

Location & Recommendation Aware News with Diversity for Mobile user

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Abstract - This paper is based on the GPS equipment system to the specifically mobile user for contrivance the news feeds according to their query and particular location. Sending a news feed to the mobile user is very common function for the social Networking sites. In this paper, we have proposed the more effective method to get the location news feed. Also their recommendations through the D-MobiFeed System. Previous system was limited scope to deliver the message to mobile user they give only same category locations unfortunately. We have focus on the Diversity term here to get geo tagged messages in less time for the different location and activities places. To reach this objective, we generalize two parts i.e. Optimization Problem that will be solved by Heuristic Algorithm. For Decision Problem, we get correctness by the Maximum Flow problem. This method improves the relevance, diversity and news feed efficiency of the D-Mobifeed System.

Key Words: User Mobility, Location Aware News Feed, Diversity Constraint, Scheduling, Smartphone.

1. INTRODUCTION

With the impressive development of the wireless devices and growth of mobile users people are more conscious about their works, activities and location. They are thirsty to get the whole online services within a short time for the good results. The world has witness to increasing the popularity of mobile devices and now, it's become very common for the people in their daily life. As a mobile is a very essential part of our life to do many things online [1]. Accordingly, this some challenges are facing by mobile user while getting the quality of results. The GPS equipped Smartphone's and Social Networking Sites like (eg. Face book, Twitter, iGoogle, My Yahoo!) Are the today's most widely used for the Communication? And location with the advance of Mobile computing wireless communication is also referred as Location based Social Network (LSBN) [9]. Much news of them are related with the geographical information, eg. Geo-tagged messages, geo-tagged photos, or check-ins. These large number of the messages are mostly send by user's friends or the subscribed agents to the user by his nearby location [8].eg. "Bob can get messages in every 10 seconds from his location within 1 km." Since a huge number of messages are obsessed by social networking sites. A very much big question in front of location aware news feed system is how to manage efficiently k most relevant

messages and show them on users mobile devices. Various research communities had gave a lot of concentration and commercially focus so many social networking sites and location aware news feed system but none of them was focused on to scheduling the messages or news feeds for mobile users [8]. In difference to Mobifeed and D-Mobifeed system focuses on challenges in providing location aware news feed system for mobile users. We model the D-Mobifeed for the scheduling moving users which takes both the relevance and diversity in the account of users [7]. The broader aspects of user satisfaction was unable for relevance unfortunately. Although user have expectation to receive a message from the different areas of his interest, they may be referred diversity (i.e. messages belong to different category of news feed) a location aware news feeds. In the news feeds web search the diversity is recommended for the user satisfaction [14], [15], [5], and [6]. This type of task can automatically pertain us how much Mobile computing environment is challenging location aware news feeds. The relevance of message is the geographical distance of user and messages and that relevance is change according to user's location. This dynamic environment create for us very big platform to employ the location technique to improving the system efficiency and the quality of news feed system. Existing diversification problem was focus on individual items retrieving with certain level of diversity. In contrast, with our techniques the location prediction, our aim is to improving or increasing the quality of news feed by scheduling more location and diversity news feed for mobile user simultaneously [4]. The previous technology is used to coordinate and activities, linking with them in the same manner by their spatial references. The Geocaching is form by the GPS – guided treasure to catch the user locations via GPS devices. It is a general box which having the log of the location and items to the swap. Generally this type of cache used to see the various locations for the record and containing some items which swap on the timely [2].

Mobile user's use of the different application on their mobile is reflecting their educational, personal and professional experiences. These experiences can inform the decision making and success. While this experiences the data is generally used as log of that user to retrieve the information frequently. By knowing his previous records the application will suggest him another things according to his interest and searching the activity places. With the help of this we can

predict the user past and future interest of places and activities [3]. Many mobile users' uses the location term for their geo-tagged points and interest in this way they are save their data for the geo spatial references and non-spatial data too for the future security. With this based we can easily identified the current location of mobile and we predict his future and existing path with the help of log. But unfortunately, while using the mobile system we are not getting the proper solution many times if the user asks about

the query he will get the answer but also get the some unessential results too. Also mean while getting the result about the query the messages are not schedule the proper way this is a one of the major challenges faced by the mobile user. Here, we giving the solution on that by using the D-Mobifeed system to scheduling the relevance messages and get the result properly with diversity term [7].

