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INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 04, April 2025, pp : 3401-3409

e-ISSN : 2583-1062
Impact Factor : 7.001

AI IN HEALTHCARE DIAGNOSIS

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ABSTRACT

Artificial Intelligence (AI) has revolutionized the healthcare industry, significantly enhancing the accuracy, efficiency, and accessibility of medical diagnosis. AI-driven systems, leveraging machine learning, deep learning, natural language processing, and computer vision, have demonstrated remarkable capabilities in disease detection, medical imaging analysis, and predictive healthcare analytics. These technologies enable healthcare professionals to identify diseases at earlier stages, improving patient outcomes and reducing mortality rates.One of AI's most impactful applications is in medical imaging, where deep learning models analyze X-rays, MRIs, CT scans, and other diagnostic images with high precision. AI-powered tools can detect abnormalities such as tumors, fractures, and organ anomalies faster than traditional methods, reducing diagnostic turnaround time and aiding radiologists in making more accurate assessments. Similarly, AI is transforming pathology by analyzing biopsy samples to identify cancerous cells, improving early detection rates.Beyond imaging, AI plays a crucial role in predictive analytics. By analyzing vast datasets of patient records, AI algorithms can predict the likelihood of diseases such as diabetes, cardiovascular conditions, and neurological disorders. These predictive capabilities allow doctors to implement preventive measures, reducing hospital admissions and improving overall patient health. AI also assists in real-time patient monitoring, particularly in intensive care units (ICUs), where it detects subtle changes in vital signs that could indicate complications, enabling timely interventions.Moreover, AI-driven chatbots and virtual assistants are transforming patient interaction by providing instant medical advice, scheduling appointments, and managing follow-ups. This not only enhances patient engagement but also reduces the burden on healthcare professionals, allowing them to focus on critical cases. Personalized treatment plans are another key benefit, as AI analyzes genetic data, lifestyle factors, and medical history to recommend tailored therapies.Despite its advantages, AI in healthcare faces challenges such as data privacy concerns, ethical considerations, and the need for robust regulatory frameworks. Additionally, AI models require extensive training on high-quality medical data to ensure reliability and accuracy.With the growing adoption of AI, the future of healthcare promises improved diagnostics, optimized resource allocation, and enhanced patient-centric care. This paper explores real-world AI implementations, challenges, and future trends, and presents a practical AI-based diagnostic model with case studies on diseases such as cancer, cardiovascular conditions, neurological disorders, and infectious diseases.

Keywords- machine learning,deep learning,neural networks,Natural Language Processing and Knowledge Base System**.**

1. INTRODUCTION-

The integration of Artificial Intelligence (AI) into healthcare has revolutionized medical diagnosis by automating processes and providing data-driven insights. Traditional diagnostic methods, while effective, often suffer from human error, inefficiencies, and limited scalability. Physicians typically rely on experience, medical literature, and historical data to diagnose illnesses. However, many diseases present overlapping symptoms, which can sometimes lead to misdiagnosis or delayed treatment. AI bridges these gaps through advanced algorithms that enhance diagnostic accuracy, reduce processing time, and improve overall patient care.AI-based diagnostic tools leverage machine learning, deep learning, and natural language processing (NLP) to analyze vast amounts of patient data, including lab reports, radiological images, and genetic information. These tools can identify complex patterns and correlations that might not be immediately

evident to human practitioners. Deep learning, which mimics the neural networks of the human brain, enables AI models to detect anomalies in medical imaging with remarkable precision. Similarly, NLP allows AI systems to extract valuable insights from unstructured medical records, clinical notes, and research papers, providing doctors with evidence-based recommendations.

One of AI's most transformative applications in healthcare is early disease detection. AI-driven systems can detect diseases such as cancer, cardiovascular conditions, and neurological disorders in their early stages, significantly

improving treatment outcomes and reducing mortality rates. For instance, AI-powered medical imaging solutions assist radiologists in identifying tumors, fractures, and other abnormalities with a high degree of confidence, minimizing the chances of oversight. Additionally, AI-driven pathology tools analyze biopsy samples at a microscopic level, offering rapid and accurate cancer diagnoses.

