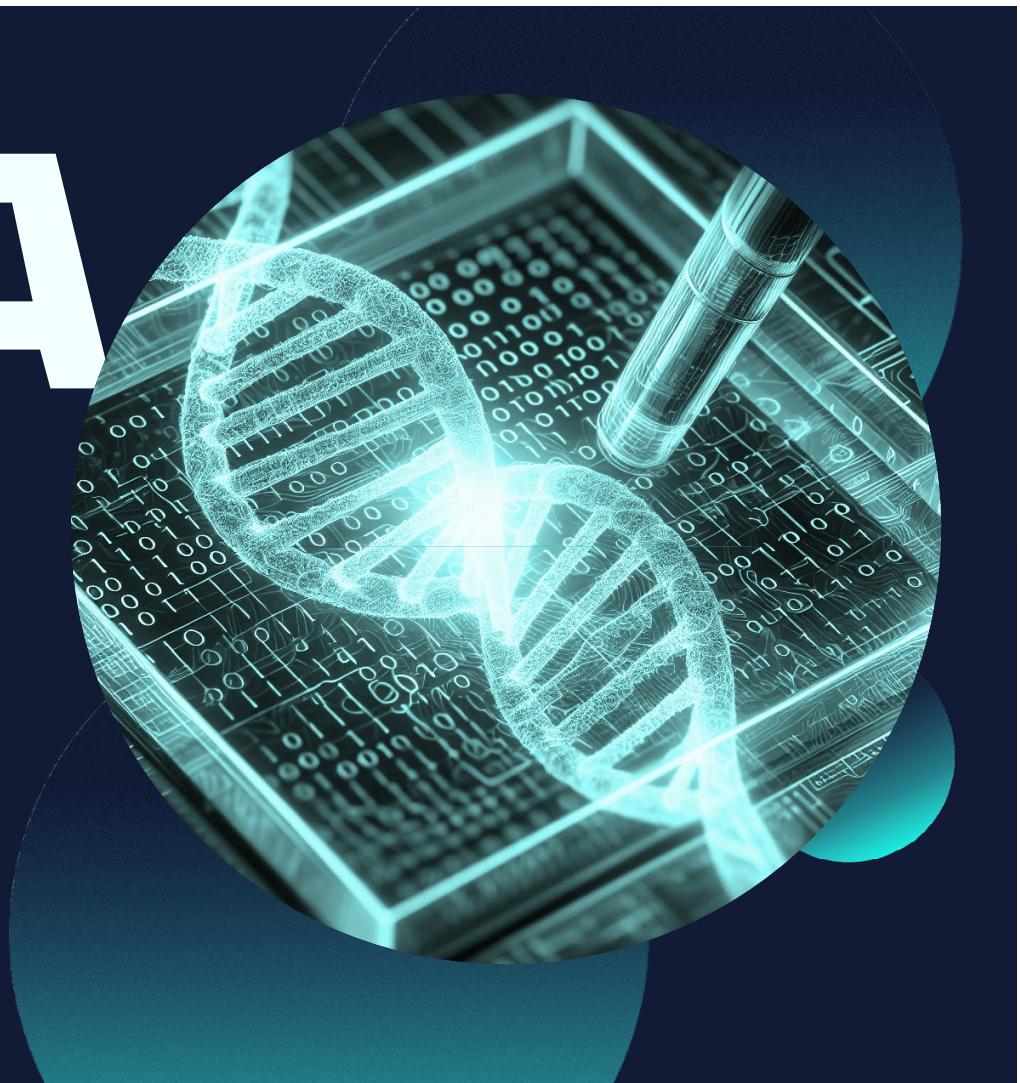


HUDA

Hybrid Underwriting Approach with DNA Analysis

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Our Approach



Scope



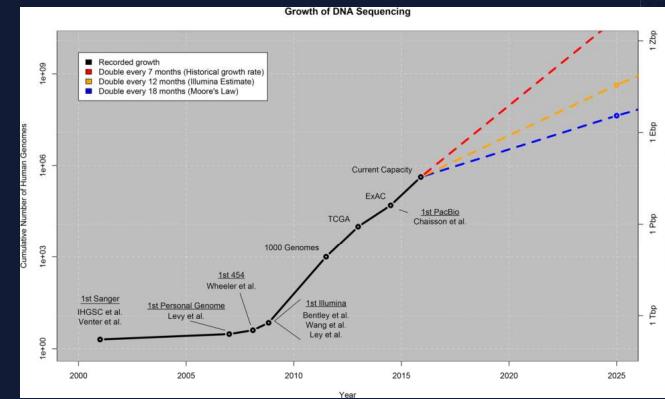
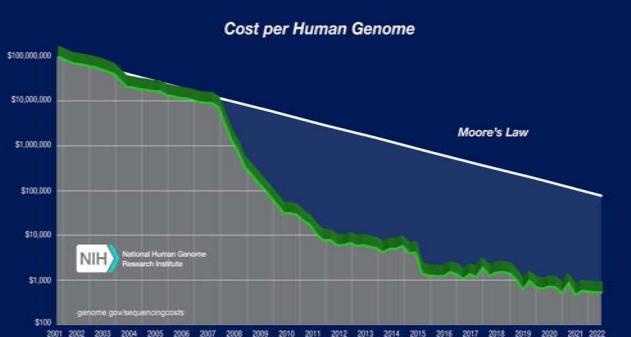
Solution



Benefits

- The scope of our approach encompasses insurance underwriting, where we assess risk and set premiums for policyholders.
- We specifically focus on incorporating genetic information (DNA analysis) alongside traditional features.
- Our hybrid underwriting approach, enriched with DNA analysis, integrates three powerful machine learning techniques.
- Supervised learning predicts claim likelihood by considering traditional features and genetic risk factors.
- Unsupervised learning segments customers based on shared characteristics, including genetic predispositions.
- Reinforcement learning dynamically adjusts premiums using real-time data, incorporating genetic insights.
- Underwriters benefit from personalized policies, adaptability, and fairness in pricing. This holistic approach ensures accuracy, agility, and informed decision-making, shaping the future of insurance underwriting .
- We combine supervised, unsupervised, and reinforcement learning for insurance underwriting. It predicts claim likelihood, segments customers, and dynamically adjusts premiums. Genetic data enhances risk assessment, ensures fair pricing, and adapts to changing factors .

Why gathering genome sequencing data is feasible?



- Decreasing cost of genome sequencing technology
- Increasing accessibility and availability of genome sequencing services
- Growing interest and demand from individuals for personalized health insights
- Advancements in data analysis and interpretation techniques
- Contribution to understanding of genetic factors in health and disease

<https://www.genome.gov/about-genomics/fact-sheets/Sequencing-Human-Genome-cost>

Responsible Data Acquisition for Genetic Insights

Data Collection and Preprocessing

- Gather historical data on insurance claims, genome sequences, customer behavior, and risk factors.
- Clean and preprocess data to remove noise and inconsistencies.

Legal and Ethical Considerations

- Prevent discrimination based on genetic information.
