



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 3, March 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com



The Review of Changing Roles of Machine Learning in Healthcare

Manju Payal

Software Developer, Academic Hub Ajmer, India

ABSTRACT: The use of machine learning applications in health care is quickly growing, and it has the potential to have a significant impact on the area. In this paper explain about the advantage of the machine learning in healthcare. How to change the healthcare using the machine learning. In the field of healthcare, machine learning algorithms have made significant progress. The application of machine learning in health care is discussed in this study. Within a few years, machine learning will transform health care.

KEYWORDS: Machine Learning, DeepMind Health, Deep Learning.

I. INTRODUCTION

Machine learning is used in healthcare analysis to handle a variety of ailments such as cancer, diabetes, strokes, and so on. One of the worst illnesses is cancer. Lung cancer, breast cancer, prostate cancer, stomach cancer, and other forms of cancer are all present in the human world. Every year, about 12% of instances of lung cancer are diagnosed, with 10% of those diagnosed dying from the disease. Similarly, 11 percent of instances of breast cancer occur, with 9 percent of those diagnosed dying from the disease. This occurs in all forms of cancer.[1] The cancer prevalence in 2018 is. It lists the overall number of cases and deaths for each cancer kind. It is necessary to create accurate and high-quality data while dealing with cancer in health-care analyses. In this competitive environment, healthcare must use data in such a way that the quality of health care always improves while the cost of treatment decreases. Machine Learning (ML) research in health care has been gradually rising in recent years. It is challenging for people to infer and make choices from a range of medical data, such as clinical data, omics data, or EHR data. As a result, machine learning has been recommended in health care for better data interpretation and decision-making.[2]

Many diseases nowadays must be detected early in order to begin appropriate therapy. They may be incurable and fatal if not treated. As a result, complicated medical data, medical reports, and medical pictures must be analysed in less time with more accuracy. In other cases, defects are so subtle that people are unable to detect them. [3] Machine learning technologies are being applied in healthcare for computational decision making in cases when a critical data analysis on medical data is required to identify hidden linkages or anomalies not evident to humans.[4]

With digitization sweeping the globe, particularly healthcare, the ability to acquire, receive, and present data has become a top priority.[5] Machine learning has the potential to assist meet the growing demand for medications while also improving operations at a lower cost. It can also aid in the detection of dangerous illnesses. As well as assisting in the treatment of patients with more precision and specialised attention.[6]

II. BENEFITS OF MACHINE LEARNING IN HEALTHCARE INDUSTRY –

1) Helps in Maintain Accurate Data

Keeping track of everything used to be difficult and time-consuming. However, because to advancements in technology such as machine learning, it is now simpler to keep accurate health information. It aids in the organisation of data and records, and most importantly, it saves time, effort, and money.[7]

Machine learning-based tools aid in treatment from the ground up with clinical practise diagnosis and suggestions, thanks to emerging technology. It's one of the most important machine learning use cases in the health insurance industry.[8]

2) Forecast of Sudden Outbreak

Machine learning not only helps with the current problem, but it also allows you to predict future issues. Machine Learning can anticipate epidemics throughout the world in a circumstance like this.[9] In today's situation, the expert



must gather a massive amount of data derived from website data, real-time social media updates, and other sources. It aids in the verification of data and the prediction of everything from illness outbreaks to severe infectious diseases.[10]

3) Surgeries perform by Robots

Machine Learning, for example, is a cutting-edge technology that allows robots and gadgets to execute their jobs. Robotic surgery is one of Machine Learning's contributions to the healthcare business.[11] Many experts believe the application has potential. Surgical workflow pattern, robotic surgical supply improvements, surgical skill evaluation, and automated suturing are the four subcategories. It can, however, work with a human-provided algorithm. It executes as if it were a second hand.[12]

4) Helps in Detecting Illness and Analysis

The categorization and analysis of diseases and disorders is one of the major advantages of machine learning in healthcare.[13] Because it was difficult to diagnose, it made it more controllable. It might range from difficult-to-find cancers in the early stages to other illnesses spread through the bloodstream.[14]

5) Manufacturing and Managing of Medicine

One of the advantages of machine learning in healthcare is the ability to discover drug development approaches at an early stage.[15] It also includes a Research and Development team that manages technologies like next-generation order and medication accuracy. It may potentially aid in the discovery of new treatments for complex illnesses.[16]

Unsupervised training, which can detect models in data without ever making any forecasts, is now a benefit of machine learning approaches.

