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REVIEWER'S REPORT

Manuscript No.: IJAR-59715

Title: Artificial Intelligence in Modern Microbiology: Advances in Diagnostics, Resistance Prediction and Antimicrobial Discovery.

Recommendation:
Accept as it is .....
Accept after minor revision.....
Accept after major revision .....
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		Good		
Techn. Quality	Excellent			
Clarity	Excellent			
Significance	Excellent			

Reviewer's ID: Dr. Sumathi

Detailed Reviewer's Report

1. **Artificial intelligence (AI) is the ability of computer systems and software to perform tasks that normally require human intelligence, such as reasoning, learning, decision-making, perception, and understanding language.**
2. **Artificial intelligence (AI) is the capability of computational systems to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making.**
3. **Machine learning (ML) is a subset of artificial intelligence (AI) that uses statistical algorithms to learn patterns from data and make predictions or decisions without being explicitly programmed for every task.**
4. **Deep learning is a specialized subset of machine learning that uses artificial neural networks with multiple processing layers (typically four or more) to learn complex patterns and representations from vast amounts of data**

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5. **Antimicrobial resistance (AMR) happens when bacteria, viruses, fungi, and parasites change over time and no longer respond to medicines like antibiotics, antivirals, or antifungals. As a result, standard treatments fail, making infections harder or impossible to treat.**
6. **Antibiotic discovery spans a historical arc from early chemical dyes and accidental mold observations to the modern antimicrobial resistance crisis and innovative platforms targeting unculturable microbes.**
7. **Clinical microbiology is a subspecialty of laboratory medicine and pathology focused on isolating, identifying, and characterizing infectious microorganisms—including bacteria, viruses, fungi, and parasites—from clinical specimens to diagnose and manage infections.**
8. **Artificial intelligence (AI) is transforming modern microbiology by automating diagnostics, predicting antimicrobial resistance (AMR), accelerating antibiotic discovery, and enabling the generative design of novel microbial genomes and bacteriophages.**
9. **Artificial intelligence integration, portable and lab-on-a-chip technologies, and multi-omics molecular profiling are the primary drivers reshaping modern medical diagnostics from a reactive model into a proactive, personalized science.**
10. **Advances in diagnostics resistance prediction have transitioned from slower, growth-based phenotypic testing to rapid, genomic, and AI-driven predictive modeling. These breakthroughs allow clinicians to move away from broad-spectrum empirical treatments and immediately prescribe narrow-spectrum, targeted therapies, saving critical time in treating life-threatening infections**
11. **Artificial Intelligence (AI) and rapid molecular diagnostics have transformed the landscape of antimicrobial resistance (AMR), shifting the paradigm from slow, culture-based testing to real-time resistance prediction and accelerated drug discovery.**
12. **Historically, conventional phenotypic susceptibility testing has forced clinicians to rely on empirical, broad-spectrum therapies while waiting 36 to 72 hours for laboratory readouts. Today, generative algorithms, machine learning models, and high-throughput genomic frameworks are dramatically compressing**

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diagnostic windows and expanding the pipeline for novel therapeutics.

13. **Key words are good**
14. **Significant points are given meaningful.**
15. **But can be made rasult and discussion points with tables and graphs.**
16. **Summary points also ne included.**
17. **After those changes good to publish in your journal.**