AI is also playing a critical role in telemedicine and remote diagnostics. With the rise of digital healthcare, AI-powered chatbots and virtual assistants facilitate remote consultations, guiding patients based on their symptoms and medical history. These systems enable healthcare providers to extend their services to rural and underserved areas, bridging the accessibility gap. Predictive analytics further enhance telemedicine by forecasting disease progression and recommending preventive measures tailored to individual patients.

Beyond diagnosis, AI is reshaping other aspects of healthcare, including treatment planning, robotic surgeries, and continuous patient monitoring. Wearable devices equipped with AI can track vital signs in real-time, alerting healthcare providers about potential health risks before they escalate. AI-driven robotic surgical systems improve precision and minimize surgical risks, leading to faster recovery times for patients.

Despite its numerous benefits, AI adoption in healthcare faces challenges such as data privacy concerns, ethical considerations, and the need for regulatory oversight. AI models require high-quality medical data for training to ensure reliability, and their decisions must be interpretable to gain trust from medical professionals. However, with continued advancements, AI is set to revolutionize the entire healthcare ecosystem, improving diagnostic capabilities, optimizing hospital workflows, and ensuring better patient outcomes.

2. MACHINE LEARNING TECHNIQUES IN DISEASE PREDICTION

Machine learning techniques have significantly improved disease prediction by analyzing complex medical data and identifying patterns that might be imperceptible to human clinicians. These methods enhance diagnostic accuracy, optimize treatment plans, and contribute to early disease detection, ultimately improving patient outcomes. Some of the most prominent machine learning techniques in healthcare include:

Supervised Learning-

Supervised learning is widely used in medical diagnostics, particularly for classification tasks such as tumor detection in medical imaging. These models rely on labeled datasets where input features correspond to known outcomes, allowing the system to learn and make predictions on new data.

- Support Vector Machines (SVM): Used in cancer detection by distinguishing malignant and benign tumors based on imaging features.
- Decision Trees & Random Forests: Effective in predicting disease risks by analyzing patient histories, lab reports, and genetic factors.
- Logistic Regression & Naïve Bayes: Often used for disease classification, such as predicting the likelihood of diabetes or heart disease based on clinical parameters.

Unsupervised Learning-

Unlike supervised learning, unsupervised learning identifies hidden patterns in unstructured data, aiding in personalized treatment and patient segmentation.

- K-Means Clustering: Groups patients based on similar symptoms, medical histories, or genetic markers, helping in the development of targeted therapies.
- Principal Component Analysis (PCA): Reduces data dimensionality while preserving essential information, improving the efficiency of predictive models.
- Autoencoders: Help detect anomalies in medical images, assisting in the early detection of rare diseases.

Reinforcement Learning-

Reinforcement learning (RL) is instrumental in optimizing treatment recommendations by learning from patient outcomes. It is commonly applied in:

- Robotic Surgeries: Enhancing precision and adaptability in complex procedures.
- Adaptive Treatment Planning: Personalizing medication dosages and therapy regimens based on patient responses over time.
- Clinical Decision Support Systems: Helping doctors refine treatment strategies based on evolving patient conditions.

Deep Learning-

Deep learning, a subset of machine learning, is particularly useful in analyzing high-dimensional medical data. Neural networks, especially Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), have transformed healthcare analytics.

- CNNs (Convolutional Neural Networks): Extensively used in medical imaging to detect abnormalities in X-rays, MRI scans, and CT scans. These networks excel in image-based diagnostics by recognizing patterns indicative of diseases such as pneumonia, fractures, and tumors.
- RNNs (Recurrent Neural Networks): Process sequential medical data, such as ECG readings, monitoring patient vitals over time to detect irregularities in heart rhythms and neurological conditions.
- Transformers: Emerging deep learning models that analyze medical text data for advanced diagnostics and automated medical record processing.