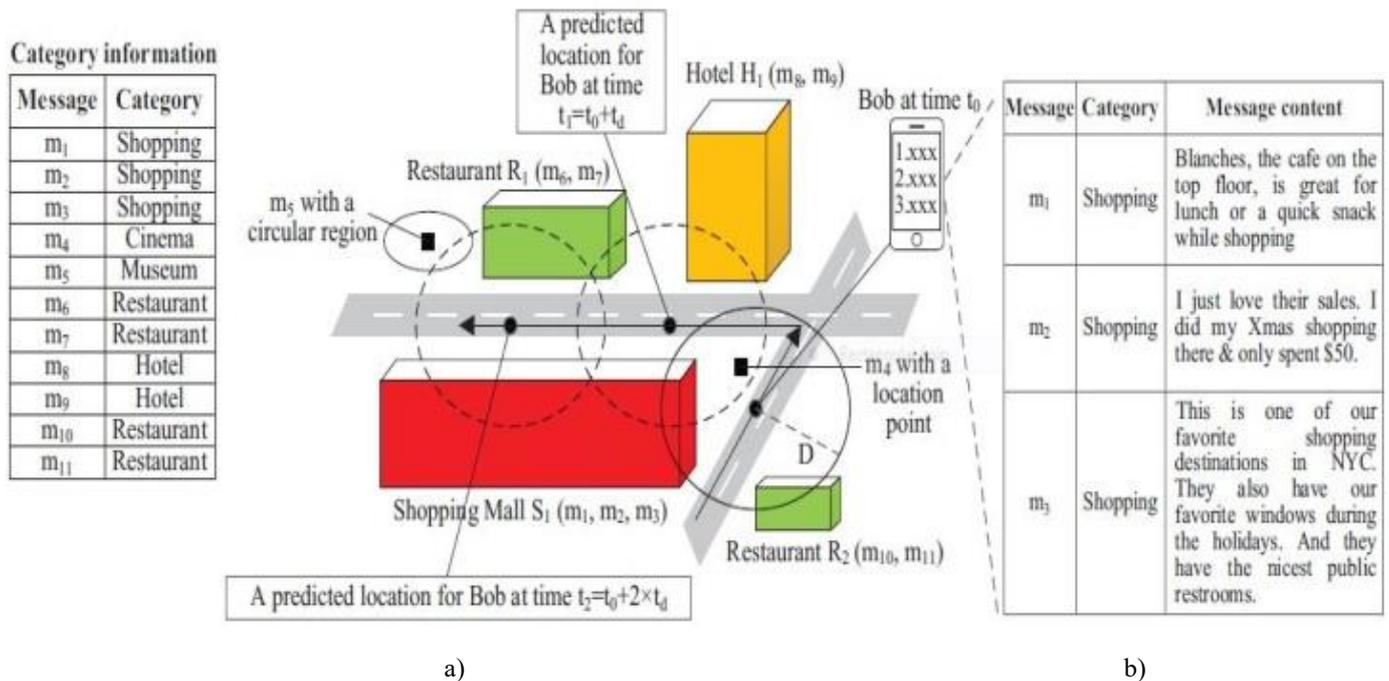
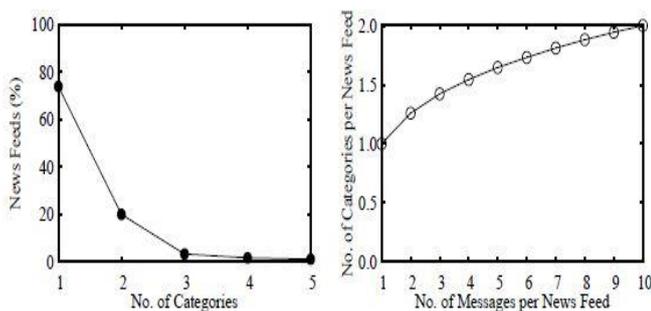


Fig. 1: (a) An application scenario. (b) The news feed at t_0 generated by MobiFeed



(a) Distribution of news feeds with different numbers of categories (k=5) news feeds with various k (b) The number of categories per news feed versus the number of messages per news feed

Fig. 2: Diversity of news feeds generated by MobiFeed.