- Handle genetic data responsibly.
- Respect individual rights over genetic data.

Customer Data Collection Best Practices

- Obtain explicit consent before collecting any data, including DNA samples.
- Communicate purpose, risks, and collect only necessary data.



DNA Data Collection

- Voluntary participation (e.g., saliva swabs).
- Informed consent: Explain purpose and implications.
- Ensure secure storage and processing.

GDPR Articles Application

- Consent (Article 6): Obtain explicit consent for genetic data collection.
- Legitimate interests (Article 6): Balance risk assessment with privacy rights.
- Special categories of data (Article 9): Process genetic data transparently.
- Data minimization (Article 5): Collect relevant genetic data only.
- Transparency (Article 12): Inform customers about genetic data use.
- Data subject rights (Articles 15-22): Respect individual rights over genetic data.

Supervised



Method

- Apply clustering algorithms (e.g., k-means, hierarchical clustering) to unlabeled data, incorporating genetic information.
- Features include customer behavior, preferences, and genetic risk profiles.
- Customer segments (e.g., low-risk, high-risk, young drivers), considering genetic factors.



Usage

- Review model predictions.
- Understand customer segments, including genetic risk profiles.
- Tailor policies and premiums for each genetic risk group.
- Make informed decisions about coverage and premiums.

Unsupervised



Method

- Use a fair and interpretable clustering algorithm (e.g., k-means, hierarchical clustering).
- Balance the impact of genetic data with other non-genetic features.
- Evaluate fairness metrics to minimize disparities across genetic risk groups.
- The clustering algorithm groups customers into segments based on shared characteristics, including genetic predispositions. Each segment represents a distinct risk profile.



Usage

- Assess genetic risk factors to determine policy eligibility and premiums.
- Identify high-risk segments early and provide targeted interventions.
- Continuously adapt policies based on changing genetic information. Ensure fair treatment and avoid discrimination.
- Transparently communicate the use of genetic insights.

