Finding Your Nearest Therapist

Prachi Chodankar[1], Krupa Doshi[2], Tanmay Bhatiya[3], Prof. Mahendra Patil[4]

[1,2,3]Student, Dept. of Computer Engineering, Atharva College of Engineering, Mumbai, India
[4]Professor, Dept. of Computer Engineering, Atharva College of Engineering, Mumbai, India

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Abstract - *In recent times more and more people are suffering from mental health issues yet there are not many easily available platforms that provide a comprehensive treatment plan in one place. The idea represented in the paper discusses the different existing aspects involved with creating a perfect one stop solution to locate your nearest mental health professional. This research focuses on finding the advantages and disadvantages of the variations of KNN search algorithm. This paper includes research of an existing web-based solution that caters to overall healthcare issues.*

***Key Words*: KNN Algorithm, Mental Health, Nearest Search Algorithm, Mobile Technology, Privacy Preserving Search, Online Solution regarding healthcare issues**

1. INTRODUCTION

The system discussed in this paper aims to help you find your nearest mental health professional. The idea represented in the paper focuses on efficient design of systems to save customer's time and avoid the situation of manually finding a therapist. The system explained in this paper uses KNN technology to locate the nearest therapist so that the user can locate the doctor, book appointments with them and have a hassle-free experience The main objective behind this project is to develop a fully functional website with a built-in navigation system to help reach your nearest therapist. Users need not sign in to locate their nearest therapist but will have to do so while booking an appointment with one. Once you book your appointment with a professional, you'll also get the fastest route to reach them as an add on feature on the website.

2. Literature Survey

- [1] The growth of the Internet has significantly lowered the cost of obtaining and sharing information about individuals. As a consequence, private information about individuals is increasingly at risk. This paper presents a novel notion of strong location privacy that ensures query indistinguishability from any location in a spatial database, making it possible to conduct arbitrary KNN search in various spatial databases. Earlier research fails to preserve this property because an adversary may be able to link the query to a local region. This paper formulates sophisticated solutions that break down kNN queries into a series of retrievals of database blocks. The block retrieval occurs via secure hardware PIR, which makes it impossible for the LBS to identify the block. In addition, all queries obfuscate the block access pattern by following a common query plan. The paper begins with the design and implementation of a benchmark solution called BNC, which relies on a PIR-based technique. It then identifies its weaknesses and develops a new solution called AHG to handle them. This study concludes that AHG performs better in all settings than BNC through rigorous simulations of secure hardware. More importantly, the paper demonstrates that AHG has response times in the order of a few seconds, and can handle Gigabyte datasets, which makes AHG an attractive solution for use in applications with high privacy requirement settings.

- [2] suggested a method for arranging data into a navigable small-world graph structure that is suitable for distributed approximate k-nearest neighbor search in metric spaces. The approach relies just on relative distances between objects from a set and query, and so is theoretically adaptable to any metric data. From a probabilistic perspective, the search is approximate. The algorithm is straightforward to comprehend. The graph's navigable small-world feature is because it keeps long-range Delaunay approximation links made at the start of creation, rather than using the metric space structure. There is no center or root element in the structure; all elements are of the same kind. Insertions are handled in the same way as queries, with the algorithm locating and connecting the inserted element to its approximate neighbors. On each step, the method needs just local information and can be started from any vertex. Multiple searches using a random initial vertex can improve the accuracy of the approximate search, and the recall error reduces exponentially with the number of visited elements. At minimal complexity, we can achieve very good recall (greater than 0.999), making our approach a formidable competitor for exact search structures. It is possible to achieve both logarithmic search and construction complexity at fixed accuracy, and they can be done in tandem without particular consideration. The dimensionality dependence for Euclidean data is demonstrated to be weak experimentally.