For example, "Alice wherever he go in news places inside or outside of the city contained by his close places in 1.5 km has credited messages in every 20 seconds". Figure 1a illustration an application scenario. The messages of geo-

tagged location could be a pointed as (e.g., m₄), a rounded area (e.g., m₅), or the spatial area of a place (e.g., m₆ and m₇ are spatially coupled with restaurant R₁). At the side of, geo-tagged messages can be categorized by their core venues; for illustration, m₆ and m₇ are posted from users at restaurant R₁, so they are instinctively categorized to a "restaurant" category. In the earlier work, the up to date location-aware news feed system schedule news feeds for their mobile users. In this, the relevance of a message is considered by Bob to m both the pleased similarity between m and Bob's submitted messages (i.e., a non-spatial factor) and the distance between m and Bob (i.e., a spatial factor). It is aggravated by the detail that, if the news feeds are only computed based on a user's location at the query time (i.e., it does not judge the user's future locations, e.g., GeoFeed), For example, in Fig. 1a the total relevance of news feeds are not optimized., there are total 11 messages (i.e., m₁ to m₁₁) with their geo-location intersects Bob's query regions (i.e., circular regions in Fig. 1a) at time t₀, t₁, and/or t₂. Suppose, m_i is additional relevant to Bob than m_j if i < j, and the number of messages per news feed (i.e., k) is 3. GeoFeed

takings (m1, m2, m3) at t0, (m4, m6, m7) at t1, and (m5) at t2. To develop the relevance of news feeds, given Bob's current location at t0, MobiFeed was predicts two future locations for him at t1 and t2, and schedule news feeds by considering all three query regions at the same time, which results in a superior solution with (m1, m2, m3), (m 4, m8, m9), and (m 5, m6, m7) at t0, t1 and t2, correspondingly. Therefore MobiFeed has aims the total relevance at maximizing of news feeds by utilize a location prediction technique [15].

2. RELATED WORK

In this section, we elaborated the location aware news feed system existing techniques, recommender aware system with diversity and user data with wireless network.

2.1 Location Aware News Feed Systems

Most existing systems of location aware news provide only the forward messages to the subscribed users [7], [12]. This enables a message where user can receive it to be associated with spatial extent. For that proposed system is Mobifeed to schedule the message for mobile users [11]. The most relevant geo-tagged messaged it schedule to the mobile users. But it has a major drawback, that most relevant messages can be same category; the most of the time with and thus it would obstruct to users explore new places and activities. The recommender system in conventional stipulated and Diversity term is the bring user satisfaction. To address this limitation, our D-MobiFeed framework allows users to specify their required number of diversity news feeds in terms of the number of message categories (i.e., the h-diversity constraint). D-MobiFeed aims at maximizing the total relevance of news feeds and satisfying the condition that each news feed contains messages belonging to at least h different categories [9], [12], [13].

2.2 Recommender & Diversity Aware Search Systems

The benefit of Mobifeed is to evaluate the quality of relevance of messages as a recommender system to the mobile users (i.e., accuracy) [9]. So, however a recommender systems is designed with a single goal has many drawbacks. And these systems need to think beyond these metrics. Ziegler et al. introduce an intra-list similarity metric to measure the diversity of a recommendation list everywhere, where the similarity between products is derived from their taxonomy-based categorization [16],[7]. In that, Authors tell the heuristic algorithm to show the better accuracy for getting the recommendation list and diversification [9]. The process of search on web is little differentiating from the recommender system. It involve the user query (i.e. Keywords) the query, however, have uncertainly more than

single obscure [17]. There is way to address this problem is to produce different interpretations a set of diversified results that cover of the target query. Specifically, diversification results approaches in classified as either implicit or explicit. The similar aspects are given by implicit approach of query. Their basic idea is to repeat select documents which are correspondence to the query but distinct to the selected ones in terms of collection of words or divergence in models [9], [18]. On the other hand, Explicit approach is model aspects of a query For example, Agrawal et al. is pretended that there vitality a Group of taxonomy over queries and documents to represent user intentions, and they pretend a diversification function that maximizes the possibility of finding at least one relevant document in the top-k positions. Similarly, Carterette and Chandar model the aspects of a query as topics extract from the top ranked documents, and they designed a probabilistic method to Maximize the coverage of the retrieved documents [9], [19].

