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Subject: CC-309 Introduction to AI and ML

Unit1 : Case Study - Creating a New Health Care Market with AI

Outline:

In the last, five to ten years, AI becoming more advantageous for the healthcare industry and going to have a significant impact on this industry. Healthcare Industries are applying AI to make a better and faster diagnosis than humans. AI can help doctors with diagnosis and can inform when patients are worsening so that medical help can reach to the patient before hospitalization.

Techniques:

Various AI techniques play a critical role in reshaping the healthcare market:

- **Machine Learning (ML):** For analyzing patient data to predict diseases or treatment outcomes.
- **Natural Language Processing (NLP):** To process clinical notes and unstructured data for insights.
- **Computer Vision:** For interpreting medical images like X-rays, MRIs, and CT scans.
- **Robotic Process Automation (RPA):** For automating administrative tasks such as patient scheduling and billing.
- **Deep Learning:** For advanced applications like drug discovery and

genomics analysis.

- **Reinforcement Learning:** For optimizing treatment protocols and operational workflows.

Use of AI Techniques in Different Healthcare Areas:

- **AI-Powered Diagnostics:** AI algorithms can analyze patient data, such as medical imaging or genomic profiles, to detect diseases early. An AI-based radiology platform analyzes X-rays for early detection of lung cancer, reducing misdiagnosis rates by 30%. Faster and more accurate diagnoses help patients receive timely treatment.
- **Predictive Healthcare:** AI can analyze historical and real-time data to predict health risks. Wearables integrated with AI predict potential heart attacks based on user health patterns. Preventive measures can lower healthcare costs and save lives.
- **Telemedicine Platforms:** AI-enabled platforms can connect patients with healthcare professionals remotely, reducing geographic barriers. A chatbot pre-screens symptoms, triages cases, and refers patients to appropriate specialists. Increases access to care in rural areas and reduces strain on healthcare facilities.
- **Drug Discovery and Development:** AI accelerates drug development by identifying promising compounds and simulating their effects. An AI platform identifies a new treatment for rare diseases within months instead of years. Reduces costs and time-to-market for life-saving medications.
- **Operational Efficiency in Hospitals:** Streamlining Administrative Work and Automating tasks like patient scheduling, billing, and medical record management. Predicting patient inflow and optimizing staff and bed availability.
- **Mental Health Care:** Chatbots and virtual therapists provide cognitive behavioral therapy (CBT) and emotional support. AI analyzes speech patterns and social media activity to detect early signs

of depression or suicidal tendencies.

- **Surgical Assistance:** AI-powered robots like da Vinci Surgical System assist surgeons in performing minimally invasive surgeries with precision. AI analyzes imaging data to help surgeons plan complex procedures in advance.
- **Public Health Management:** AI monitors and analyzes data to predict disease outbreaks (e.g., flu trends or COVID-19 hotspots). AI helps governments and health organizations identify health risks and allocate resources efficiently.
- **Patient Monitoring and Wearables:** Devices like smartwatches use AI to track vitals (e.g., heart rate, oxygen levels) and detect irregularities. AI-enabled platforms help manage conditions such as diabetes or hypertension by tracking glucose levels and blood pressure.

Conclusion:

AI offers transformative opportunities in healthcare by increasing efficiency, reducing costs, and improving outcomes. By addressing challenges and leveraging advanced AI techniques, a sustainable and inclusive healthcare market can be created to meet diverse needs globally.