iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4 **Issue:** V **Month of publication:** May 2016

DOI:

Volume 4 Issue V, May 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

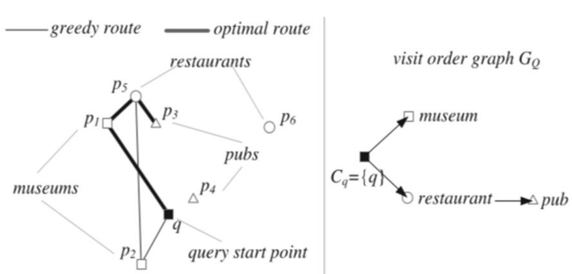
Efficient Route Query Processing with Arbitrary Order Constraints Providing Optimal Solution

G.Suganya
II-M.E(CSE), Info Institute of Engineering

Abstract*—*The optimal route query finds the shortest path starting from the query point from a given set of spatial points DS. These points are associated with some categorical information e.g., restaurant, pub, etc.,. This covers a user-specified set of categories(eg., beach, park and hotel). This can also be specified as partial order constraint between different categories eg., a ATM must be visited before hotel. In the previous work, it focused on where the query contains the total order of all categories to be visited(eg., park-ATM-hotel).The only known solution reduces the problem to multiple, total-order optimal route queries is done without such a total order. A naive approach is used in this paper,using this naive approach a significant amount of repeated computationsis done. Hence,this approach is not scalable to large datasets. A novel solution to the general optimal route query is been proposed in this paper. This is based on two different methodologies namely backward search and forward search. This proposed method can be adapted to answer a variantamount of optimal route queries. In this the route only needs to cover a subset of the given categories. Extensive experiments use both real and synthetic datasets,hence the proposed solution are efficient and practical.

I. INTRODUCTION

Consider a tourist who wants to travel around Malaysia.The tourist does not have much knowledge about the city,he/she searches online maps to plan for a trip.The tourist has fixed a starting point, eg., his/her hotel, and certain objectives in mind, such as visiting a park, shopping in a mall,dining at a fine restaurant and enjoying a few drinks at a local pub.Meanwhile,some destinations may need to be visited in a certain order.Consider a constraint a pub must be visited after a restaurant.The ideal route should cover all the destinations, satisfying all order constraints, and minimize the total travel length. Searching for such a route is captured by the optimal route query. This method usually has a vast search space, and consequently, is too tedious to be done manually.At present,major online map providers have already shown interest in tools that assist such trip planning tasks. For example, Google City Tours(citytours.googlelabs.com) provides suggested tours for a given starting address.These tours are predefined, and cannot be customized according the tour plan.Yahoo Travel(travel.yahoo.com)provides a similar service that allows user to search and share trip. But this method cannot provide optimal route queries. The figure illustrates an example optimal route query on a dataset DS with six locations p1-p6.Each location is associated with one category Cp.eg., p1;p2 are restaurnts;p3 and p4 are beach;and p5 and p6 are cottages.(If a location belongs to multiple categories, eg., a restaurant and a hotel, we conceptually split it into multiple points with identical coordinates, Each associated to a single category).The query contains two parameters: a starting point q,and a directed acyclic graph GQ called the visit order graph.Each vertex in GQ corresponds to a category C and each edge hC;C0i indicates that a point of category C must be visited before another of category C0.Consider an example GQ signifies that a restaurant must be visited before a mall.We Assume that each category appears at most once in GQ.To represent the fact that q must be the first point in the route,we create an artificial category Cq containing a single point q,and add an edge connecting Cq and every other vertex in GQ without an in –edge. The resulted query satisfies all the visit order constraints and it is the shortest route that visits all the categories in GQ. The user may not have sufficient time to visit all the categories. At some situation, some compromise is to find a route that covers a subset of l categories from CG, where l is a user-specified parameter.



II. LITERATURE REVIEW

Mehdi Sharifzadeh , Mohammad Kolahdouzan, Cyrus Shahabi[1]

This deals with the nearest neighbor(NN) problem to give variation in the real world and route planning applications. This paper gives a study about an unexplored form of NN queries. This query is named as optimal sequenced route(OSR).This exits in both vector and metric spaces. Given a starting location and destination location in addition with a number of intermediate location. The OSR finds a route with minimum length from starting point to ending point. This works as a shortest path problem when plotted in a large planar graph. In some path algorithm, they used a technique known as Dijikstra's. This method is impractical or cannot be implemented for real-world scenarios. This technique propose a technique known as LORD, a light threshold-based iterative algorithm. This LORD technique utilizes the threshold that prune the location. These locations does not belong to the optimal route. This introduces a method which is an extension of R-LORD for efficient examination of threshold values.