2.3 User Data & Wireless Network

According, in the wireless communication data spilt into user oriented and network oriented components, where mobile users device communicate with each other, and network devices services the wireless coverage, global positioning system, SMS, and other functions [1]. Everyone has her/his own living habits, like when to sleep, where to live, whom to play with, whom to talk, and where to go therefore these habits will definitely be reflected in their communication information, since mobile phones have become an anxious part of our life and an integral part for every individual. The practical communication activities of mobile users include voice calls, SMS, saving location and other data transaction through all kinds of Internet Applications, that we say here as user-oriented data [1]. By the theoretical foundation for the value of conventional data on the web can be drawn from Goff man's theory of Social performance Although developed to explain face-to-face interactions, data of social sites is widely used to on the web today for the interactions [14], [20]. One of the most fundamental use of these data for showing the locations and sharing the locations to the user frequently by his geo tagged position. Where user get the message according to his places and their activities [14]. Generally, the user does not choose the place so far from his current place so he or she always refers to the nearby location to visiting the places for same or different category. That generally data created according to his history of visited pages, geo tagged locations and the places where user visited internally [15].

3. SYSTEM MODEL

In this section, we present D-MobiFeed system Model.

3.1 System Architecture

The diversity-aware recommender system and web search systems concentrate on diversity for retrieving an individual list of items, in order to improve user atonement.

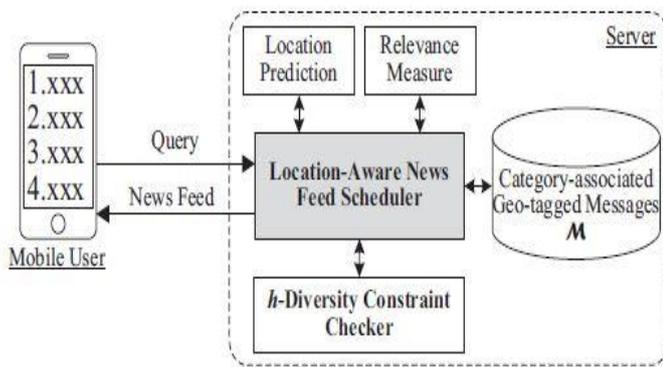


Fig. 3: System Architecture D-Mobifeed System

In this work, we focus on mobile influences where mobile users are moving in different coverage areas. Our dilemma is exclusive and more exigent as D-MobiFeed considers the geographical distance factor between messages and mobile users. And thus the relevance message is changing as user is moving. More precisely, D-MobiFeed has an opportunity to in close a location prediction technique to improve the quality of news feeds by scheduling multiple (i.e., $n + 1$, where n is a look-ahead step) location and diversity-aware news feeds for mobile users concurrently [7],[8],[9]. The main reason to compute each newsfeed individually as in the web search or recommender systems will not maximize the total relevance of news feeds for a user [18]. In our experiment results, D-MobiFeed with $n = 0$ producing a news feed at a time performs worse than D-MobiFeed with $n > 0$ computing a set of n news feeds simultaneously, in terms of relevance, diversity, and efficiency [9].

3.2 Location Prediction

With the fame of mobile devices and the quick development of Web, users can look around news wherever they want; so, their news preferences are usually related to their geo-tagged messages. Therefore, many researchers have been put efforts on location-aware news recommendation, which recommends to users news happening nearest to them. Nevertheless, in users' news preferences are not only related to their locations, but also strongly related to their personal interests [15]. However in the era, for geo-tagged news recommendation, Geo-Feed and GeoRank propose to users for news Happening at the users' current locations or within a given range, where GeoRank uses only static point locations of both users and news, while GeoFeed allows news with spatial Extent; Wen et al. proposed a news torrent reference framework, called MobiFeed, to study further news

recommendation according to users 'moving tracks [15]. The location prediction role can utilize any existing location prediction algorithm if it can predict a user's location at a specified future time in a road network. Integrate the algorithm into D-MobiFeed of path prediction given a user u 's current location, u 's historical trajectories, the road map, and a future time t , the path prediction algorithm estimates u 's location at t . For the technical detail of the prediction algorithm in use D-MobiFeed [7], [21].

3.3 Relevance Measure

D-MobiFeed singly required the relevance measure function to settle on a Return a score to recognize the relevance of a message m_j to a user u_i , i.e., $relevanceScore(u_i, m_j)$. We come together the following non-spatial and spatial factor to employ the relevance measure function.

$$relevanceScore(f) = \sum_{j=1}^k relevanceScore(u, m_j) \times displayWeight(j, k),$$

3.4 Category-associated Geo-tagged Messages

In that, we use M to denote the geo-tagged messages. Every message $m_j \in M$ is distinct as a tuple ((MessageID, SenderID, Content, Timestamp, Spatial, Category), where MessageID is a message Identifier, SenderID is its sender's identifier, Content is its content, Timestamp is its post time, Spatial is its spatial extent, and Category is its category. In D-MobiFeed, every message is associated with exactly one category respectively [9].