3. APPLICATIONS OF AI IN DISEASE DIAGNOSIS

AI Applications in Disease Diagnosis-

Artificial Intelligence (AI) is transforming the field of disease diagnosis by offering precision, efficiency, and early detection capabilities. AI-driven tools leverage deep learning, machine learning, and natural language processing to analyze vast medical datasets, assisting healthcare professionals in making faster and more accurate diagnoses. Below are some of the key applications of AI in disease diagnosis:

Cancer Detection-

AI has significantly improved cancer detection by analyzing medical images such as MRI, CT scans, mammograms, and histopathology slides. Early-stage detection is crucial for increasing survival rates, and AI-based tools such as Google's DeepMind, IBM Watson, and PathAI enhance oncologists 'ability to detect malignant cells with high accuracy. These AI systems:

- Identify tumors in radiology scans faster than human experts.
- Analyze biopsy samples to differentiate between benign and malignant tissues.
- Assist in developing personalized cancer treatment plans based on genetic and molecular profiling.

Cardiovascular Diseases-

Cardiovascular diseases (CVDs) are among the leading causes of mortality worldwide. AI-powered models predict heart disease risks by analyzing patient history, electrocardiogram (ECG) signals, and wearable device data. AI applications in cardiology include:

- Detecting arrhythmias and abnormal heart rhythms using deep learning models.
- Providing early warnings for stroke and cardiac arrest through continuous heart rate monitoring.
- Assisting in predictive analytics for hypertension and atherosclerosis based on genetic and lifestyle factors.

Neurological Disorders-

AI is revolutionizing neurology by assisting in the early detection of diseases such as Alzheimer's, Parkinson's, and epilepsy. Advanced AI algorithms process brain imaging data (MRI, PET scans) and electrophysiological signals (EEG) to detect abnormalities. AI-powered diagnostic tools:

- Identify early signs of neurodegenerative diseases before visible symptoms appear.
- Improve seizure prediction for epilepsy patients, helping in better management.
- Assist in cognitive assessments and personalized therapy recommendations.

Diabetes Prediction and Management-

AI-driven systems help in both the prediction and management of diabetes by analyzing glucose levels, genetic predisposition, and lifestyle factors. Key AI applications include:

- Early diabetes detection based on blood test patterns and patient history.
- AI-based insulin management systems that provide real-time glucose monitoring and insulin dosage recommendations.
- Predictive alerts for potential diabetic complications, allowing for timely medical interventions.

Infectious Disease Outbreak Prediction-

AI plays a crucial role in tracking and predicting the spread of infectious diseases, such as COVID-19, influenza, and dengue. By analyzing global health records, travel data, and genomic sequences, AI helps in:

- Epidemiological modeling to predict outbreak hotspots and transmission rates.
- Automating contact tracing for more efficient containment strategies.
- Optimizing resource allocation by predicting hospital demand and vaccine distribution needs.

4. BENEFITS OF AI IN HEALTHCARE

Artificial Intelligence (AI) is revolutionizing the healthcare industry by enhancing diagnostic accuracy, accelerating medical processes, and optimizing patient care. Its ability to analyze vast amounts of medical data with precision has significantly improved disease detection, treatment planning, and overall healthcare efficiency. AI-driven solutions are transforming medical practices by minimizing human errors, reducing workload, and enabling proactive healthcare strategies.

One of the most significant benefits of AI in healthcare is enhanced diagnostic accuracy. AI-powered algorithms process large datasets, including medical imaging, pathology slides, and genomic sequences, to detect diseases with high precision. This reduces the likelihood of misdiagnosis, ensuring that patients receive timely and accurate treatment. For instance, deep learning models can identify cancerous tumors in radiology scans with accuracy comparable to or even exceeding human radiologists. By assisting doctors in early-stage disease detection, AI contributes to better patient outcomes and higher survival rates.

Another major advantage is faster processing times. Traditional diagnostic methods, such as manual evaluation of lab results and imaging scans, can be time-consuming. AI-powered tools can analyze medical images, blood reports, and genetic data in a matter of seconds, significantly accelerating the diagnostic process. This rapid turnaround allows healthcare professionals to make swift and informed decisions, which is particularly crucial in emergency cases such as strokes, heart attacks, or sepsis, where timely intervention can save lives.