- In comparison to other methods based on permutation indexes, the suggested methodology can give substantially higher efficiency in the number of metric calculations on a large dataset. To obtain 0.999 recall, only 0.03 percent of the 10 million 208-dimensional CoPHiR datasets must be examined. On a single server node, 2800 queries/s may be processed for recall 0.93. At large datasets, the suggested improved kNN search algorithm gives very high efficiency and scalability. There are, however, several approaches to optimize the structure to get lower complexity and/or higher accuracy constants. One of which is node friend selection algorithms that are more advanced. It is self-evident that choosing closest neighbors as friends is not the ideal strategy to approximate the Delaunay graph because this method only considers distances between the new element and candidates while ignoring distances between the candidates. Knowledge of the metric space's internal structure can help improve search performance. [3] shows that the accuracy of a single search in Euclidean space can be greatly improved while keeping the number of friends per node constant. And more advanced algorithms for creating navigable little worlds; better management of simultaneous searches. Even while the approach can theoretically be applied to any metric space and its performance has been demonstrated experimentally in vector spaces and CoPHiR, it is unclear what the algorithm's actual range of applicability is. To get to the bottom of this, more research is needed. To summarize, the algorithm's simplicity, efficacy, great scalability in both size and data dimensionality, and distributed nature make it a solid foundation for many real-world similarity search applications.

- The future of psychiatric assessment is closer than [4] believes, and it will almost certainly entail the collecting of real-time data on client mood and behavior. Data collecting via mobile devices can lead to more efficient and timely care. Clinicians will be able to analyze a client's progress using information obtained in real-time rather than asking them about their week. A number of studies and projects are underway to illustrate the efficacy of combining mobile data collection in improving psychopathology treatment and understanding. 4Depression is a European 7th Framework Program for Research and Technological Development (FP7) project that is currently collecting EMA through a combination of mobile phone and Web-based self-report assessment, activity monitoring with wearable sensors, and recording electrophysiological measures. The project also employs algorithmic data computation to estimate a client's current and future mental health issues, which is coupled with monitoring software that provides clients with ongoing and real-time support via smartphones and the Internet.

- [5] It's also conceivable that EMA data collected electronically and on a big scale will help us better understand mental diseases and, if linked to electronic health records, will improve our understanding of who reacts well to certain therapies and who doesn't. Some technologies, such as those that track physical activity and allow for self-reporting of mood and function, are ready to be employed. Others will need more study and development to ensure their dependability, usability, and overall clinical utility. Before such data is extensively collected, privacy and ethical issues surrounding this type of assessment must be addressed. Finally, as these tools improve, developers will need to think about how interoperability with electronic health records may affect their evaluation tool.

- [6] They want to compute the nearest therapist of their points using the union of their data sets. For a local point x, the steps to find the k nearest therapist's algorithm are as follows. First, the local nearest therapist set for x is computed. The second step is to securely compute the distance from x to each remote points and the individual shares from this calculation are stored for use in the following steps where we can find therapist. Next, starting with the closest local therapist of x to the farthest, the distances to all remote points are compared with the distance to the current local therapist. Using this information, party A can count the number of total therapists that are closer than the local therapist. This is repeated until the number of therapists exceeds the parameter k. The set of identifiers of the remote points which are closer than this local therapist is then discovered. This set forms the Extended nearest Therapist Set. Finally, the Find Furthest Points algorithm is used to remove the remote points within this set that should not be in the actual nearest therapist set.

- [7] Practco's goal is to provide easier access to healthcare and enable people to make better healthcare decisions. Significant growth has been achieved by the organization in all these years. It is affiliated with more than 2,00,000 doctors through 10,000 hospitals as well as a total of 12,000 diagnostics and wellness and fitness centers. Over 40 million appointments a year are booked through

Practo Search by millions of consumers. Despite its complexity and uniqueness, the Indian healthcare sector offers remarkable opportunities which are being used by Practo in an efficient way. Their approach is to use methods such as TV, radio, and social media (Facebook, YouTube, and Google) to promote an app that may be able to solve some health problems in the community, in hopes of increasing their number of users. With the help of these campaigns, we can discover that healthcare marketing doesn't need to be dull or serious. We can incorporate humor and fun to communicate with consumers.