4. EXPERIMENTAL RESULTS

In this section, we first give our Module Description, Experimental setting along with results comparison with Optimal solution and effects of distance.

4.1 Module Description

The implemented study included three modules they are namely login and registration, database creation and getting news result. Whereas, Login and Registration is the first stage of every user in system to entering into. In Login activity we give User ID and password if he/she not fills the fields it will give the message and after login again will display message of welcome. User will create his/her registration too by entering his/her information.

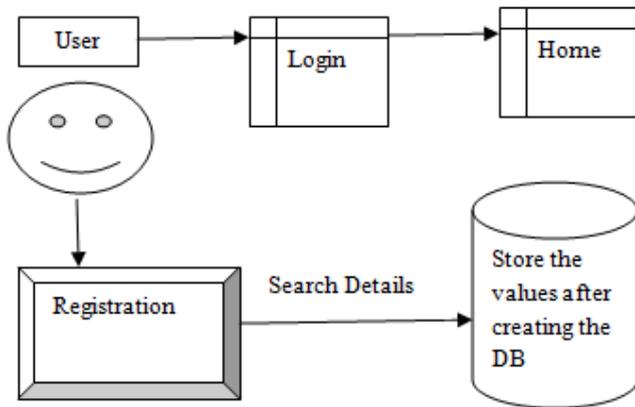


Fig. 4: User login process into the system

Once user can create his/hers record by filling his/her information like Name, User ID, Password, Mobile number etc. that data will store in MySQL using Php function. Generally Android has its own database SQLite but could not store the value that's why we using php to database for our application [6].

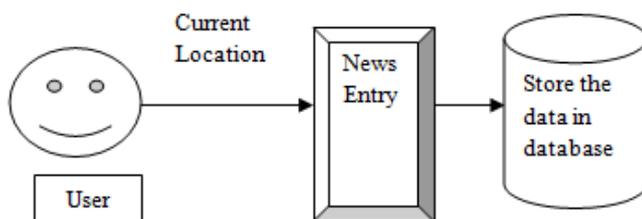


Fig. 5: User query entry into database

When these things are done then according to user choice he will see his/her nearby location by different category.

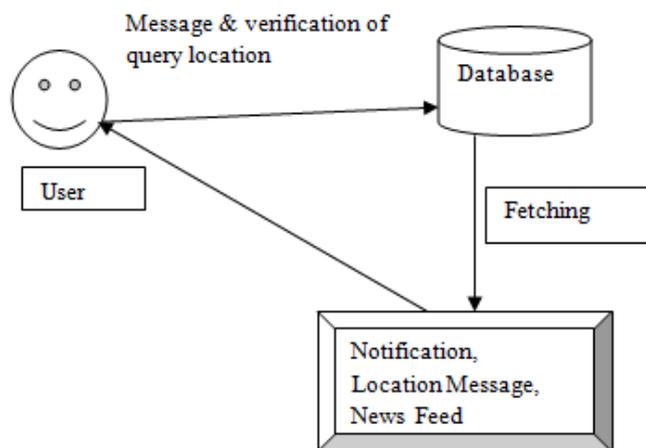


Fig. 6: News fetching from System

When user send his query to the system it checked by news feed scheduler to give h-diversity constraint. It will goes to server and fetching and monitor by server then result will retrieve and display on user mobile.

4.2 Experiment Setting

We applied tryouts in Android using real road network location which scuttled from just dial and foursquare to show the D-Mobifeed system efficient results. Dataset contain the geo-tagged messages and number of users. When user will fire his query that will checked by the h-diversity constraint checker will check the user history log for the exits and future location with their relevance score and messages are fetching geo tagged location whole activity will goes run inside the server. Where all background process will run fetching and monitoring the data and finally display the output as news feed to the user. Each news feed either semantic location or a longitude/latitude coordinate. Then, we arbitrarily produce message spatial extents as circular regions centered at each message allotting location with a radius caused uniformly from 5 to 20 miles. Experiments were estimated on a server computer with processor I3, 4 GB RAM with windows 7 hard disk space 200 MB at least and project run on Android phone minimum support version 5.0 an onwards.

4.3 Evaluated Algorithms & Performance metrics

In this section we compared our work with previous experiments results.

