



# Use Case- Fairness



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# Use Case: Fairness in AI-powered Patient Diagnoses



In a bustling city hospital, the administration decides to implement an AI system to assist doctors in diagnosing patients in the emergency department. The hospital serves a diverse population with patients of varying backgrounds, ages, and medical histories. **The AI system is designed to analyze symptoms, medical history, lab results, and other data to provide potential diagnoses and treatment**

# Scenario Background



- The hospital aims to use AI to improve diagnostic accuracy, reduce waiting times, and enhance patient outcomes. However, they are acutely aware of the potential for biases in the system that could lead to disparities in healthcare access and treatment outcomes.

# Key Ethical Considerations



- Equity in Healthcare
- Avoiding Biases
- Transparency and Explainability

# Step 1: Developing the AI System



- The hospital forms a multidisciplinary team including data scientists, medical professionals, and ethicists to develop the AI algorithm.
- The team ensures that the AI is trained on a diverse dataset that represents the hospital's patient population, including various demographics and medical

# Step 2: Fairness Testing and Validation



- Before deployment, the AI system undergoes rigorous testing to detect and mitigate biases.
- Metrics such as demographic parity and equal opportunity are used to assess fairness in the system's diagnostic recommendations.

# Step 3: Ethical Review and Oversight



- An ethics committee is established to oversee the development and implementation of the AI system.
- The committee reviews the system's design, data sources, and potential impacts on patients to ensure ethical guidelines are followed.

# Step 4: Implementing the AI System



- In the emergency department, doctors use the AI system as a decision support tool when diagnosing patients.
- The AI provides potential diagnoses along with explanations, highlighting the key symptoms and factors leading to its conclusions.

# Step 5: Monitoring and Feedback Loop



- The hospital continuously monitors the AI system's performance and collects feedback from doctors and patients.
- Any instances of bias or discrepancies in diagnoses are promptly addressed and the system is adjusted accordingly.

# Step 6: Addressing Biases and Improving Fairness



- If biases are detected, the hospital takes steps to retrain the AI model using more diverse and representative data.
- Additionally, the hospital invests in ongoing education for healthcare staff on recognizing and addressing biases in medical decision-making.

# Step 7: Community Engagement



- The hospital engages with the community to explain the role of AI in patient diagnoses and the measures taken to ensure fairness.
- Community input is sought to understand patient perspectives and incorporate their feedback into the system's development and improvement.

# Scenario Question

## Scenario: Fairness in AI-Powered Loan Approval Systems

**Question:** Imagine a financial institution implementing an AI system to automate the process of approving loan applications. The AI is trained to analyze various factors such as credit history, income, employment status, and other relevant data to assess the risk of lending to an individual. However, ethical challenges emerge regarding the fairness of the system's decisions, particularly in relation to potential biases.

How can we design and implement an AI-powered loan approval system that ensures fairness, transparency, and accountability, while also addressing potential biases and promoting equal access to financial opportunities?