobile devices that are location specific. Geo tags can be applied to videos, websites, photos, text messages, RSS feeds, or QR codes with timestamps listed in Table 1

Table 1: Base 32 Table

Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Base32	0	1	2	3	4	5	6	7	8	9	b	c	d	e	f	g
Decimal	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Base32	h	j	k	m	n	p	q	r	s	t	u	v	w	x	y	z

The innovative Altitude Geo Hash method is poised to revolutionize the invoicing practices of packers and movers by introducing a novel approach to location-based billing. Developed by altitude, this concept addresses the limitations of traditional invoicing methods that typically consider only factors like distance, time, and cargo size when determining the costs associated with moving services. These methods often need to pay more attention to the impact of altitude variations on fuel consumption and overall expenditures. However, the Altitude Geo Hash method takes into account any changes in altitude that occur during transportation operations and integrates them into pricing calculations. This is made possible by implementing a geospatial technique known as hashes, which divide the entire geographical region into more manageable sections. Each hash is assigned a unique code that specifies its location and altitude.

By utilizing this method, packers and movers can accurately measure the distance traveled and the amount of fuel consumed, considering the horizontal distance and the vertical ascents and descents. This enables them to establish more reliable, transparent billing systems that reflect the time and resources involved in the relocation process. The Altitude Geo Hash method empowers movers and packers to optimize their routes by identifying areas with significant altitude variations and suggesting alternative paths. This helps reduce fuel consumption and associated costs. It also enables them to provide customers with more precise estimates, enhancing customer confidence and overall satisfaction. To achieve this, the method leverages GPS technology to track the real-time movement of the vehicle. By incorporating altitude into the billing process, the Altitude Geo Hash method ensures a fair and accurate assessment of transportation services, particularly in regions with hilly or mountainous terrains.

The system divides the geographical area into smaller squares using geohashing, assigning unique hash values to each square for precise location identification. The altitude data for each location point is then collected and integrated into the billing rate calculation, ensuring a comprehensive approach to invoicing based on actual transportation parameters. Maps are crucial in representing spatial and temporal locations and generating extensive data in today's interconnected world. The widespread availability of Internet-connected devices equipped with GPS and IoT capabilities enables the collection and analysis of vast data. To provide unique identification for each location, alphanumeric Geo-hash codes are employed. These codes allow location-based services to identify mobile devices and their users geographically. By incorporating altitude information into generating Geo-hash codes, a secure identification code can be created for location-based devices, ensuring precise user identification. The Haversine distance method is utilized to calculate the distance between two locations and determine payment charges for packers and movers. The Haversine distance accurately measures the angular length between two points on the Earth's surface, enabling precise distance calculations. This method ensures that payment charges for relocation services are determined accurately based on the distance traveled.

This manuscript comprehensively explains the unique Altitude Geo Hash (Alt Geo Hash) code, which incorporates altitude information. It proposes a practical payment method for users involved in transporting goods between locations. Location-based services (LBS) are essential for maintaining the structure of public life. However, the lack of standardized apps and the need to ensure secure order payments pose risks like credential leakage. The Alt Geo Hash method provides an agreeable payment system for users engaged in goods shifting. It helps prevent fraudulent activities by discouraging unauthorized third parties from exploiting vulnerabilities in the payment process. By implementing this method, users can have confidence in the security and accuracy of their payment transactions when utilizing relocation services. The Alt Geo Hash method establishes a streamlined and reliable payment system that reduces risks and creates a secure and trustworthy environment for service providers and users.

The Altitude Geo Hash method revolutionizes the billing process for packers and movers by integrating geospatial data and altitude information. In the traditional approach, billing was primarily based on distance traveled, which may not accurately account for the complexities and expenses involved in transporting goods across diverse geographical terrains. The Altitude Geo Hash method introduces several essential steps to address this issue. Firstly, it employs Geo Hashing, which converts geographical coordinates into a unique alphanumeric string. This division of the Earth's surface into a grid allows for precise identification of locations. In this method, starting and ending points and any intermediate stops along the route are encoded using Geo Hashing. Altitude data corresponding to the Geo Hash codes of the locations involved is obtained. This data can be sourced from reliable altitude databases or digital elevation models (DEMs).