Reinforced



Method

- Train reinforcement learning agents to interact with customer behavior, market changes, and genetic data.
- Rewards:
Prioritize customer satisfaction and profitability.
- Actions:
Adjust premiums dynamically based on both traditional factors (e.g., driving behavior) and genetic insights (e.g., health predispositions).



Usage

- Monitor Adjustments: Review pricing changes made by the system.
- Ensure Fairness: Evaluate pricing across risk segments.
- Transparent Communication: Explain adjustments to policyholders.

Benefits of Hybrid XAI Model

Transparency in pricing



An XAI model for premium calculation provides transparent explanations of how premiums are determined, thus increasing customer satisfaction.

Justification of Premium increases



The XAI model can provide transparent explanations for premium increases, including changes in risk factors, market conditions, or regulatory requirements.

Fair treatment



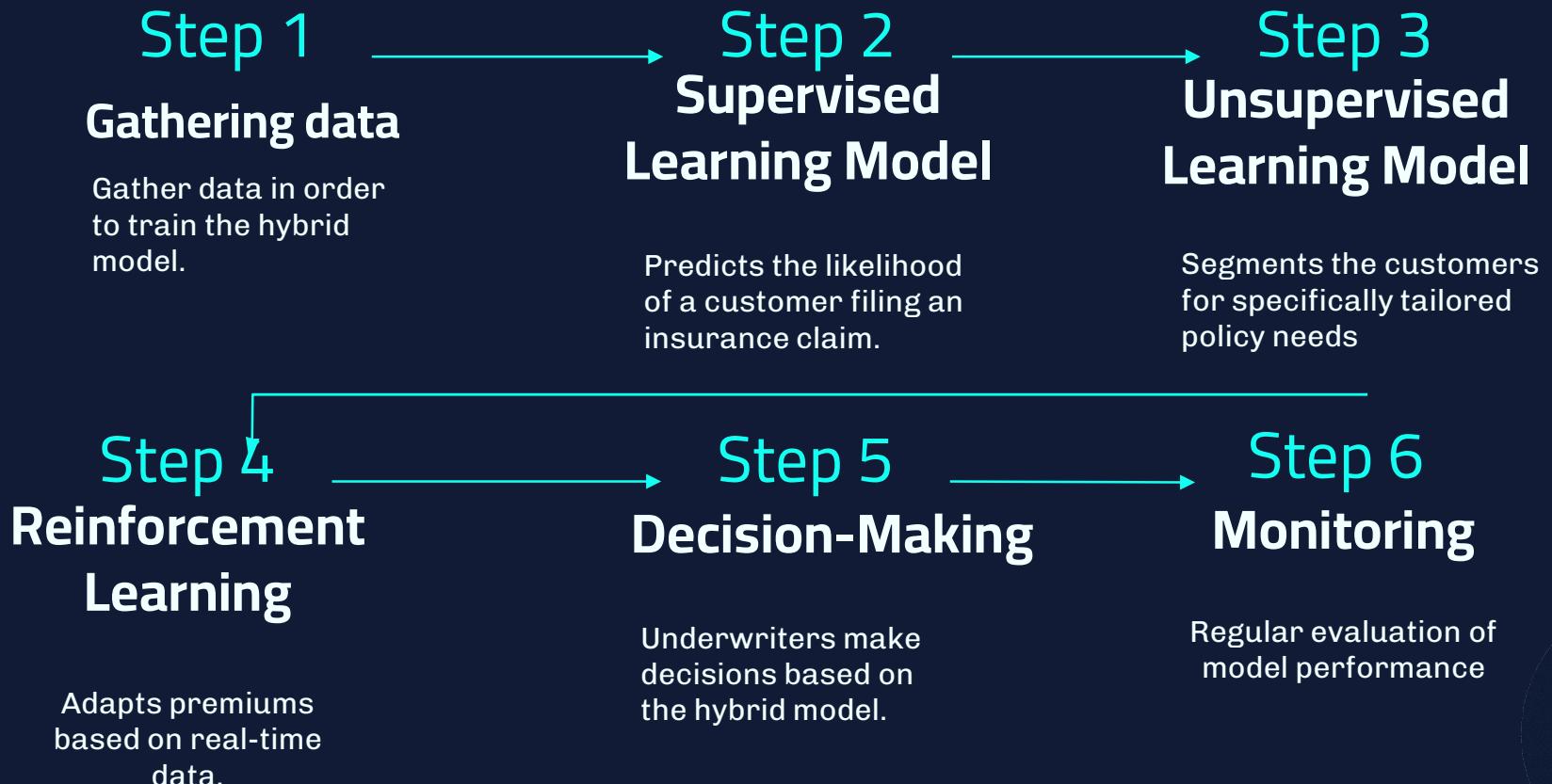
By identifying and addressing systemic biases, the model promotes equal treatment and fairness across all customers, enhancing trust in the insurance company's practices.