- n-LA-no-diversity: This algorithm uses in previous work i.e. mobifeed it was not reflect diversity in the news feeds Precisely, it schedules messages among n + 1 news feeds by using a greedy manner (i.e. set higher priority of message with bigger value). And looks ahead n steps.
- zero-LA: This algorithm is founded on our D-MobiFeed, nevertheless its look-ahead step (n) is set to zero. In other words, zero-LA Engenders news feeds seeing both diversity and relevance, But then again it does not accomplish any location prediction and procedures a news feed request at a time. This baseline is designed to Estimate the usefulness of the look-ahead technique used by D-MobiFeed.
- n-LA: This is our projected D-MobiFeed with the look-ahead technique (i.e., n > 0). [7], [9].

We evaluated the system performance by three performance metrics they are following,

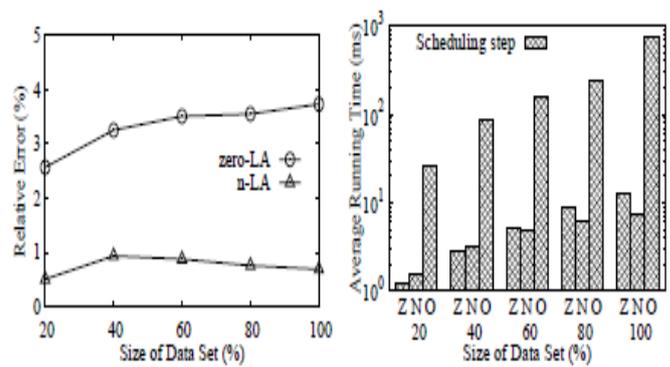
- The number of categories: This metric directs the class of news feeds, as it procedures the typical number of categories in a news feed.

- Relevance score: these metric displays the quality of news feeds by computing the average total relevance score of a news feed.
- Running time: This metric specifies the efficiency of an appraised algorithm. The total running time is fragmented into three parts, specifically, decision step, candidate message step and scheduling step [9].

4.4 Experimental Results

In this section, we first encapsulate the crucial results in our trial.

- *Efficiency:* Our offered three-stage heuristic algorithm Implements much better than the brute-force optimal algorithm by an order of running time. Our D-MobiFeed with the n-look-ahead manner ($n > 0$) (i.e., n-LA) is more effective than D-MobiFeed with the zero-look-ahead method ($n = 0$) (i.e., zero-LA) with reverence to several levels of diversity rations, n look-ahead steps, Entreated numbers of messages in a news feed, and query distance ranges, as depicted in chart 3 (a),(b) and (c) respectively. For the reason that the n-look-ahead method can effectively segment Performance amongst numerous news feeds simultaneously.
- *Diversity:* n-LA outstrips our previous work n-LA-no-diversity (i.e., MobiFeed) in terms of diversity. In precise, n-LA-no-diversity cannot fulfill the h-diversity requirement ($h = 3$) in all the experiments, while n-LA can always satisfy the default value of h ($h = 3$) and the required value of h (up to $h = 10$), as depicted in chart 1 (a),(b) and (c) respectively.
- *Relevance:* Subsequently, n-LA considers equally relevance and diversity, it marginally decreases the relevance of news feeds equated to the n-LA-no-diversity (i.e., MobiFeed), as depicted in chart 1 (b),chart 2 (b) and chart 3(b). Though, the n-look-ahead method ($n > 0$) effectively Progresses the relevance of news feeds compared to zero-LA. Here, zero-LA refer as 'Z', n-LA refer as 'N', and 'O' refer as an optimal solution respectively. chart shows that our heuristic algorithm is better than optimal solution.



(a) Relevance Score Error (b) Running Time

Fig. 7: Comparison with optimal solution

4.5 Effects of Range Distance

This all experiments study the effect of user-stated query range distance (i.e., D) on the performance of algorithms with Various D from 200 to 1,500 meters. It is projected that larger D leads to more candidate messages for a query region. Thus, algorithms find more diverse news feeds and more relevant news feeds for the mobile user. However, it shows that the running time of algorithm gets larger when D increases, as they need to retrieve more candidate messages and process them to produce news feeds. When we applied different range of distance to the radius that will effect produces in the results and news feeds. That result will more get clear the idea to the user and for us to get confident about the produces news feeds. In this experimentation, we calculate the effect of look-ahead steps (i.e.n, varying from 1 to 10, on the enactment of D-MobiFeed. while the average number of categories per news feed of both n-LA and n-LA-no-diversity is less than the default value of $h = 3$ n-LA doubles the number of categories per news feed as in n-LA-no-diversity.