AI also enables personalized treatment plans, tailoring medical recommendations based on a patient's genetic profile, medical history, and lifestyle factors. Precision medicine, powered by AI, helps doctors select the most effective drugs and therapies for individual patients, minimizing adverse reactions and improving treatment success rates. This is especially beneficial for chronic diseases like diabetes, cardiovascular conditions, and cancer, where personalized care can lead to better management and improved quality of life.

Moreover, AI enhances cost efficiency in healthcare by automating routine administrative and clinical tasks. AI-powered chatbots assist in patient inquiries, reducing the burden on medical staff, while robotic process automation (RPA) streamlines hospital operations such as billing, scheduling, and electronic health record (EHR) management. By optimizing resource allocation, hospitals can reduce operational costs while improving service quality.

The integration of AI in remote monitoring and telemedicine has expanded access to healthcare, particularly in rural and underserved areas. AI-powered wearable devices continuously track vital signs, such as heart rate, blood pressure, and oxygen levels, allowing for real-time health monitoring. These devices alert healthcare providers and patients about potential health risks before symptoms escalate, facilitating early intervention. Telemedicine platforms, powered by AI-driven diagnostics and virtual assistants, enable doctors to consult and treat patients remotely, improving accessibility and reducing hospital visits.

Furthermore, AI plays a crucial role in predictive analytics, allowing healthcare providers to forecast disease outbreaks and predict patient deterioration. AI models analyze epidemiological data, social determinants of health, and patient records to anticipate potential health crises. This predictive capability is invaluable in pandemic response planning, as seen during the COVID-19 outbreak, where AI-assisted models helped track virus spread and optimize resource allocation. In hospitals, AI-driven predictive analytics can identify high-risk patients, allowing doctors to implement preventive measures before conditions worsen.

In conclusion, AI is reshaping the healthcare landscape by improving diagnostic accuracy, enhancing efficiency, and enabling proactive patient care. Its applications in personalized treatment, telemedicine, and predictive analytics are driving a shift towards a more data-driven and patient-centric healthcare system. While challenges such as data privacy, algorithmic bias, and regulatory compliance remain, continuous advancements in AI will further refine its capabilities, making healthcare more accessible, affordable, and effective for all.

5. CHALLENGES AND ETHICAL CONCERNS

While AI has revolutionized the healthcare industry by improving diagnostic accuracy, enhancing efficiency, and enabling personalized treatment, it also presents several challenges that must be addressed for its successful implementation. These challenges range from data privacy concerns to ethical and regulatory issues, highlighting the need for careful oversight and responsible AI integration.

One of the most significant challenges is data privacy and security. AI systems require vast amounts of patient data to function effectively, but ensuring the confidentiality of medical records is a critical concern. Healthcare data is highly sensitive, and unauthorized access, data breaches, or cyberattacks can lead to severe consequences, including identity theft and medical fraud. Strong encryption, secure storage, and compliance with regulations like HIPAA (Health

Insurance Portability and Accountability Act) and GDPR (General Data Protection Regulation) are essential to protect patient information from misuse.

Another pressing issue is bias in AI models, which can result in inaccurate predictions and disparities in healthcare outcomes. AI models are trained on large datasets, and if these datasets are not diverse or representative of all patient demographics, the AI system may produce biased results. For example, an AI diagnostic tool trained predominantly on data from one racial or ethnic group may not perform as accurately for other populations, leading to misdiagnoses or unequal treatment recommendations. Addressing bias requires diverse and high-quality training data, along with continuous monitoring and validation of AI algorithms to ensure fairness and inclusivity.

Integration challenges also hinder the widespread adoption of AI in healthcare. Many hospitals and clinics operate with legacy systems that may not be compatible with AI-powered tools. Integrating AI solutions into existing healthcare workflows requires significant investments in infrastructure, training for medical staff, and seamless interoperability with electronic health record (EHR) systems. Without proper integration, AI tools may become inefficient or underutilized, limiting their impact on patient care.