6) More Personalized Medication

Another benefit of Machine Learning in healthcare is the ability to give individualised therapies that are more dynamic and efficient when personal health and predictive analytics are combined. However, it is also available for additional investigation and a more accurate assessment of the situation. Doctors are now confined to choosing from a limited number of judgements or even reducing the risks to the patient based on his hypothetical past and accessible communicated data.[17]

Still, Machine Learning in the drug industry is advancing at a rapid speed, employing the patient's medical information to develop new therapy options. Several technologies and tools with current health analysis skills will be released in the next years. As a result, additional data is needed to prepare for a few of the Machine Learning technologies that rely on healthcare technology.

7) Crowdsourcing Analysis

The notion of crowdsourcing media data isn't new to the business. As a result of the collaboration of Machine Learning and AI, it is even increasing at a rapid rate. Popular groups are also attempting to learn more about medical concerns using crowdsourcing in a more accurate and timely manner. Aside from that, these study methodologies become much more accessible to people from groups that may not otherwise be able to participate since they are on another location. Concerning the analysis support to make patients feel much more at ease while providing much more crucial feedback and surveys.[18]

8) Clinical Research and Trial

When it comes to research and clinical trials, machine learning offers a wide range of applications. The businessperson understands that a clinical study with urgent care costs a lot of money and takes years to complete. And success isn't assured either.[19]

Using Machine Learning-based predictive research to identify latent clinical trial participants can help researchers work with a supply of data from a range of sources, including prior medical visits, social media, and other sources. Machine learning also ensures real-time data access and regulates trial associations, as well as backing the most appropriate sample size to be investigated and utilising the energy of electronics work, all of which contribute to a reduction in data-based errors.[20]



III. HOW MACHINE LEARNING WILL CHANGE HEALTHCARE

Because the healthcare business plays such an important part in our society, it's no wonder that it has been quick to accept new technology. It hasn't always been simple, as healthcare organisations have had to figure out how to preserve sensitive patient data while still improving the system.

They've been able to do this in part by utilising cutting-edge machine learning (ML) algorithms that work without the need for human interaction. As a result, big healthcare datasets may now be analysed without violating any restrictions or confidentiality agreements.[21]

We can now utilise these models to better assess and comprehend risk variables, diagnoses, and coefficients of causality, which has the potential to alter the business. As a result, clinical decision-making will improve and patient care will improve.

Ayasdi, Digital Reasoning Systems, Nervanasys, and Sentient.ai are just a few of the companies working to integrate machine learning to healthcare (among others).[22]

1. ML in the Rapid Detection of Cancer

In the detection of cancer, machine learning algorithms have already shown to be as excellent as dermatologists. This might be a game-changer for the over 5.4 million new cancer cases diagnosed each year in the United States alone. Early identification of melanoma will be critical in this circumstance to enhance survival chances.[23]

When machine learning (ML) algorithms are used in the examination process, they mix visual processing with deep learning (DL) algorithms to assist clinicians in identifying the problem.

On mammograms, ML may also be used to assist locate malignant tumours. Mayo Clinic researchers took it a step further by using artificial intelligence (AI) and machine learning (ML) to identify brain cancers without the need for a sample. This indicates that DL algorithms can find characteristics that aren't visible in standard MRI images.[24]

2. ML in the Discovery of New Drugs

Drug discovery using machine learning has been around for a long, particularly with IBM's health applications. Recently, Google entered the drug discovery market, and a slew of firms are gathering financing to use machine learning to make their mark.

While machine learning may surely speed up the process of identifying new medications, it can also aid scientists in better understanding and designing new therapies. However, these new attempts are not without criticism, so it will be fascinating to observe how things go in the future.[25]

3. ML in Automatic Recommendation or Treatment

While it may be some time before we see autonomous therapies in operation, they are a viable prospect. This is because the legal ramifications of putting patients' lives in the hands of AI will necessitate lengthy studies to demonstrate its safety, viability, and superiority to present treatment approaches.[26]

Once approved, we may expect to see insulin monitoring pumps that function independently to monitor blood glucose levels and deliver insulin as needed. Diabetics' quality of life may improve as a result of not having to break their everyday routine to inject insulin.