Resna and Lallu A [2]

This deals with the importance of optimal route finding when a person is new to a city. The person may be unaware of the locations like hospitals, schools, colleges, ATM, etc. Suppose the person wants to go to park, then to a ATM and finally to a restaurant. The optimal route queries are used to find the best route with shortest path. Consider an example of road map queries, in which the user specify the starting, destination and some intermediate location. These locations are specified along with some constraints. Constraints can be given in either total order or partial order .If the user specifies all the visiting order of places then it is total order of places then it is total order .Consider an example of first go to a park,then go to ATM and last to the restaurant. If the user does not specify the complete order the it is taken as a partial order.For exampleATM must be visited before restaurant. The visiting order of park is not specified in this partial order .This deals with survey on optimal route finding by various technique with or without constraints. This concludes the merits and demerits of different methods.

SravaniAdusumilli and S. Ravi Krishnan,.

Some navigational applications cannot handle complicated search scenarios .It can find only point to point route specifics. This deals with a technique known as Batch Forward Search(BFS) which is a elaborate navigation method. This method has a route search with effective routes for complex queries in heterogeneous environments. This also deals with uncertainties regarding to geographic entities. This BFS formulates a way for integrating arbitrary constraints into a specific route search. But this method may not be useful for some user .In some realistic scenario, some additional complicating factor should be considered by the navigational service provider. The complicating factor includes working hours of the entities to be visited, type of services the entities cater and possible restrictions on the order by which the entities may be vivited. To handle temporal constraints over route queries the Batch Forward Search algorithm can be extended with Temporal Approximation Algorithm.

S. Karthik..

In an optimal route query there are a given set of spatial points. These spatial points are associated with a categorical information. The categorical information may include a beach and then a park. The optimal route query finds the shortest path that starts from the query point. This then covers a user specified set of categories(eg., beach, restaurant, hotel).The user may specify partial order constraints among the different categories .The partial order constraints is nothing but a beach must be visited before restaurant. In the previous work it focused on only total order constraints for all the categories to be visited. In a general scenario, the known solution that reduces the problem is to multiple total order optimal route queries. In this paper we propose a naive approach that incurs a significant amount of repeated computations. But these repeated computations is not scalable to large datasets. To overcome these difficulties we propose a novel solution to the general optimal route query based on two different methodologies. These two methodologies are known as Forward Search and Backward Search. In addition to this the proposed methods answer a variant of the optimal route queries. By which the route only needs to cover a subset of the given categories. Extensive experiments are done using both real and synthetic datasets. These confirm that the proposed solution are efficient and practical .This is better that existing methods by large margins.

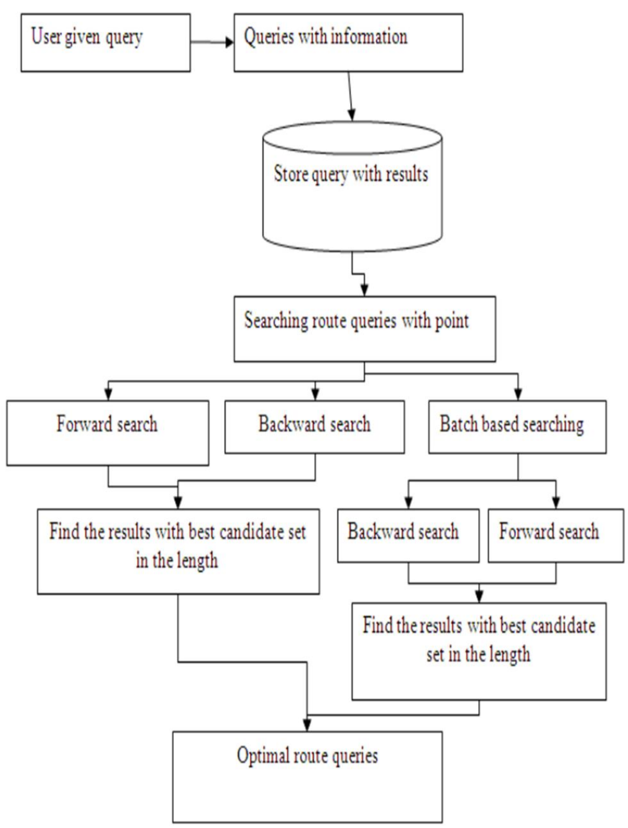
Geo- Asadi, X. Zhou, and G. Yang.