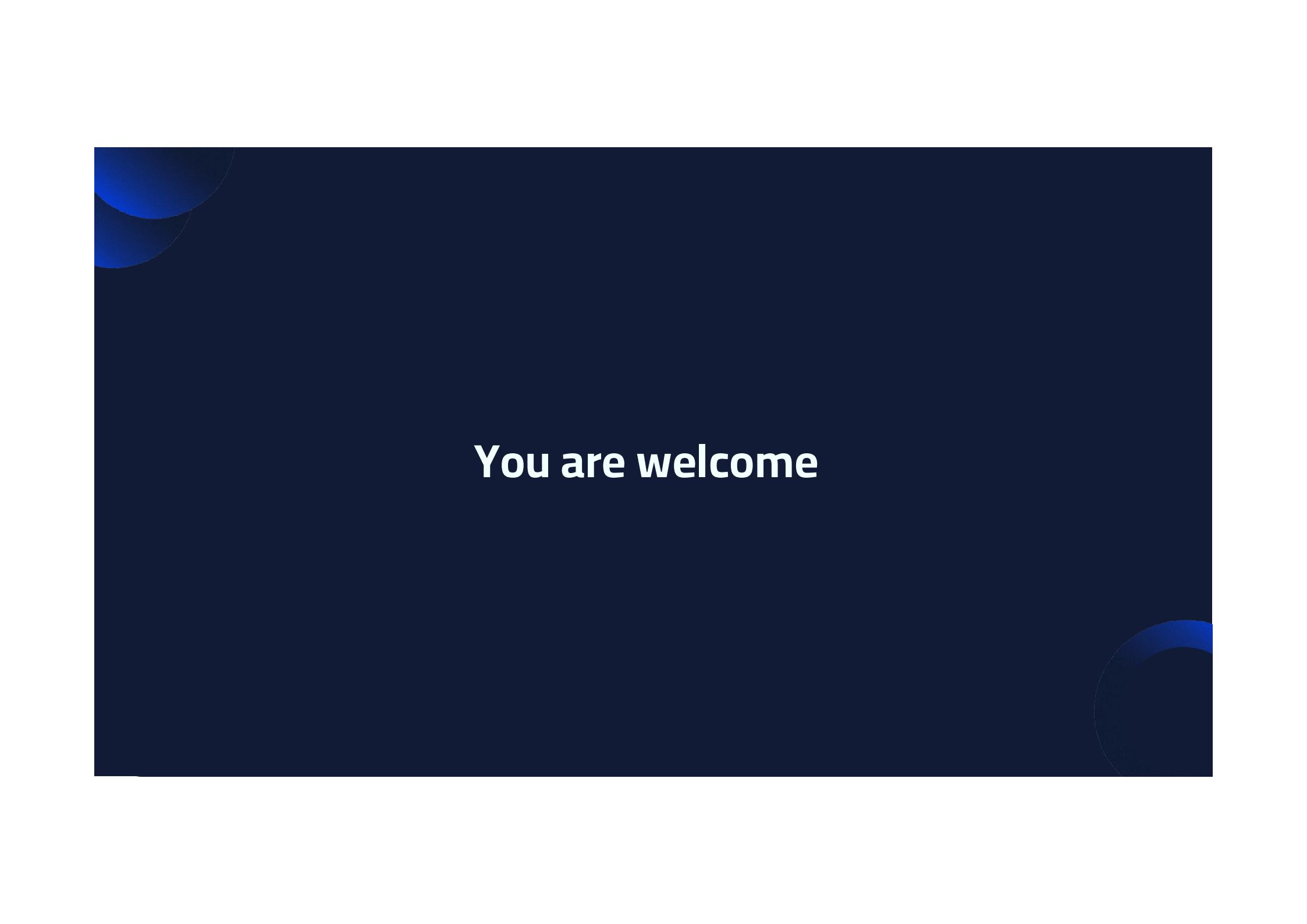
Personalized Pricing



By analyzing individual customer data, including demographic information, past claims history, and other relevant factors, the XAI model can tailor premiums to each customer's specific risk profile.

Step-by-step progression





You are welcome