By incorporating altitude information into the billing calculation, the method acknowledges the influence of varying terrains on the effort and resources required for transportation. The altitude data is used to compute an altitude adjustment factor, representing the additional effort and resources needed to transport goods at different altitudes. For instance, moving items uphill demands more energy and specialized equipment than traversing a flat surface. By quantifying this adjustment factor, the Altitude Geo Hash method accurately reflects the actual costs associated with different terrains. The billing calculation considers both the distance traveled and the altitude adjustment factor.

Geospatial algorithms are applied to determine the distance between the Geo Hash codes associated with the starting and ending locations. This distance is then modified using the altitude adjustment factor to account for the terrain's difficulty level. The resulting value accurately captures the effort and resources required for the move, generating a fair and accurate billing amount. By integrating altitude information into the billing calculation, the Altitude Geo Hash method offers packers and movers a comprehensive and fair approach to determining charges. It guarantees that costs adequately represent the challenges and resources of transporting goods across diverse terrains. Ultimately, this method enhances pricing accuracy, promoting fairness and transparency in the billing practices of packers and movers. Figure 1 describes that it is widely used in various applications such as location-based services, geographic data analysis, and distributed systems.

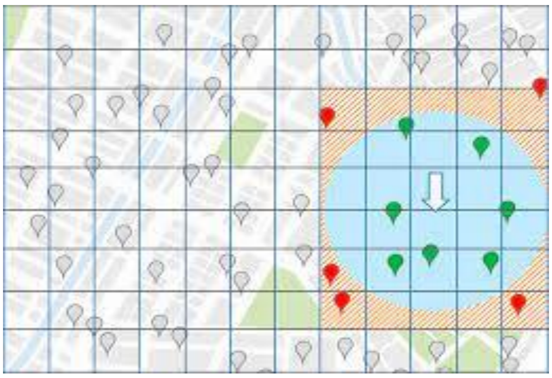

Figure 1: Implementing geo hashing in server less web

The developed hash-based index addresses the need for efficient range exploration focusing on achieving high update rates. By leveraging a single structure that handles updates and queries, the index offers a comprehensive solution for managing data in a range-based context. A key innovation of this index is integrating a grid-based safe region approach. This approach enables an uninterrupted range of queries while maintaining a high rate of updates. The grid-based safe region acts as a protective mechanism, ensuring that range queries can be performed seamlessly without being affected by concurrent updates. The experimental results of evaluating the suggested index highlight its superiority over existing hash-based indices presented in published research. Specifically, the index demonstrates exceptional performance in continuous-range search operations. These results substantiate the claim that the suggested index provides outstanding outcomes for range exploration tasks, surpassing previous solutions in efficiency and effectiveness.

The success of this index lies in its ability to strike a balance between efficient range exploration and timely updates. By incorporating the grid-based safe region approach, the index minimizes the impact of updates on ongoing range queries, thereby enhancing the system's overall performance. This breakthrough can have significant implications for applications that heavily rely on range-based searches and frequent data updates, such as real-time analytics, database management, and geospatial systems. The development of this hash-based index marks a significant advancement in range exploration. Its ability to provide exceptional outcomes for continuous-range search operations and its capacity to handle high update rates distinguishes it from existing hash-based indices. This innovative solution has the potential to revolutionize the way range queries are conducted, offering improved efficiency and effectiveness in a wide range of domains. Euclidean and Manhattan distance are commonly used distance metrics to measure the proximity between two points in a 2D space. However, these metrics do not offer a shared prefix for the two points, making it challenging to efficiently identify and compare nearby locations using only these distance calculations. The Geo hash method overcomes this limitation by introducing a distinctive identifier representing a particular location. Geo hash utilizes a hierarchical grid system that divides the Earth's surface into smaller cells. Each cell is assigned a specific code based on its latitude and longitude coordinates, generated by encoding these values into a binary representation.