- [8] Though there is little documented research comparing the effectiveness and well-being of therapists who do and do not engage in their own personal psychotherapy, the plethora of research demonstrating the positive effects of psychotherapy in general suggests that psychologists who take part in their own psychotherapy will benefit both personally and professionally. Some parts of effective training should include discussion of the potential obstacles to finding a psychotherapist. A professional issues class in a doctoral program may encourage the students to seek psychotherapy throughout their careers when they need arises, but the course should also consider practical matters such as how to find a psychotherapist given the complexities of dual relationships, finances, and time demands. Likewise, self-awareness and self-care for postdoctoral fellows and early career practitioners will be important to consider in ongoing training and policy discussions. Admission of distress should be encouraged and respected as a sign of maturity and the taking of responsibility for one's own health and ability to function effectively as a therapist. Finding an acceptable psychotherapist may look different in the future than it currently does as technological advances make long distance psychotherapy feasible to the patient and their family. For example, inexpensive Internet based video conferencing opens up opportunities for psychologists practicing in small towns and rural settings where other mental health professionals are scarce or nonexistent. Though concerns still exist regarding the ethics and confidentiality of using technology in the psychotherapy office, the benefits may outweigh the risks.

3. CONCLUSION

More often than not, mental health problems are not discussed openly and seeking help becomes all the more difficult. Also, there are not many easily available platforms that provide a comprehensive treatment plan in one place. Thus, in this paper we have seen that using location-based services and kNN search algorithm to find the nearest therapist, we've come one step closer to making mental health services easily accessible. The main objective of this paper is to help students understand how one can leverage web technologies along with Machine Learning algorithms such as kNN to solve a problem that has existed for quite some time. The aspects discussed in this paper will essentially be of good service and improve the overall medical fraternity experience of people looking for an easily available platform to connect to a mental health professional. Hence it is a viable solution to the hassle that a common man would otherwise have to face when looking for a mental health professional.

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REFERENCES

[1] Starvos Papadopoulos, Spiridon Bakiras, Dimitris Papadias, Nearest Neighbour Search with Strong Location Privacy.
[2] Yury Malkov, Alexander Ponomarenko, Andrey Logvinov, Vladimir Krylov, Approximate Nearest Neighbor Algorithm based on Navigable Small World Graphs, Information Systems
[3] Beaumont, O., A.-M. Kermarrec, and É. Rivière. Peer-to-peer multidimensional overlays: approximating complex structures. 2007. Berlin, Heidelberg.
[4] Patricia A. Areán, PhD; Kien Hoa Ly, PhD; Gerhard Andersson, PhD Mobile technology for mental health assessment
[5] Warmerdam L, Riper H, Klein M, et al. Innovative ICT solutions to improve treatment outcomes for depression: the ICT4Depression project. Stud Health Technol Inform. 2012;181:339-343
[6] Mark Shaneck, Yongdae Kim, Vipin Kumar, "Privacy Preserving Nearest Neighbor Search"
[7] Prof. Punit Kumar Mishra, 2017. "PRACTO: Transitioning healthcare services in India", International Journal of Current Research, 9, (03), 48555-48561

[8] Jennifer L. Bearse, Mark R. McMinn, Winston Seegobin, and Kurt Free, "Barriers to Psychologists Seeking Mental Health Care" Professional Psychology: Research and Practice at 2013 American Psychological Association 2013, Vol. 44

BIOGRAPHIES

Prachi Chodankar
(BE Student) Atharva College of Engineering, Dept. of Computer Engineering, Mumbai, India

Krupa Doshi
(BE Student) Atharva College of Engineering, Dept. of Computer Engineering, Mumbai, India

Tanmay Bhatiya
(BE Student) Atharva College of Engineering, Dept. of Computer Engineering, Mumbai, India

Prof. Mahendra Patil
(Professor) Atharva College of Engineering, Dept. of Computer Engineering, Mumbai, India