

Diabetes Prediction Using Machine Learning

This presentation explores the potential of machine learning to predict diabetes, discussing its applications, techniques, and future directions.

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Introduction to Diabetes

Causes

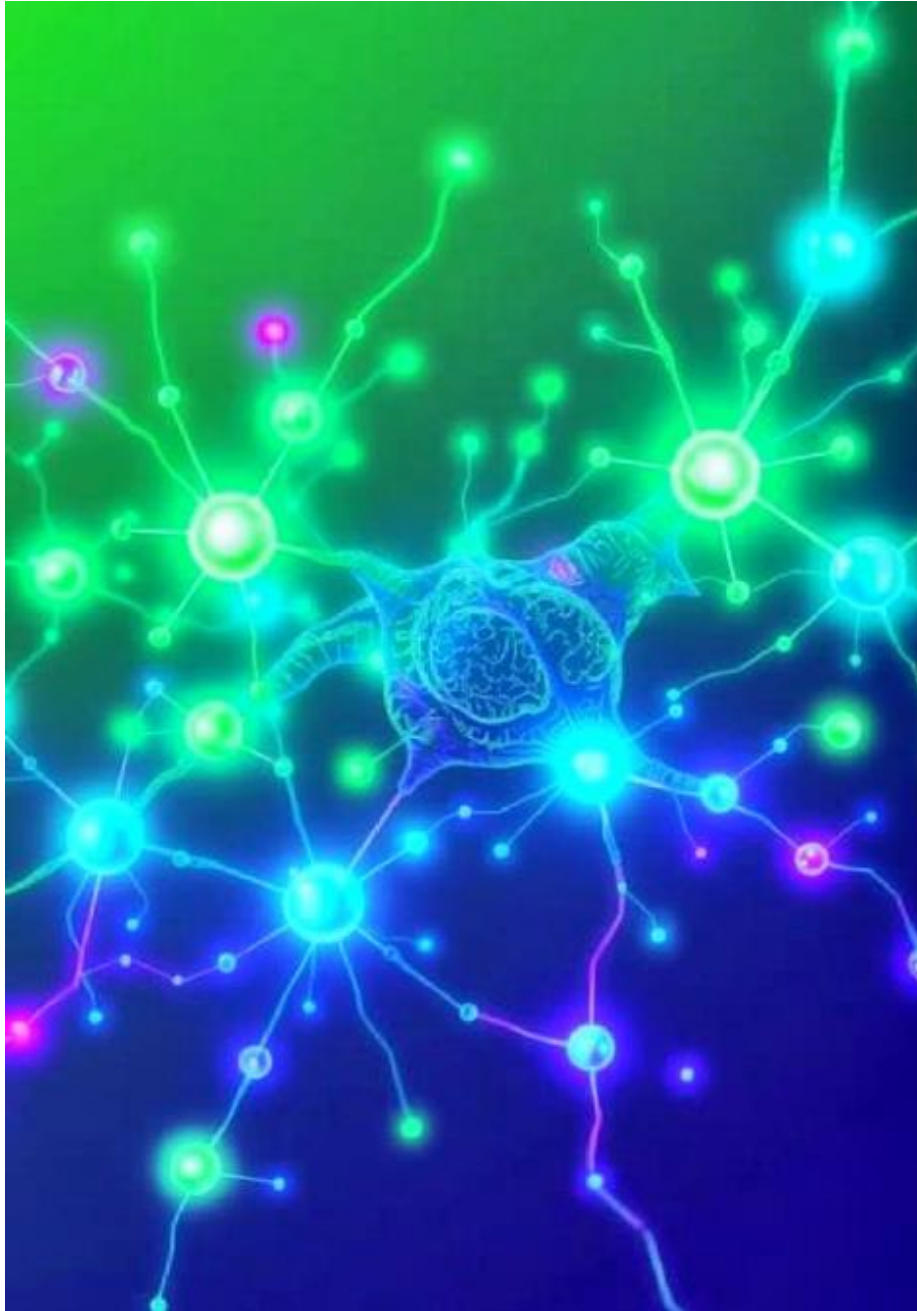
Diabetes occurs when the pancreas doesn't produce enough insulin, or the body can't use insulin properly.

This leads to high blood sugar levels, damaging organs over time.

Symptoms

Symptoms include increased thirst, frequent urination, and unexplained weight loss.

Other symptoms include fatigue, blurred vision, and slow-healing sores.



Machine Learning Techniques

Supervised Learning

Algorithms trained on labeled data to predict outcomes, like diabetes risk based on patient data.

Unsupervised Learning

Algorithms identify patterns in unlabeled data to group patients into clusters based on risk factors.

Reinforcement Learning

Algorithms learn through trial and error, optimizing decisions over time to improve diabetes management.



Data Preprocessing and Feature Engineering

1

Data Cleaning

Removing or correcting errors and inconsistencies in the data, ensuring accuracy.

2

Feature Selection

Identifying the most relevant features for diabetes prediction, improving model performance.

3

Feature Transformation

Converting features into a format suitable for the machine learning algorithm, enhancing model accuracy.



Model Selection and Evaluation Metrics



Accuracy

The percentage of correctly predicted outcomes, a commonly used metric.