This can even be extended to devices that modify antibiotic or painkiller doses based on data from the user's blood, food, sleep, and stress levels. Humans are notoriously lousy at sticking to medicine regimens, thus this has the potential to save lives.[27]

Because AI and machine learning are still in their infancy in healthcare, they will only improve in the future to give even more advantages to diagnosis and preventive efforts. You will soon be exposed to AI in healthcare if you haven't already.

While adoption may be slower than most of us would like, we can all anticipate it to play a big part in making healthcare more efficient and cost-effective in the near future.[28]

4. Applications of Machine Learning in Healthcare :

1) Disease Identification

One of the most important characteristics of a successful healthcare organisation is its capacity to quickly and accurately diagnose diseases. Scientists and computationalists are entering the fight in high-need areas such as cancer detection and therapy, with hundreds of medications presently in clinical trials. One method combines cognitive computing with genetic tumour sequencing, while another use machine learning to generate diagnoses and therapeutic treatments across a variety of fields, including oncology. DeepMind Health is another example, which is working on technologies to treat macular degeneration in aged eyes.[29,37]



2) Diagnosis in Medical Imaging

Medical imaging, and its capacity to present a more full view of a disease, is another key aspect of identifying an illness. Deep learning is playing an increasingly important role in this area, since richer data sources that may be employed in the diagnostic process make it more accessible. Although many ML applications are right a large percentage of the time, the technology has certain limitations in that it cannot explain how it arrived at its predictions. However, by analysing a result and judging if the machine's therapy ideas are accurate or not, technology paired with healthcare experts may give treatment options faster using these enhanced diagnosis tools.[30,36]

3) Drug Discovery

ML has the potential to identify novel medications with significant economic benefit for pharmaceutical companies, hospitals, and patients. Some large tech companies, such as IBM and Google, have developed machine learning tools to help patients find new therapy options. Precision medicine is an important concept in this discussion since it entails understanding mechanisms underlying complex disorders and developing new treatment options. Precision medicine research has been used by institutions like the MIT Clinical Machine Learning Group to build algorithms that can assist doctors better understand disease processes and design effective therapies for diseases like Type 2 diabetes.[31]

4) Robotic Surgical Tools

Because of the high-risk nature of operations, we will always require human assistance, but machine learning has proved extremely helpful in the robotic surgery sector. The da Vinci robot, which allows surgeons to operate robotic arms in order to do surgery with high detail and in confined areas, is one of the most popular breakthroughs in the profession. These hands are generally more precise and steady than human hands. There are additional instruments that employ computer vision and machine learning to determine the distances between various body parts so that surgery may be performed properly. The identification of hair follicles for hair transplantation surgery is one example of this.[32,33]

IV. LITERATURE SURVEY

"A computer virus is believed to learn from the past experience and from some tasks and a few performance on, as evaluated by, increases with experience," says Tom Mitchell. Most machine learning algorithms are concerned with identifying and/or exploiting interrelationships across datasets, and most machine learning algorithms are concerned with finding and/or exploiting correlations and associations. Once Machine Learning Algorithms have identified specific connections, the model may either utilise the information to forecast future observations or generalise it to uncover intriguing patterns. Regression, Linear Regression, Logistic Regression, Naive Bayes Classifier, Bayes theory, KNN (K-Nearest Neighbor Classifier), Decision Tress, Entropy, ID3, SVM (Support Vector Machines), K-means Algorithm, Random Forest, and others are some of the methods used in Machine Learning.[34]

Using EHR data, Maryam et al. [13] evaluated the Seattle heart failure model for the prediction of heart failure. To determine the survival score, 5044 patient samples were obtained and characteristics extracted. The authors used a Cox proportional regression model to calculate the survival score of heart patients who survived for one, two, or five years. Patients who died after five years were then excluded, and different machine learning models such as random forest, logistic regression, support vector regression, decision tree, and ada boost were used on the remaining patients. According to the findings of the trial, logistic regression performed the best, improving the AUV curve value by 11%.[35]

V. CONCLUSION

The direct influence of machine learning on health systems has been described in this study, but the indirect implications of machine learning in fundamental sciences, drug development, and other supporting technologies on health systems have not been studied.