The regulatory and legal landscape surrounding AI in healthcare is another area of concern. AI-driven decisions in medical diagnosis and treatment planning raise ethical questions about accountability and liability. Who is responsible if an AI system makes an incorrect diagnosis or recommends an ineffective treatment? Ensuring compliance with healthcare regulations and establishing clear guidelines for AI accountability are crucial for building trust in AI-powered healthcare solutions. Additionally, regulatory approval processes for AI-based medical tools can be complex and time-consuming, slowing down innovation and deployment.

Another challenge is the dependence on AI, which could reduce human oversight in critical medical decisions. While AI can assist healthcare professionals in making more informed choices, over-reliance on automated systems may lead to errors if clinicians do not critically evaluate AI-generated recommendations. Medical practitioners must remain actively involved in decision-making processes, using AI as a supportive tool rather than a replacement for human expertise. Ensuring a balanced approach, where AI enhances rather than replaces clinical judgment, is key to maintaining high-quality patient care.

In conclusion, while AI holds immense potential to transform healthcare, addressing its challenges is essential for responsible and effective implementation. Strong data security measures, diverse and unbiased training datasets, seamless integration with existing systems, clear regulatory frameworks, and maintaining human oversight will be critical in ensuring AI's success in the medical field. By overcoming these challenges, AI can truly enhance healthcare delivery and improve patient outcomes without compromising safety, ethics, or equity.

6. FUTURE SCOPE OF AI IN HEALTHCARE

The rapid advancements in Artificial Intelligence (AI) are reshaping the future of healthcare, introducing innovative solutions that enhance patient care, streamline medical workflows, and accelerate medical research. From AI-driven drug discovery to robotic surgeries, the integration of AI is pushing the boundaries of what is possible in modern medicine. Here are some key future trends that will define AI's role in healthcare:

One of the most promising applications of AI is in AI-driven drug discovery. Traditional drug development is a time-consuming and expensive process, often taking 10–15 years to bring a new drug to market. AI is revolutionizing this field by leveraging predictive modeling, molecular simulations, and deep learning to identify potential drug candidates faster. AI-driven platforms analyze biological data, predict how molecules interact, and simulate drug efficacy, significantly reducing the time required for drug formulation and testing. Companies like DeepMind's AlphaFold have already transformed protein structure prediction, paving the way for breakthroughs in personalized medicine and novel drug development.

Another groundbreaking trend is the rise of robotic surgeries, where AI-powered surgical robots assist human surgeons in performing complex procedures with unparalleled precision. These robotic systems, such as the da Vinci Surgical System, provide enhanced dexterity, real-time imaging, and minimal invasiveness, reducing complications and improving recovery times. AI-driven robotic surgeries are particularly effective in fields like orthopedics, neurosurgery, and minimally invasive procedures, where high precision is critical. As AI continues to evolve, robotic-assisted surgeries are expected to become even more autonomous, optimizing surgical outcomes.

AI is also driving real-time patient monitoring through wearable health devices that continuously track vital signs such as heart rate, blood oxygen levels, and glucose levels. These AI-powered wearables, like smartwatches and biosensors, provide predictive alerts for chronic conditions such as diabetes, hypertension, and cardiovascular diseases. By detecting abnormalities in real time, AI enables early medical intervention, reducing hospital admissions and improving patient

outcomes. AI-driven monitoring systems are also playing a crucial role in elderly care and remote patient management, allowing healthcare providers to offer personalized treatment plans without requiring frequent hospital visits.

Another crucial advancement in AI healthcare is Explainable AI (XAI), which focuses on increasing the transparency and interpretability of AI decision-making. One of the biggest challenges in AI adoption within healthcare is the "black box" nature of many AI algorithms—where the reasoning behind a decision is not easily understood by humans. XAI aims to make AI models more transparent, allowing healthcare professionals and patients to understand how and why AI-generated diagnoses or treatment recommendations are made. This increased interpretability fosters trust in AI-driven medical solutions and ensures accountability in clinical decision-making.