4.5 Comparison with Optimal Solution

In this stage, messages from n+1 news feeds, such that in every news feed, there are at most h messages attendant with distinct category. After excellent each messages we guarantee that n+1 news feeds satisfy the minimum diversity [9]. We applied all stages of algorithms for the different category to produce the results and here we get the results for different category. As shown in table 1) results are came after applied stage one in the algorithm i.e. satisfying h-diversity constraint. And table 2) results are came after applied stage two and three i.e. scheduling of remaining messages and sorting. The generated results are totally satisfy the user requirement for the particular query and get the maximum recommendation.

Table 1:- The experimental results of news feed at t₀, t₁ and t₂ after stage one.

	Message	Category	Relevance Score to u
News feed at t ₀	m2	Restaurant	0.67
	m5	Theater	0.63
	m10	Museum	0.48
News feed at t ₁	m1	Restaurant	0.72
News feed at t ₂	m3	Restaurant	0.17
	m4	Stadium	0.61
	m8	Shopping	0.56

Table 2:- The experimental results of news feed at t₀, t₁ and t₂ after stage two and three.

	Message	Category	Relevance Score to u
News feed at t ₀	m2	Restaurant	0.67
	m5	Theater	0.63
	m11	Shopping	0.52
	m10	Museum	0.48
News feed at t ₁	m1	Restaurant	0.72
News feed at t ₂	m4	Stadium	0.61
	m8	Shopping	0.56
	m9	Museum	0.20
	m3	Restaurant	0.17

5. CONCLUSION

In this paper, we deliberate D-MobiFeed; location-aware news feed framework takes the relevance and diversity of news feeds into explanation when scheduling news feeds for moving users. D-MobiFeed users can stipulate the minimum number of categories in a news feed as an h-diversity constraint, and it aims at maximizing the total relevance of caused news feeds and satisfying the h-diversity constraint. In this, we focus on two crucial complications in D-MobiFeed, namely, decision and optimization problems. The Decision problem is an exhibited as a maximum flow problem and Facilitate D-MobiFeed to decide whether it can fulfill the h-diversity constraint for a news feed. For the optimization problem, we Proposal an efficient three-stage heuristic algorithm to maximize the total relevance of news feeds under the h-diversity constraint. Experimental Results based real road network dataset locations and crawled from just dial too. To show that D-MobiFeed can work efficiently for providing location- and diversity-aware news feeds when sustaining their high quality in terms of relevance. Our future track is to measure the difference of pairwise messages in terms of their category information and study a innovative multi-objective optimization problem of discovery a set of news feeds, in which each news feed satisfies the h-diversity constraint and the difference of the messages in each news feed is maximized while maximizing the total relevance of a set of n+1 news feeds for mobile users (where n is the look-ahead step).

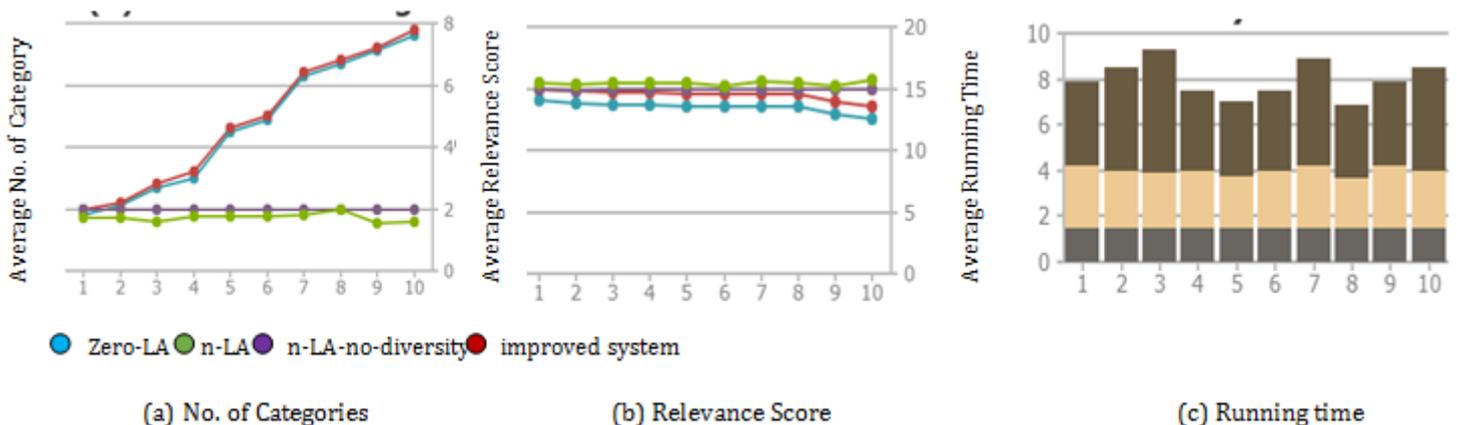


Chart 1:- Effect of the minimum number of message categories per news feed.