Prediction is intrinsically difficult since technology alters its surroundings, which in turn creates new opportunities and limits for technology. General intelligence will eventually be attainable, as a form of it currently exists in human brains. In the next 5-10 years, however, an expansion of present techniques to artificially re-create universal intelligence is implausible.

In the field of healthcare, the use of digital technologies such as machine learning is entering a new phase. Our understanding of both inherited and environmental aspects contributing to the genesis of complex diseases will rapidly accelerate when informatics, biology, engineering, chemistry, and computer science collide. It's interesting to think about how copy number differences may be used to predict cancer diagnosis. Machine learning might be used to produce an interpretable technique of understanding how the genomic landscape interconnects across genes to contribute to hereditary cancer risk, which could enhance patient care on an individual basis.



REFERENCES

1. Jiang, Z., Dong, Z., Wang, L., & Jiang, W. (2021). Method for Diagnosis of Acute Lymphoblastic Leukemia Based on ViT-CNN Ensemble Model. *Computational Intelligence and Neuroscience*, 2021.
2. Luo, D., Qin, D., Cheng, H., Zhou, M., Zhu, D., & Ni, C. (2021). Comparison of Image Quality of Multiple Magnetic Resonance Imaging Sequences in Multiple Myeloma. *Journal of Medical Imaging and Health Informatics*, 11(2), 497-505.
3. Meraj, Talha, WaelAlosaimi, Bader Alouffi, Hafiz TayyabRauf, SwarnAvinash Kumar, RobertasDamaševičius, and HashemAlyami. "A quantization assisted U-Net study with ICA and deep features fusion for breast cancer identification using ultrasonic data." *PeerJ Computer Science* 7 (2021): e805.
4. El Hussein, S., Chen, P., Medeiros, L. J., Wistuba, I. I., Jaffray, D., Wu, J., & Khoury, J. D. (2022). Artificial intelligence strategy integrating morphologic and architectural biomarkers provides robust diagnostic accuracy for disease progression in chronic lymphocytic leukemia. *The Journal of Pathology*, 256(1), 4-14.
5. Kumar, S. A., García-Magariño, I., Nasralla, M. M., & Nazir, S. (2021). Agent-Based Simulators for Empowering Patients in Self-Care Programs Using Mobile Agents with Machine Learning. *Mobile Information Systems*, 2021.
6. Kumar, S. A., Nasralla, M. M., García-Magariño, I., & Kumar, H. (2021). A machine-learning scraping tool for data fusion in the analysis of sentiments about pandemics for supporting business decisions with human-centric AI explanations. *PeerJ Computer Science*, 7, e713.
7. Suryaganesh, M., Arun Samuel, T. S., Ananth Kumar, T., & NavaneethaVelammal, M. (2022). Advanced FET-Based Biosensors—A Detailed Review. *Contemporary Issues in Communication, Cloud and Big Data Analytics*, 273-284.