AI is also fostering global AI healthcare networks, enabling cross-border collaborations in medical research and data sharing. With AI-powered platforms, researchers and healthcare institutions worldwide can securely share medical datasets, clinical trial results, and treatment protocols. This global collaboration accelerates medical discoveries, enhances disease surveillance, and enables faster responses to pandemics and emerging health threats. AI-driven networks are particularly crucial for personalized medicine, epidemiology, and rare disease research, where global data pooling significantly improves accuracy and insights.

7. CONCLUSION

Artificial Intelligence (AI) has emerged as a game-changer in the healthcare industry, redefining medical diagnosis, treatment, and overall patient care. By leveraging machine learning, deep learning, and predictive analytics, AI has significantly improved diagnostic accuracy, minimized human errors, and enhanced healthcare efficiency. AI-driven diagnostic models now enable early disease detection, allowing for timely medical interventions that can reduce mortality rates and improve patient outcomes. With the growing adoption of AI in various aspects of healthcare, including medical imaging, telemedicine, robotic surgeries, and real-time patient monitoring, the industry is witnessing an unprecedented transformation in how diseases are detected, managed, and treated.

One of AI's most profound contributions is its ability to process and analyze vast amounts of medical data at an unprecedented speed and accuracy. AI-powered algorithms can identify subtle patterns in lab results, radiological images, and genetic data, leading to more precise and faster diagnoses. AI has already demonstrated remarkable success in detecting diseases such as cancer, cardiovascular conditions, neurological disorders, and infectious diseases, often outperforming traditional diagnostic methods. This ability to uncover hidden insights that might be overlooked by human practitioners has positioned AI as an indispensable tool in modern medicine.

Beyond diagnosis, AI is enhancing healthcare efficiency by automating labor-intensive tasks such as medical imaging analysis, lab result interpretation, and treatment planning. Robotic-assisted surgeries powered by AI provide greater precision and reduced complications, leading to faster recovery times for patients. Additionally, AI-driven telemedicine platforms and virtual assistants have expanded healthcare accessibility, providing round-the-clock medical support to patients, especially in remote and underserved regions. Wearable AI devices have further revolutionized healthcare by enabling real-time patient monitoring, allowing for proactive disease management and reducing hospital readmissions.

However, while AI presents tremendous benefits, its widespread adoption in healthcare is not without challenges. Concerns related to data privacy, security, bias in AI models, regulatory compliance, and integration with existing healthcare infrastructures must be carefully addressed. AI systems rely on extensive patient data, raising ethical concerns about confidentiality and potential misuse. Ensuring that AI algorithms remain fair, unbiased, and transparent is critical to maintaining trust among both healthcare professionals and patients. The advancement of Explainable AI (XAI) is essential in demystifying AI-driven decision-making, allowing medical practitioners to understand and validate AI-generated diagnoses. Additionally, regulatory frameworks must evolve to keep pace with AI advancements, ensuring that AI applications adhere to ethical guidelines and legal standards in patient care.

Looking ahead, AI is set to play an even greater role in medical research, drug discovery, and personalized medicine. AI-driven drug discovery has the potential to accelerate the development of new treatments, reducing the time and costs associated with bringing new medications to market. Global AI healthcare networks will enable cross-border collaboration, facilitating the sharing of medical knowledge and datasets, leading to faster and more effective disease diagnosis and treatment strategies. Furthermore, AI-powered mobile health (mHealth) applications will expand healthcare accessibility in remote regions, providing AI-assisted diagnostics and virtual consultations to populations with limited access to medical professionals.

In conclusion, AI has the potential to revolutionize healthcare, offering unparalleled improvements in diagnostic precision, operational efficiency, and patient care. While challenges such as ethical concerns, data security risks, and integration barriers persist, continuous advancements, regulatory support, and responsible AI implementation will help

address these issues. As AI technologies continue to evolve, their integration into healthcare systems will pave the way for a more proactive, personalized, and data-driven approach to medicine. If leveraged effectively, AI-driven healthcare can enhance global health equity, improve patient outcomes, and ultimately make quality healthcare more accessible and affordable for all.