Some users are popular with the search engines retrieve and web pages. But these are not only relevant to query but also important. These are links between web resources and the study of the analysis made it popular. PageRank and HITS are some of the Link-Based page ranking models. These models assign global weight to each page regardless of its location. This is a successful popularity measurement on general search engines. Some general search engines does not retrieve and rank higher the pages. Whereas, the location based search engine retrieve and rank higher the pages which are more popular locally. The location based query results are not only relevant to the topic but also popular with citied by local user. Current ranking models are often unable to estimate the local popularity and hence they are less effective for the queries. We propose a model using back link locations for calculating the local popularity or web resources. Using this model, it automatically assign correct location to the links and content. This is also used to calculate new geo-rank scores for each page. This experiments give more accurate geo-ranking of search engine result. This model is used for processing location-based queries.

K.Shivakrishna,M. Jayapal.

Conventional spatial queries involve conditions on object geometric properties. The conventional spatial queries include search and nearest neighbor retrieval. Several trendy applications call for novel varieties of queries. These aim to seek out objects satisfying both spatial predicate and predicate on their associated texts. Consider an example for this method that rather than considering all the restaurants, a nearest neighbor query would invite that restaurant which is nearest among the database at identical time. The simplest solution to the queries rely on IR2 tree which include some deficiencies. These deficiencies have a serious impact on its efficiency. To overcome this we develop a new access methodology called spatial inverted index. This method extends the standard inverted index to address mutidimensional information. This comes with a algorithm which will answer nearest neighbor queries with keywords in real time. This project technique outperforms the iR2 tree in query reaction time significantly. This is done typically by an element of order of magnitude spatial queries. This is similar to range search and nearest neighbor retrieval. This involves only conditions on objects geometric properties. A spatial database manages multidimensional objects. The objects include points, rectangle, circles and etc. This provide a fast access to those objects based on different selection criteria. To find the object that satisfying both spatial predicate and predicate on their associated texts, many applications call a new form of queries. Consider an example of taking all the restaurants, a nearest neighbor query would ask for closest restaurant with specified keywords. These all works at the same time .The existing system used IR2 tree for providing best solution for finding nearest neighbor. But this method had some deficiencies. To overcome this we implement the new method called spatial inverted index. This index is used to improve the space and query efficiency. Some enhancement have done to search the required objects based upon priority. This proposed algorithm is scalable to find the required objects.

III. SYSTEM ARCHITECTURE



Volume 4 Issue V, May 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

IV. ADVANTAGES

In the proposed system, extensive experiment is done using large-scale real data sets and synthetic data sets.This confirm that the proposed method is efficient and practical.In optimal route queries, the route only needs to cover a subset of the given categories.The optimal Route query finds the shortest path that starts from the query point and covers a user-specified set of categories.These techniques will be presented based on the aggregate count.Nevertheless,they can be immediately extended to cover other categories, such as min, max, sum, avg etc. The advantage of this approach is that multiple rules are considered while forming a route.

A. Forward Search Solutions

The forward search approach traverses the search space in a depth-first manner. This incrementally improves the bound for optimal route length. The benefit of this search is that forward search methods report results progressively, i.e., they update it, until reaching the optimal one or being terminated by the user.

B. Simple Forward Search

(SFS) produces a single solution to the query at first, and then incrementally Greedy algorithm computes a route by repeatedly connecting the current location(starting from the query point Q) to the nearest point belonging to an unvisited category permitted by GQ. The simple forward search is similar to the Greedy method. In this it also extends the current path by adding the nearest point from an unvisited category. The only difference between the two is that SFS backtracks after it obtains a complete route. In the running example of fig. 1, after SFS reaches the same route q! p2!p5! p3 as Greedy, the former backtracks to point p5, connects it to its next nearest pub p4, and checks whether the new route q! p2! P5! P4 is shorter than the current best one q!p2!p5.In this figure the SFS backtracks to p5 again. This has tested all pubs and other categories. This has already covered by the current path q! p2! P5, the simple forward search backtracks once more to p2.This then connects to next nearest permissible neighbor p6 and continues with q!p2!p6.The process terminates when the shortest route is reported as the query result and all feasible routes are examined. A naïve implementation of forward search clearly takes time exponential to the number of points in the data set.

C. Backward Search Solutions

This search is the first method for answering optimal route queries. Similar to R-LORD, the backward search methodology computes the optimal routes in reverse order of its points. We first present an important property of the general sub-route query, before explaining the methods that fit this framework in detail.