A notable advantage of the Geo hash method is that closely located points share a common prefix in their Geo hash codes. This property enables efficient spatial indexing and searching. By comparing the shared prefixes of Geo hash codes, nearby locations can be identified quickly without requiring computationally expensive distance calculations. When considering location-based services for the order and delivery of products, altitude becomes an additional crucial parameter alongside latitude and longitude. Altitude indicates the vertical position or elevation of a location. By incorporating altitude information into the Geo hash method, a more precise representation of three-dimensional space is achieved, accounting for elevation changes and variations in terrain. Geotagging involves attaching geographical coordinates (latitude and longitude) to different media types, including videos, websites, photos, text messages, RSS feeds, or QR codes. This process allows for location-specific tagging and facilitates location-based services on mobile devices. By adding timestamps to Geo tags, the time and location of media content can be tracked, providing context and enabling targeted services based on the user's location. The Geo hash method provides a distinct identifier for representing point data and ensures that nearby locations have a shared prefix in their codes. Incorporating altitude information enhances the method's representation of three-dimensional space, thereby improving location-based services. Geotagging enables the association of geographical coordinates with media, enabling location-specific services and contextual information based on the user's location.

2. RELATED WORK

Using different encoding methods, the Geo-hash unique code can be generated by a textual representation of a given latitude and longitude. Base32, Base64, Elias gamma, and delta were used to decode a given location. Base 32 code contains all 0-9 numerals and lowercase letters excluding "a", "i", "l", and"o" to encode spatial points into uni-code string. The world-safe Base 32 alphabet (Table 1) is the extension of the Base 20 Location Code in Open, consisting of 8 numerals, 12 case-sensitive letters, and 12 case-insensitive letters. The ST-Hash algorithm [4] encodes both spatial and time parameters. The three-bit streams are interleaved and coded as a string. Latitude and longitude are also encoded into the binary format using Binary tree construction of spatial data. The timestamp is converted into a binary form, and three-bit streams are interleaved to generate an ST-Hash code. The ST code is uniquely generated for each location at a given time. Any point can be identified for user A with latitude and longitude on the Earth's surface. We can also take an interval region of points on the Earth. Figure 2 depicts the user location and interval region. Each latitude is coded in binary form by dividing the interval (-90, 90) into two half parts like (-90, 0) (0, 90). If the latitude falls on the left part, prefix "0," or if it falls on the right part, prefix "1". Divide the interval into half and add a binary bit iteratively until the latitude block is found. One bit stream was formed with a latitude point. For longitude, divide the interval (-180, 180) iteratively for a specific required block. Merge latitude and longitude with 0-1 merge to form a 1D bit stream.

The altitude was taken from location-based devices and divided by 100. Note that the quotient value suffixes are in the 1D coded form. 0-1 merged latitude and longitude is encoded by the Base 32 string format, and altitude is a suffix with the format. For example, latitude and longitude (170, 480) are coded as "t540sqb8" for Geo hash in Base 32 format. If the altitude is 487 (487/100), the quotient value will be taken and suffixed with code. Therefore the final encoded form of the given latitude, longitude, and altitude points is "t540sqb84".

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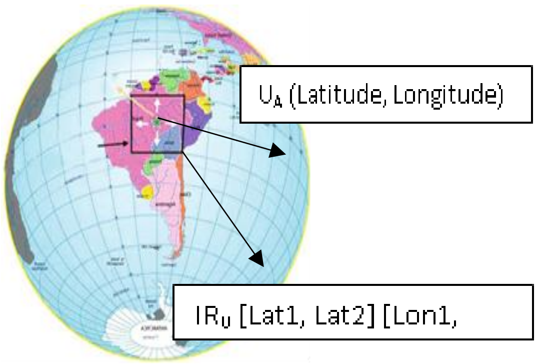

Figure 2: An example of User location *and Interval region*

In [11], the authors created a hash-based index that provides outstanding outcomes for range exploration with higher updated rates. The suggested index is built on a single structure that serves both updates and queries, and they developed a grid-based safe region approach to perform uninterrupted range queries with high updates. Experimental results demonstrate that the suggested index outperforms hash-based indices found in published work for continuous-range search operations.

In [12], the authors integrated the algorithms of search engines into the device that can rapidly and correctly detect the microseismic focal point. Initially, the propagation properties of microseismic signals in mining and stone layers are investigated, and focal location data are acquired. However, since the obtained coal mine microseismic data includes noise, it is first denoised. The denoised waveform data and focus point location are stored in a waveform database. The conceptual framework and theoretical model of the stable distribution-based location-sensitive hash (LSH) are presented and enhanced, and the optimal method of multiprobe LSH is achieved.