8. Thiruvikraman, P., Kumar, T. A., Rajmohan, R., & Pavithra, M. (2021). A Survey on Haze Removal Techniques in Satellite Images. *Irish Interdisciplinary Journal of Science & Research (IIJSR)*, 5(2), 01-06.
9. Mostafa, A. M., Kumar, S. A., Meraj, T., Rauf, H. T., Alnuaim, A. A., & Alkhayyal, M. A. (2022). Guava Disease Detection Using Deep Convolutional Neural Networks: A Case Study of Guava Plants. *Applied Sciences*, 12(1), 239.
10. Simsek, E., Badem, H., & Okumus, I. T. (2022). Leukemia Sub-Type Classification by Using Machine Learning Techniques on Gene Expression. In *Proceedings of Sixth International Congress on Information and Communication Technology* (pp. 629-637). Springer, Singapore.
11. Kumar, S. A., Kumar, H., Dutt, V., & Soni, H. (2021, February). Self-Health Analysis with Two Step Histogram based Procedure using Machine Learning. In *2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV)* (pp. 794-799). IEEE.
12. Kumar, S. A., Kumar, A., Dutt, V., & Agrawal, R. (2021, February). Multi Model Implementation on General Medicine Prediction with Quantum Neural Networks. In *2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV)* (pp. 1391-1395). IEEE.
13. Aof, A. M. B., Awad, E. A., Omer, S. R., Ibraheem, B. A., & Mustafa, Z. A. (2022). A Computer-Aided Diagnoses Program for Leukemia Detection Using Blood Samples. *Journal of Clinical Engineering*, 47(1), 44-49.
14. Kumar, S. A., Kumar, H., Swarna, S. R., & Dutt, V. (2020). Early Diagnosis and Prediction of Recurrent Cancer Occurrence in a Patient Using Machine Learning. *European Journal of Molecular & Clinical Medicine*, 7(7), 6785-6794.
15. Glorindal, G., Mozhiselvi, S. A., Kumar, T. A., Kumaran, K., Katema, P. C., & Kandimba, T. (2021, July). A Simplified Approach for Melanoma Skin Disease Identification. In *2021 International Conference on System, Computation, Automation and Networking (ICSCAN)* (pp. 1-5). IEEE.
16. Kumar, S. A., Kumar, H., Dutt, V., & Dixit, P. (2020). The Role of Machine Learning in COVID-19 in Medical Domain: A Survey. *Journal on Recent Innovation in Cloud Computing, Virtualization & Web Applications [ISSN: 2581-544X (online)]*, 4(1).
17. Kumar, K. S., Radhamani, A. S., Sundaresan, S., & Kumar, T. A. (2021). Medical Image Classification and Manifold Disease Identification through Convolutional Neural Networks: A Research Perspective. *Handbook of Deep Learning in Biomedical Engineering and Health Informatics*, 203-225.
18. Kumar, S. A., Kumar, H., Dutt, V., & Swarnkar, H. (2020). COVID-19 Pandemic analysis using SVM Classifier: Machine Learning in Health Domain. *Global Journal on Application of Data Science and Internet of Things [ISSN: 2581-4370 (online)]*, 4(1).
19. Suresh, K. K., Sundaresan, S., Nishanth, R., & Ananth, K. T. (2021). Optimization and Deep Learning-Based Content Retrieval, Indexing, and Metric Learning Approach for Medical Images. *Computational Analysis and Deep Learning for Medical Care: Principles, Methods, and Applications*, 79-106.