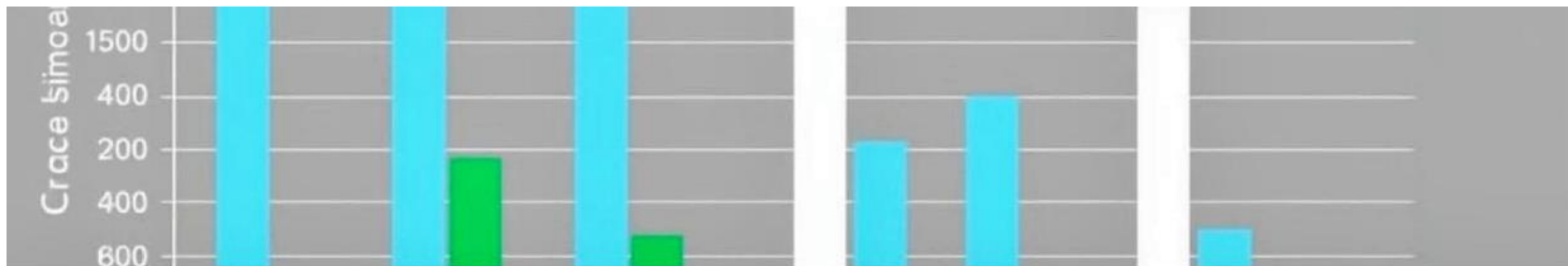
Precision

The proportion of true positive predictions among all positive predictions.



Recall

The proportion of correctly predicted positive outcomes among all actual positive outcomes.



Comparative Analysis of Models

Logistic Regression

A simple linear model, often used as a baseline for comparison.

1

Random Forest

An ensemble method that combines multiple decision trees to improve accuracy and robustness.

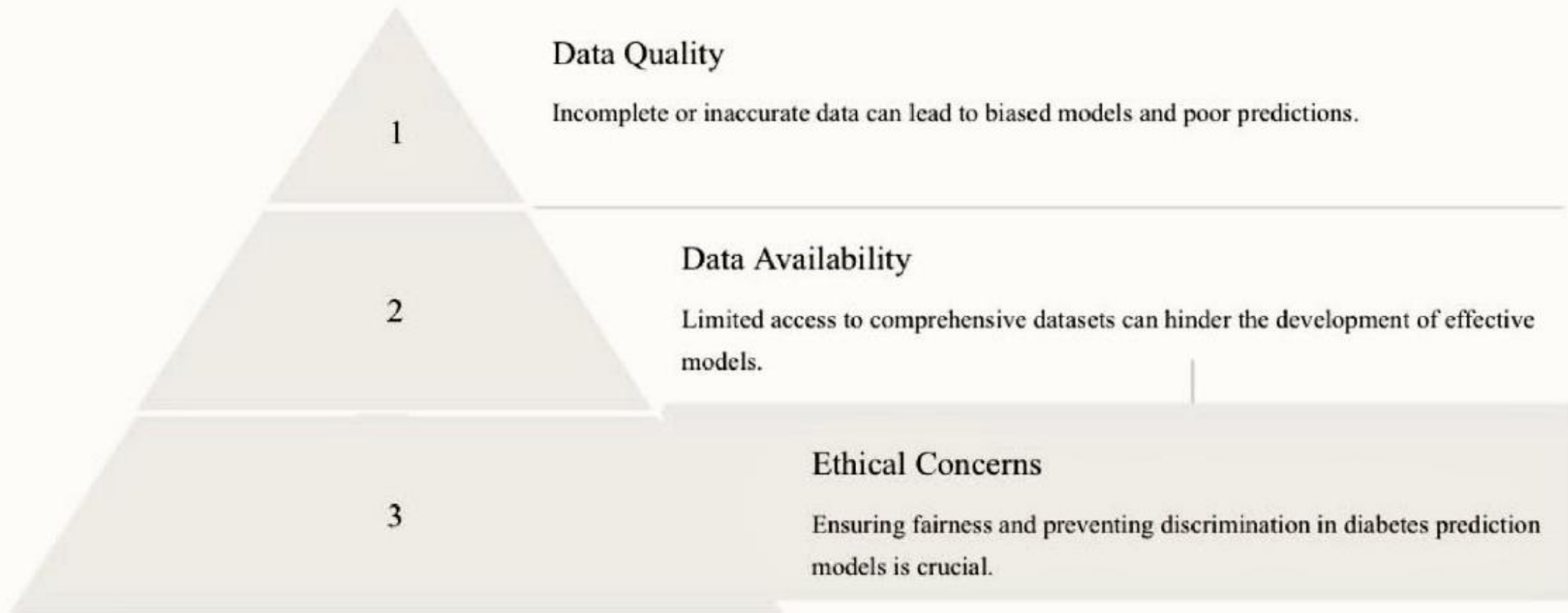
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Support Vector Machines

A powerful algorithm that finds the optimal hyperplane to separate data points.

2

Challenges and Limitations



Conclusion and Future Directions

Machine learning offers promising potential for predicting diabetes risk and improving patient outcomes. Further research is needed to address the challenges and limitations, ultimately leading to more accurate and ethical predictions.