In [13], the authors presented novel privacy to achieve a better compromise, so-called Geo-Graph-Indistinguishability (GeoGI), for locations on a road network GeoGI was met by the suggested Graph-Exponential Mechanism (GEM). Furthermore, they formulated the optimization challenge to discover the best GEM in terms of alternatives. They devised a greedy method to obtain an approximate answer in a reasonable time since the computational cost of a naïve technique to locate the best solution is prohibitive. Lastly, regarding tradeoffs, the trials reveal that the recommended technique surpasses GeoI techniques, especially the ideal GeoI mechanism.

In [14], the authors the current maximum co-location pattern mining methods use a generate-test candidate model. When data is huge and dense, identifying maximum co-location patterns is still difficult since this model spends most of its time gathering candidate co-location instances. This paper introduces maximal cliques and hash tables (MCHT)-based maximal co-location pattern mining framework to meet the problem. List all maximum cliques that may concisely describe neighbor connections between geographical data set instances. Bit string operations accelerate maximum clique enumeration. Next, a maximum clique-based participating instance hash table structure is created. Then the hash table can efficiently retrieve maximum patterns. Next, participation indices of these patterns may be used to select the maximum prevalent co-location patterns. Subsequently, studies using synthetic and real-facility data sets show that the proposed technique reduces computing time and memory usage compared to current methods.

In [15], the authors accomplished the best matching discovery of mobile smart learning facilities, and a mobile intelligent education system resource search technique based on the distributed hash table is presented. First, integrate the chord system with the vector space model to create a resource-finding method. Following the discovery of multi-attribute resources, search for location resources using the chord and VSM resource search models, and then resolve the resemblance among search vectors and position tool vectors by creating the vector link between location resources and user queries. Ultimately, the resources with the highest relevance to the search content are obtained based on the resource similarity solution findings. According to the test findings, the value of the search request blocking rate is much lower than its threshold, the search performance is excellent, and the degree of correspondence of resource outcomes is high.

In [16], the authors proposed a location-based billing Geo-Hash method for packers and movers. The study integrates altitude data into Geo-Hash to precisely calculate expenses. The Geo-Hash method incorporates altitude to improve billing accuracy. Altitude helps portray three-dimensional space, considering height changes and terrain variations that affect freight costs. The authors run experiments to test their algorithm. These tests involve real-world packers and movers moving products across elevations. The authors show the revised Geo-Hash algorithm's billing calculations are more accurate and efficient than older techniques that don't include altitude. These comparisons demonstrate the Geo-Hash algorithm's altitude benefits. The suggested method estimates prices more precisely, billing clients based on real distance traveled and elevation variations. This increased accuracy minimizes conflicts and enhances billing transparency for service providers and customers. This study improves location-based billing for packers and movers by adding altitude information to the Geo-Hash algorithm. The experimental results show that the suggested approach improves billing calculation accuracy and dependability.

In [17], the authors introduced a comprehensive location-based billing system for packers and movers for their research. Altitude Geo-Hash, which uses altitude data to improve billing cost estimation, underpins the system. Location-based billing system implementation specifics are provided in the paper. The Altitude Geo-Hash technique, data gathering mechanisms, and data processing algorithms are described. The system architecture handles real-time location data from GPS devices and mobile apps, allowing smooth interaction with packers and mover activities. Benchmarking against traditional billing techniques without altitude information shows the proposed system's cost estimation accuracy advantage. The article also offers case studies of real-life location-based billing system uses. In these case studies, the system handles numerous scenarios, including transportation routes with different altitudes and terrain conditions. Altitude information increases cost estimation, resulting in more accurate billing for service providers and customers. The paper presents a holistic picture of the proposed location-based invoicing system based on the Altitude Geo-Hash algorithm by addressing implementation details, performing a complete performance evaluation, and giving practical case studies. The system's capabilities, benefits, and prospective impact on the packers and movers industry can be understood through implementation details, performance evaluation, and case studies.