8. CODE

Healthcare Diagnostic AI System

Python-Based Medical Assessment Tool

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Description:

This AI-based healthcare system provides initial medical assessment based on patient symptoms.

The system includes symptom analysis, severity checking, and medicine recommendations.

Features:

- Symptom-based diagnosis
- Severity assessment
- Medicine recommendations
- Patient history tracking

```
from datetime import datetime
class HealthcareAI:
def __init__(self):
# Dictionary of symptoms and associated possible conditions
self.symptoms_database = {
"bukhar": ["viral infection", "malaria", "typhoid"],
"sir dard": ["tension", "migraine", "high BP"],
"khasi": ["cold", "bronchitis", "covid"],
"pet dard": ["food poisoning", "gastritis", "appendicitis"],
"thakan": ["anemia", "vitamin deficiency", "thyroid"]
}
# Add medicine recommendations
self.medicine_database = {
"viral infection": ["Paracetamol", "Rest", "Plenty of fluids"],
"malaria": ["Consult doctor for antimalarial drugs", "Rest"],
"cold": ["Antihistamines", "Steam", "Vitamin C"],
"food poisoning": ["ORS", "Probiotics", "Light diet"],
"anemia": ["Iron supplements", "Vitamin B12", "Healthy diet"]
}
# Patient history storage
self.patient_history = {}
def check_symptoms(self, patient_symptoms):
"""
Patient ke symptoms check karke possible conditions suggest karta hai
"""
possible_conditions = []
for symptom in patient_symptoms:
if symptom.lower() in self.symptoms_database:
```

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(Int Peer Reviewed Journal)
Vol. 05, Issue 04, April 2025, pp : 3401-3409

e-ISSN : 2583-1062
Impact Factor : 7.001

```
possible_conditions.extend(self.symptoms_database[symptom.lower()])
return list(set(possible_conditions))  # Duplicate conditions hatane ke liye
def get_severity(self, symptoms_count):
"""
Symptoms ki severity check karta hai
"""
if symptoms_count <= 1:
return "Halka sa problem lag raha hai"
elif symptoms_count <= 3:
return "Moderate severity, doctor se consult karna chahiye"
else:
return "High severity! Turant doctor ke paas jaiye"
def recommend_medicines(self, conditions):
"""
Conditions ke hisab se medicines suggest karta hai
"""
recommendations = []
for condition in conditions:
if condition in self.medicine_database:
recommendations.extend(self.medicine_database[condition])
return list(set(recommendations))
def save_patient_history(self, patient_id, symptoms, conditions):
"""
Patient ka medical history save karta hai
"""
if patient_id not in self.patient_history:
self.patient_history[patient_id] = []
visit = {
'date': datetime.now(),
'symptoms': symptoms,
'conditions': conditions
}
self.patient_history[patient_id].append(visit)
# Example usage
def main():
ai_doc = HealthcareAI()
print("Healthcare AI System mein aapka swagat hai!")
patient_id = input("Apna patient ID enter karein: ")
print("Apne symptoms comma se separate karke enter karein:")
patient_input = input().strip()
symptoms = [s.strip() for s in patient_input.split(",")]
possible_diseases = ai_doc.check_symptoms(symptoms)
severity = ai_doc.get_severity(len(symptoms))
medicines = ai_doc.recommend_medicines(possible_diseases)
# Save patient history
ai_doc.save_patient_history(patient_id, symptoms, possible_diseases)
print("\nAnalysis:")
```

```
print(f"Severity: {severity}")
print("\nPossible conditions:")
for disease in possible_diseases:
print(f"- {disease}")
print("\nRecommended medicines/actions:")
for medicine in medicines:
print(f"- {medicine}")
print("\nNote: Ye sirf ek basic analysis hai. Sahi diagnosis ke liye doctor se zaroor mile.")
if __name__ == "__main__":
main()
```

Input:

Patient ID: P123

Symptoms: bukhar, sir dard

Output:

Severity: Moderate

Conditions: [List of conditions]

Recommended Actions: [List of recommendations]

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