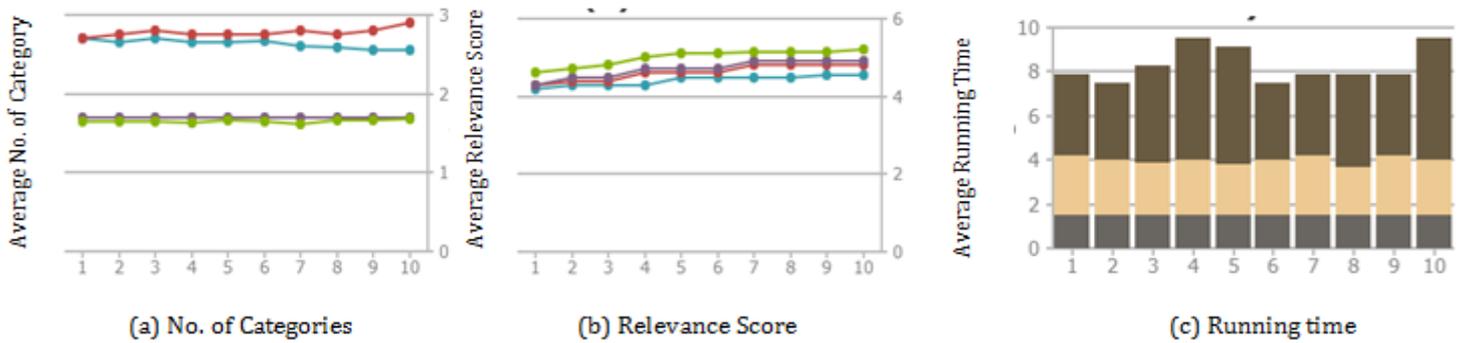


Chart 2:- Effect of Look ahead steps

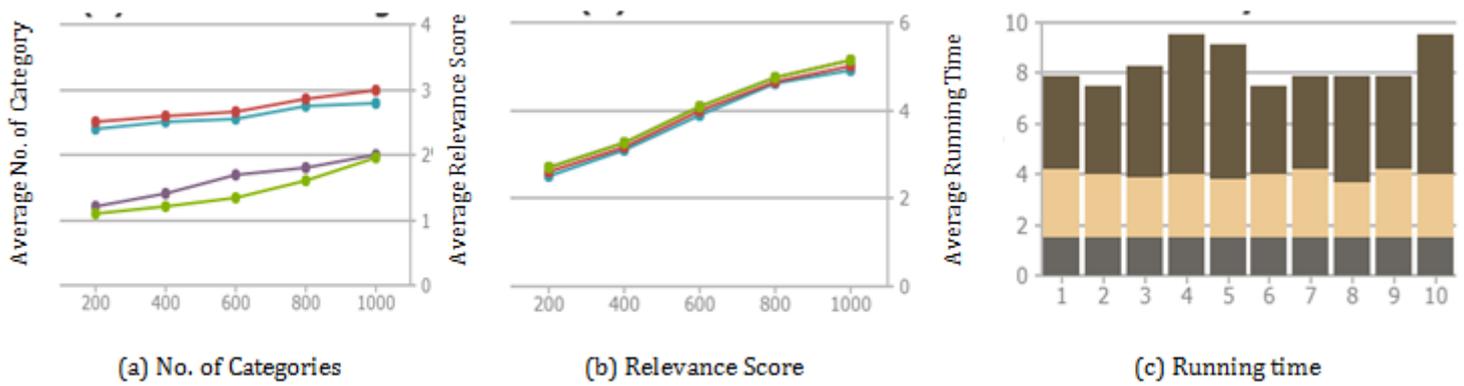


Chart 3:- Effect of query range distance

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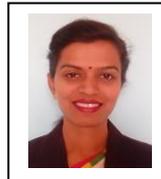
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