In [18], the authors introduced the altitude-aware Geo-Hash algorithm for systematized billing in the packers and movers sector. The study emphasizes the need to consider altitude alongside latitude and longitude in billing. A technique that generates Geo-Hash codes from latitude, longitude, and altitude data addresses this demand. The algorithm considers the three-dimensional nature of geographical space and generates unique codes that better describe individual locales. The proposed method provides a more accurate systematized billing for packers and movers by adding altitude in Geo-Hash code production test their altitude-aware Geo-Hash algorithm. These tests feature real-world packers and movers transporting things across diverse heights and terrains. The authors show that their algorithm outperforms non-altitude-aware charging methods by comparing its findings. These comparisons demonstrate the benefits of altitude-aware Geo-Hash for systematized billing in the packers and movers industry. Altitude variations directly affect transportation. Hence the suggested approach estimates cost more accurately. The approach accounts for altitude to ensure billing calculations match real expenses, making invoicing fair and accurate for service providers and customers. This study proposes an altitude-aware Geo-Hash approach for systematized billing in the packers and movers industry. The suggested approach enhances cost estimates by including altitude information. The trial results show that the strategy can improve systematized billing and increase efficiency and fairness in the packers and movers industry.

In [19], the authors presented case studies that showcase real-world applications of the location-based systematized billing approach. These case studies involve actual packers and movers operations, where the system is implemented to calculate costs based on location, distance, and altitude information. The case studies demonstrate how the integration of altitude information improves the precision and reliability of the billing process, leading to more accurate invoicing for packers and movers. By discussing the integration of altitude information into the Geo-Hash algorithm and evaluating the system's performance through simulations and case studies, this journal paper comprehensively analyzes the location-based systematized billing approach for the packers and movers industry. The findings highlight the benefits of incorporating altitude in the billing process and demonstrate the proposed method's effectiveness in enhancing the billing system's accuracy and efficiency.

3. MATERIALS AND METHODS

At each level, the area subdivision method is applied to the earth's surface using the quadtree subdivision method [5]. The Figure 3 shows the grid code values for each level.

Figure. 3: Grid codes in each level

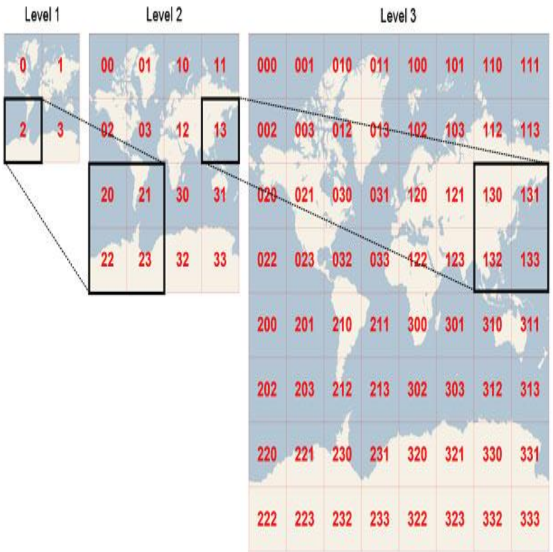

Table 2: Cell width and height in each level of Geo hash

Geo Hash Length	Cell Width	Cell Height
1	5000 km	5000 km
2	1250 km	625 km
3	156 km	156 km
4	39.1km	19.5 km
5	4.89 km	4.89 km
6	1.22 km	0.61 km
7	153 m	153 m
8	38.2 m	19.1 m
9	4.77 m	4.77 m
10	1.19 m	0.596 m
11	149 mm	149 mm
12	37.2 mm	18.6 mm

Quadree structures are indexed and can easily access the data quickly. The Geo hash is coded at each grid level by prefixing the code value. Quadtree structures were used for the 2D data. We indexed Oct trees to the 3D data.

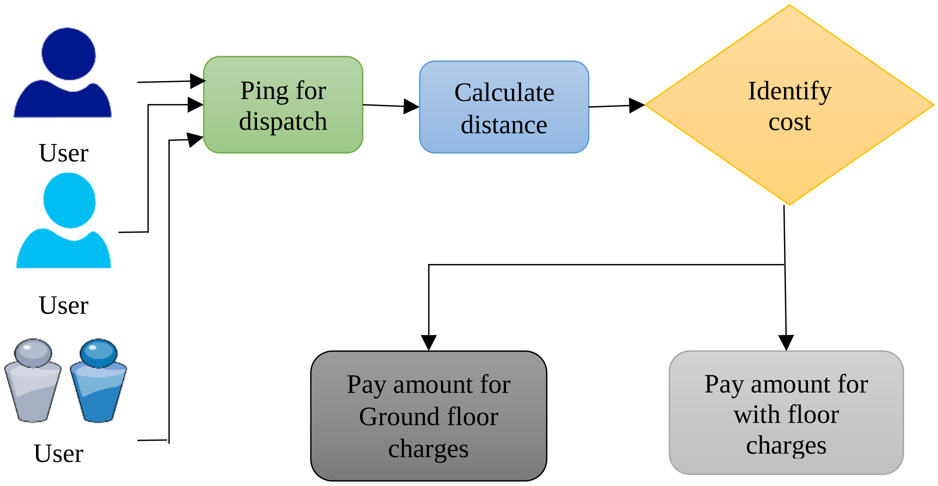

Figure 4: Architecture of Payment method

We can assign a unique code to each quadrant level by level. We still divided each quadrant into sub-quadrants using a quadtree structure; N represents the unique code (n is 5 to 9), bits depending on the encoding technique. We add altitude to the Geo-hash code to identify the height of a location. Location-based services are identified for each user's altitude at which they are located. The altitudes of the Geo-codes are used to identify the person's location and address. The Geo-hashes were coded into different levels of different cell sizes. It decreases the cell width when it goes away from the equator. Level prefixes the Geo-hash level in each Geo code. Table 2 shows the cell length and cell height at each level of the Geo hash. The quad-tree structure divides the space into each equal quadrant to provide a unique code.

We can generate a Geo hash for a given point by the following example: Suppose that the user A's location with altitude is UA is (170, 780, 492). We divide the latitude into two intervals, one is (-90, 0), and the other one is (0, 90). Since the Latitude 170 falls in (0, 90) interval, then the code has taken as "1". Again, divide the (0, 90) interval into two equal parts of (0, 45) (45, 90), and 170 belongs to (0, 90) interval then add "0" to binary code of latitude. By doing repeated steps, we may get Latitude binary code "1000110000". Similarly, the binary code for longitude 780 falls in the (00, 1800) longitude range of (-1800, 1800). We divided the interval into two equal parts: (-180, 0) and (0, 180). The Written binary-encoded form for the longitude point is

"1011011110 ". We merge the longitude and latitude points in the 0-1 code [1] to form a binary code "11001 01001 11101 01000 ". Then apply, Base 32 encoding is taken to generate a unique code string for the given location (170, 780, 492) is "t9x8 "and the altitude floor of (492/100) =4. The final Alt Geo-Hash code is "t9x84 ". Different users can ping for the delivery of goods and items to relocate from one GPS location to another. Harversine distance can be calculated, and the cost can be identified if goods shifting occurs on the ground floor or upstairs.

Figure 4 shows the architecture of a given method to avoid manual extra service charges for shifting goods. An altitude Geo-hash is used to uniquely identify a given location to ensure the privacy and security of users. The altitude Geo hash provides a unique code for any location. Location-based services identify users where they are supposed to move or what they ordered for their existing location. Work analysis: Location-based services that generate an Alt Geo-Hash code for a user to book a taxi and service requirements for any home appliance.

Many mobile apps are used in location-based services to identify user locations [6]. For example, Cityhood, Glympse, Waze, Four Square, Pokemon Go, Google Maps, and Gas Buddy are used to identify a user where the user is located [8]. Altitude plays a significant role in the same latitude and longitude point location. For example, in a 40-floored building service call to customer care or raising a complaint via a mobile app needs to identify the altitude point. Currently, service taxes are manually charged from floor to floor. Table 3 shows the uni-code of the altitude Geo hash for different locations using ST Hash and Geo Hash algorithms.