D. Simple Backward Search

Initially, SBS computes an upper bound of the optimal ordered query in route length, using a greedy search. The SBS retrieves the set CS of candidate points that may be part of the optimal route. This belong to any category contained in the visit order graph GQ. This fall within distance to the query start point q. By executing a circular range query on each R-tree that indexes a category of points relevant to the query, this improves the performance efficiently. In the example of SBS obtains all points p1-p6.Note that this is different from R-LORD, which only loads points belonging to the last category of initial step. In out setting, there is neither a total order or the concept of the last category.

E. Optimal Route Query Processing

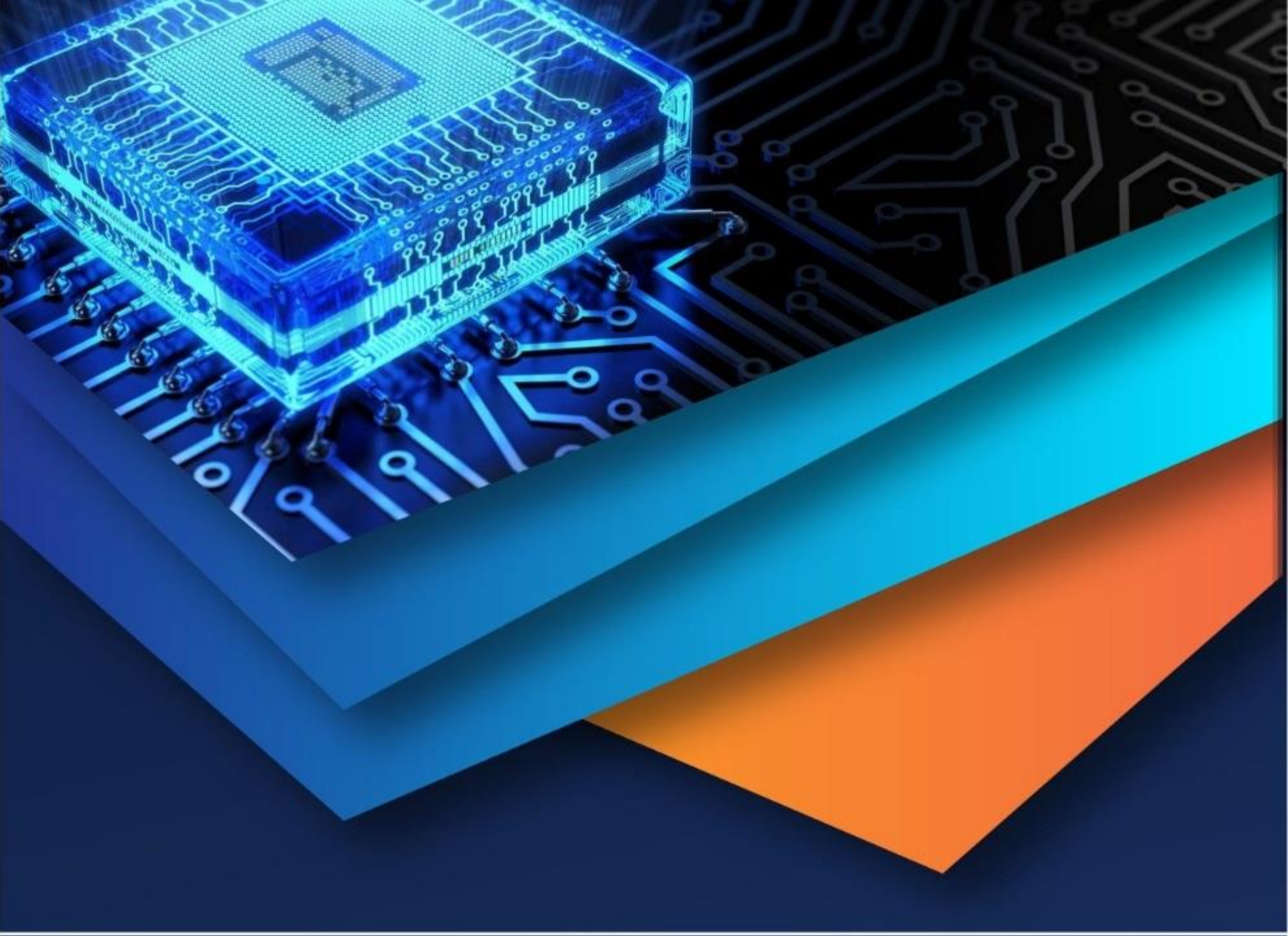
Early work on optimal route computation focuses on greedy solutions. This use the same query definition as this paper, and propose two heuristics. The first, namely NNPSR, resembles the greedy approach described in the second retrieves the nearest point of the query start position q in every category, and then connects them to form a route. In addition, it also describe a simple combination of NNPSR and RLORD , which answers a special case of the optimal route query with a total order of the categories to be visited. The hybrid solution first runs NNPSR to find a greedy route; then, it extract the category of each point on the greedy route, and runs R-LORD with this category sequence as input. None of the solutions in guarantees the quality of the results; these methods usually return suboptimal routes according to the experiments to study a variant of the optimal route query that specifies both a start point q_{start} and an end position q_{end}, but no order constraint between the data categories.