20. Kumar, S. A., Kumar, H., Dutt, V., & Dixit, P. (2020). Deep Analysis of COVID-19 Pandemic using Machine Learning Techniques. *Global Journal on Innovation, Opportunities and Challenges in Applied Artificial Intelligence and Machine Learning* [ISSN: 2581-5156 (online)], 4(2).
21. Kumar, TamilarasanAnanth, RajendraneRajmohan, MuthuPavithra, Sunday AdeolaAjagbe, Rania Hodhod, and TarekGaber. "Automatic Face Mask Detection System in Public Transportation in Smart Cities Using IoT and Deep Learning." *Electronics* 11, no. 6 (2022): 904.
22. Kumar, S. A., Kumar, H., Dutt, V., & Swarnkar, H. (2020). Role of Machine Learning in Pattern Evaluation of COVID-19 Pandemic: A Study for Attribute Explorations and Correlations Discovery among Variables. *Global Journal on Application of Data Science and Internet of Things* [ISSN: 2581-4370 (online)], 4(2).
23. Das, P. K., Pradhan, A., & Meher, S. (2021). Detection of Acute Lymphoblastic Leukemia Using Machine Learning Techniques. In *Machine Learning, Deep Learning and Computational Intelligence for Wireless Communication* (pp. 425-437). Springer, Singapore.
24. KUMAR, S. A., KUMAR, H., DUTT, V., & SWARNKAR, H. (2019). CONTRIBUTION OF MACHINE LEARNING TECHNIQUES TO DETECT DISEASE IN-PATIENTS: A COMPREHENSIVE ANALYSIS OF CLASSIFICATION TECHNIQUES. *Global Journal on Innovation, Opportunities and Challenges in Applied Artificial Intelligence and Machine Learning* [ISSN: 2581-5156 (online)], 3(1).
25. Pavithra, M., Rajmohan, R., Kumar, T. A., & Sandhya, S. G. (2021). An Overview of Convolutional Neural Network Architecture and Its Variants in Medical Diagnostics of Cancer and Covid-19. *Handbook of Deep Learning in Biomedical Engineering and Health Informatics*, 25-49.
26. Kumar, T. A., Julie, E. G., Robinson, Y. H., & Jaisakthi, S. M. (Eds.). (2021). *Simulation and Analysis of Mathematical Methods in Real-Time Engineering Applications*. John Wiley & Sons.
27. Kumar, A., Chatterjee, J. M., Choudhuri, A., & Rathore, P. S. (2018, November). A Collaborative Method for Minimizing Tampering of Image with Commuted Concept of Frazile Watermarking. In *International Conference On Computational Vision and Bio Inspired Computing* (pp. 985-994). Springer, Cham.
28. KUMAR, A. (2018). FACE RECOGNITION USING HOG-BOW BY INTERNET OF THINGS FOR SECURITY APPLICATIONS. *International Journal of Recent Advances in Signal & Image Processing* [ISSN: 2581-477X (online)], 2(1).
29. Bhargava, N., Sharma, S., Kumawat, J. R., & Pandey, A. K. (2017, October). An adaptive approach of image fusion (HSI and wavelet approaches) for information refinement in multi image. In *2017 2nd International Conference on Communication and Electronics Systems (ICCES)* (pp. 770-774). IEEE.
30. de Oliveira, J. E. M., & Dantas, D. O. (2021). Classification of Normal versus Leukemic Cells with Data Augmentation and Convolutional Neural Networks. In *VISIGRAPP (4: VISAPP)* (pp. 685-692).
31. Swarna, S. R., Kumar, A., Dixit, P., & Sairam, T. V. M. (2021, February). Parkinson's Disease Prediction using Adaptive Quantum Computing. In *2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV)* (pp. 1396-1401). IEEE.
32. Kumar, T. A., Rajakumar, G., & Samuel, T. A. (2021). Analysis of breast cancer using grey level co-occurrence matrix and random forest classifier. *International Journal of Biomedical Engineering and Technology*, 37(2), 176-184.
33. Alam, A., & Anwar, S. (2021). Detecting Acute Lymphoblastic Leukemia Through Microscopic Blood Images Using CNN. *Trends in Wireless Communication and Information Security*, 207-214.
34. Kumar, Abhishek, SwarnAvinash Kumar, Vishal Dutt, Ashutosh Kumar Dubey, and Vicente García-Díaz. "IoT-based ECG monitoring for arrhythmia classification using Coyote Grey Wolf optimization-based deep learning CNN classifier." *Biomedical Signal Processing and Control* 76 (2022): 103638.
35. A.Kumar, S.Kumar, V.Dutt, S.Narang, A.Dubey "A Hybrid Secured Cloud Platform Maintenance based on Improved Attributes. Based Encryption Strategies" published in regular issue in IJIMAI, Indexed by the Science Citation Index Expanded(Web Of Science), Universidad Internacional de La Rioja (UNIR). ISSN 1989-1660.
36. SwarnAvinash Kumar, Harsh Kumar, Vishal Dutt, Himanshu Swarnkar, "Contribution Of Machine Learning Techniques To Detect Disease In Patients : A Comprehensive Analysis Of Classification Techniques" Vol 3 No 1 (2019): *Global Journal on Innovation, Opportunities and Challenges in AAI and Machine Learning*. ISSN 2581-5156.
37. SwarnAvinash Kumar, Kapil Chauhan, Aastha Parihar, "Functionality of Classification and Regression tree in Bioinformatics" Vol 5 No 2 (2021): *Global Journal on Innovation, Opportunities and Challenges in Applied Artificial Intelligence and Machine Learning*. ISSN 2581-5156.



**Impact Factor:
7.569**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details