Table 3: Geo-hash code with Altitude

Latitude	Longitude	Altitude	Geohash	Alt Geohash
17.4841877	78.3731065	482	teper7j93dz	teper7j93dz4
17.4629979	78.3476803	492	tepeqg5136b	tepeqg5136b4
17.4484363	78.3741361	563	teper2qk98r	teper2qk98r5
17.4359811	78.4193887	532	tepg0qp7bnq	tepg0qp7bnq5
17.439662	78.4248873	612	tepg0wg32kd	tepg0wg32kd6
17.439662	78.4248873	524	tepg0wg32kd	tepg0wg32kd5

The Haversine distance of the two points is the angular distance of those points on the surface of a sphere. The first coordinate of every point is latitude, while the second coordinate is longitude and radius *r*. Haversine or a great circle distance d is computed by:

Haversin (d/r) = Haversin (Φ2-Φ1) + cos (Φ1) cos (Φ2) haversin (λ2-λ1)

Haversine (θ) = sin2 (θ/2) Φ1 and Φ2 are the latitudes of the two points, and λ1 and λ2 are the longitudes.

4. RESULTS AND DISCUSSION

Many mobile apps are currently available for location-based services to identify the particular location of a person to know where they are situated. GPS Maps are similar to Google Maps; my GPS location, GPS location finder [9], and GPS emulators are available technically. To calculate the distance between two locations, the Haversine distance [7] measure was used to fix the cost between two locations. The GPS area calculator, navigation route planner, and data and info apps were used to calculate the distance between the two locations. We used a data set containing latitude and longitude points of two locations and altitude points. These data were used to assign fixed charges for shifting items from one location to another. Attitude is adding extra money to the basic charges.

The following graph, Figure 5, shows the variations in the service taxes from floor to floor. Even in gas delivery, boys charge services differently from floor to floor. To eliminate these problems we strictly fix the cost depending on the Haversine distance between the source and destination. It added additional floor charges to the base payment.

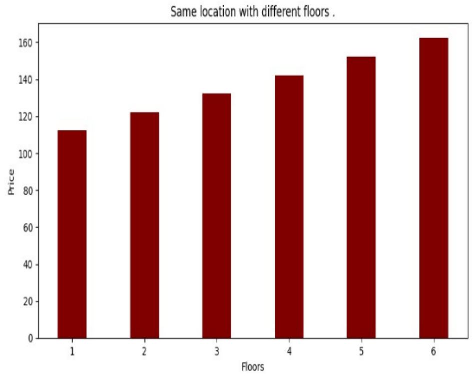

Figure 5: Price variations for different floors in a building

This procedure can be applied to any house shifting and transferring goods or vehicles from one place to another. The Data set [10] can be applied to any location. It first calculates the Haversine distance and calculates the charges at ground level, then adds the service charges if the delivery of items takes place on different floors.

Figure 6 shows the area graph of different location charges for the delivery of items with different service harges. If the delivery of items occurs on different floors, service charges are applied and added to fixed charges.

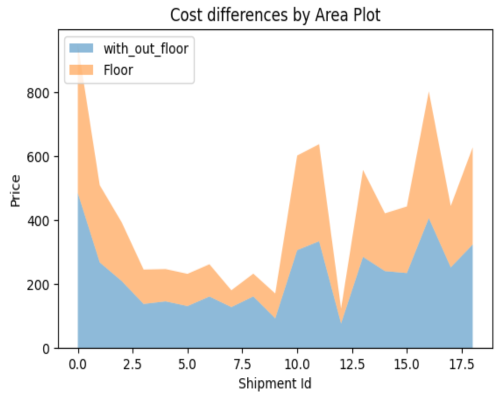

Figure 6: Price variations of goods transfer without and with floor charges

The scatter plot in Figure 7 shows the relationship between different bookings and the cost charges for the delivery of goods. If distances fall long and charges are greater to floors and altitude, charges will be applied accordingly.

Figure 7: Scatter plot for delivery of goods

5. CONCLUSION

Presently, many customers take services through direct contact with providers through a bargaining system. This procedure eliminates the cost differences from person to person and provides a unique solution while the payment option takes place. It provides fixed charges for different destinations depending on the distance to shift household objects or vehicles from one place to another. The Geo hash code is used for location identification uniquely at different levels. We can consider an altitude a floored building for the delivery of goods. A Geo hash with altitude provides a perfect measured cost without varying the charges from service providers. We may use many mobile apps to deliver goods with GPS altitude by a GPS locator. In the future, we can provide more security for user benefits and add a time parameter for user clarity. Apps can be extended to the social usage of the public for quick services and at the correct cost.

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