V. CONCLUSION

This work investigates the problem of optimal route query processing. Existing solutions are either limited to a specific setting of the problem, or incur expensive and redundant computations. Hence, this work proposed novel and efficient solutions, based on two methodologies: backward and forward search. The solution BFS that combines merits from both backward and forward search achieves the best performance. In the future, we plan to study alternative definitions of the optimal route query, that have temporal constraints (e.g., have lunch at a specified period) or maximize the number of categories to be visited given a total travel length budget.

REFERENCES

[1] S.Resources for Geo- Asadi, X. Zhou, and G. Yang, "Using Local Popularity of Web Ranking of Search Engine Results," World Wide Web, vol. 12, no. 2, pp. 149-170, 2009.
[2] A.R. Butz, "Alternative Algorithm for Hilbert's Space-Filling Curve," IEEE Trans. Computers, vol. C-20, no. 4, pp. 424-442, Apr. 1971.
[3] X. Cao, G. Cong, and C.S. Jensen, "Retrieving Top-k Prestige-Based Relevant Spatial Web Objects," Proc. VLDB Endowment, vol. 3, no. 1, pp. 373-384, 2010.
[4] H. Chen, W.S. Ku, M.T. Sun, and R. Zimmermann, "The Multi-Rule Partial Sequenced Route Query," Proc. 16th ACM SIGSPATIAL Int'l Conf. Advances in Geographic Information Systems (GIS), 2008.
[5] Y.Y. Chen, T. Suel, and A. Markowetz, "Efficient Query Processing in Geographic Web Search Engines," Proc. ACM SIGMOD Int'l Conf. Management of Data (SIGMOD), 2006.
[6] Z. Chen, H.T. Shen, X. Zhou, Y. Zheng, and X. Xie, "Searching Trajectories by Locations: An Efficiency Study," Proc. ACM SIGMOD Int'l Conf. Management of Data (SIGMOD), 2010.
[7] G. Cong, C.S. Jensen, and D. Wu, "Efficient Retrieval of the Top-k Most Relevant Spatial Web Objects," Proc. VLDB Endowment, vol. 2, no. 1, pp. 337-348, 2009.
[8] I. De Felipe, V. Hristidis, and N. Rishe, "Keyword Search on Spatial Databases," Proc. IEEE 24th Int'l Conf. Data Eng. (ICDE), 2008.
[9] A. Guttman, "R-trees: A Dynamic Index Structure for Spatial Searching," Proc. ACM SIGMOD Int'l Conf. Management of Data (SIGMOD), 1984.
[10] F. Li, D. Cheng, M. Hadjieleftheriou, G. Kollios, and S.H. Teng, "On Trip Planning Queries in Spatial Databases," Proc. Ninth Int'l Conf. Advances in Spatial and Temporal Databases (SSTD), 2005.
[11] X. Ma, S. Shekhar, H. Xiong, and P. Zhang, "Exploiting a Page- Level Upper Bound for Multi-Type Nearest Neighbor Queries," Proc. 14th ACM SIGSPATIAL Int'l Conf. Advances in Geographic Information Systems (GIS), 2006.
[12] D. Martinenghi and M. Tagliasacchi, "Proximity Rank Join," Proc. VLDB Endowment, vol. 3, no. 1, pp. 352-363, 2010.
[13] M. Sharifzadeh, M.R. Kolahdouzan, and C. Shahabi, "The Optimal Sequenced Route Query," VLDB J.—Int'l J. Very Large Data Bases, vol. 17, no. 4, pp. 765-787, 2008.
[14] D. Wu, M.L. Yiu, C.S. Jensen, and G. Cong, "Efficient Continuously Moving Top-K Spatial Keyword Query Processing," Proc. IEEE 27th Int'l Conf. Data Eng. (ICDE), 2011.
[15] M.Y. Yiu, X. Dai, N. Mamoulis, and M. Vaitis, "Top-k Spatial Preference Queries," Proc. IEEE 23rd Int'l Conf. Data Eng. (ICDE), 2007.



10.22214/IJRASET

INDEX COPERNICUS 45.98

IMPACT FACTOR: 7.129

TOGETHER WE REACH THE GOAL

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY