



SOLAS AI

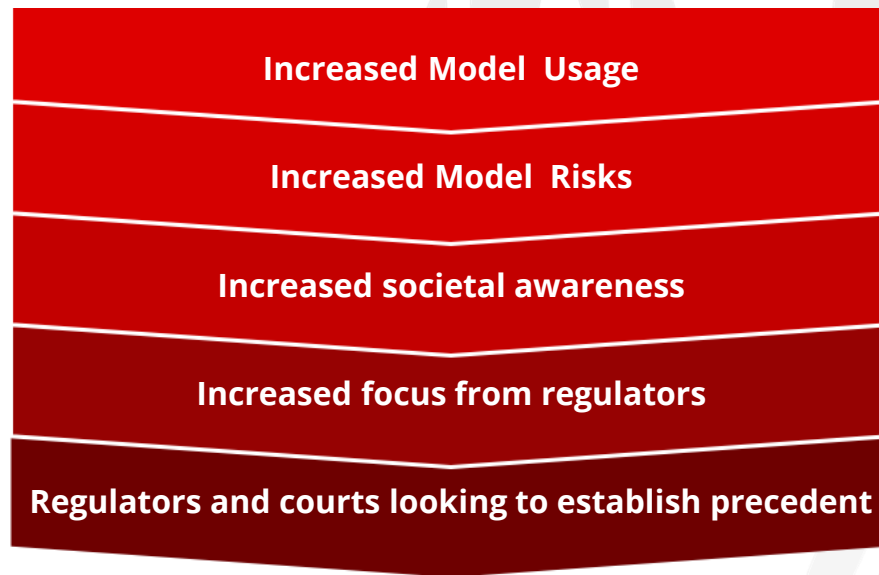
Disparate Impact Mitigation and Proxy
Detection Software

Why does your business need a robust model fairness pipeline?

Multiple forces are converging.

Enterprises must gain deep insight into their predictive models.

- ✓ Test for disparity
- ✓ Identify opportunities to reduce disparity
- ✓ Provide clarity on trade-off decisions between business value and reducing disparities



Powerful Social & Industry Trends Requiring Automated and Intelligent Analytics Regulatory Governance

CHRIS COONS

Meet Chris

Services

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Sen. Coons introduces legislation to ensure consumers are treated fairly by algorithms

The Algorithmic Fairness Act would direct the Federal Trade Commission to investigate algorithms that make decisions about important life opportunities

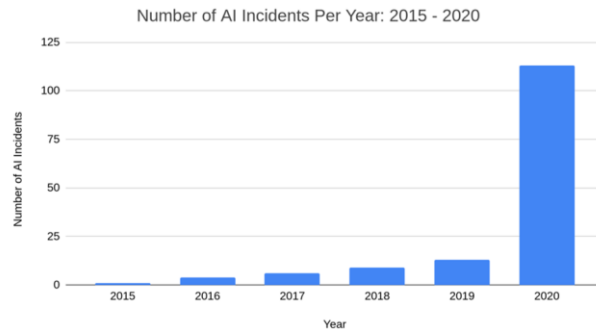
DECEMBER 17, 2020

Through 2025, 80% of organizations seeking to scale digital business will fail because they do not take a modern approach to data and analytics governance.

Souce: Gartner, 2021.

<https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/>
<https://www.coons.senate.gov/news/press-releases/consumers>
<https://www.bnh.ai/>
https://blogs.gartner.com/andrew_white/2021/01/12/our-top-data-and-analytics-predicts-for-2021/

AI Incidents Per Year



This information is based on a qualitative assessment of 146 publicly reported incidents between 2015 and 2020.

B N H
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THE WHITE HOUSE



Administration Priorities COVID-19 Briefing Room Español

BRIEFING ROOM

Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

JANUARY 20, 2021 • PRESIDENTIAL ACTIONS

What is **SolasAI**?



A software application designed to easily guide you through our unique process of detecting disparity in the models you build



Subsequently identify alternative models that are lower in disparity, while maintaining the original model's quality



Our self-service product allows modeler stakeholders to review, analyze, and make decisions related to fair lending in an efficient and transparent way



SOLASAI

Created by industry-leading consultants and data scientists

45 years in
Employment
Discrimination
Analytics

25 years in
Fair Lending
Analytics

Consultants to
over 50% of the
Fortune 50

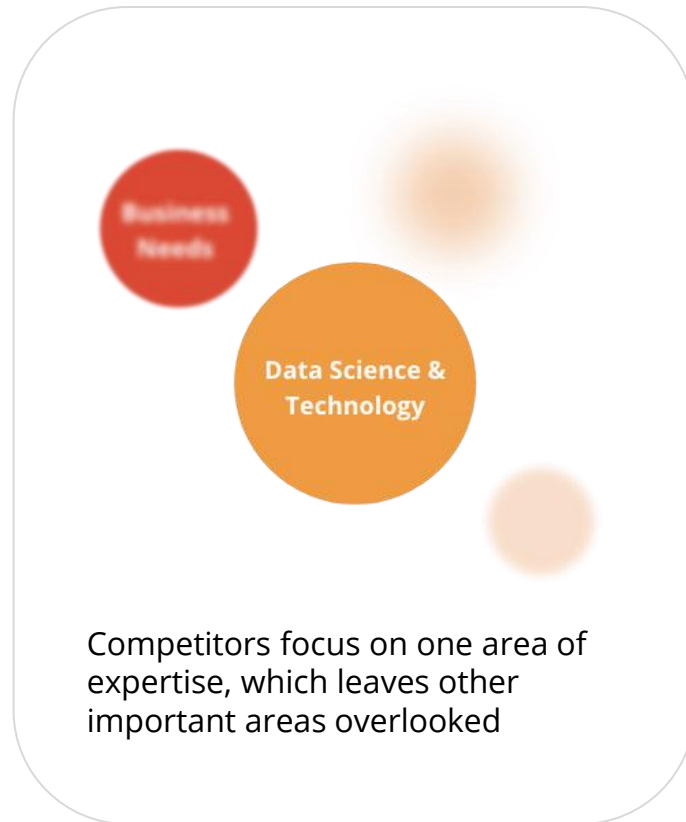
Virtually **every major**
lending institution in the
U.S use our framework for
fair lending

Provide expert
consulting to numerous
Federal, State, and Local
Regulators

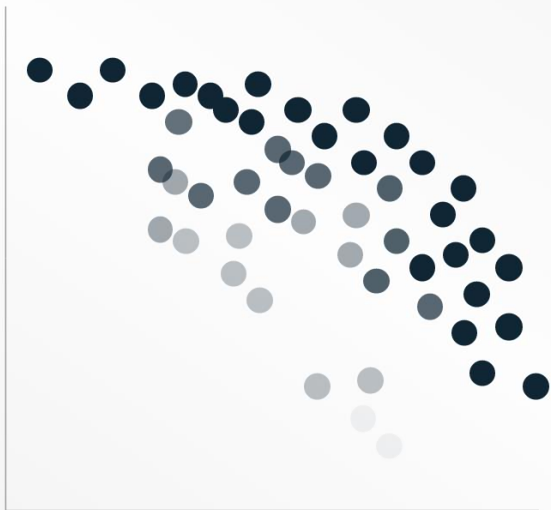
Why **SolasAI** Is Different

SolasAI goes beyond Data Science

We approach the problem from multiple sides, which makes us a one-stop shop for fairer model reconstruction.



Understand and Resolve Disparity while Preserving Predictive Value of Your Model



Detects and quantifies
algorithmic disparities



Illuminate drivers of
disparities



Clarify drivers of
predictive value

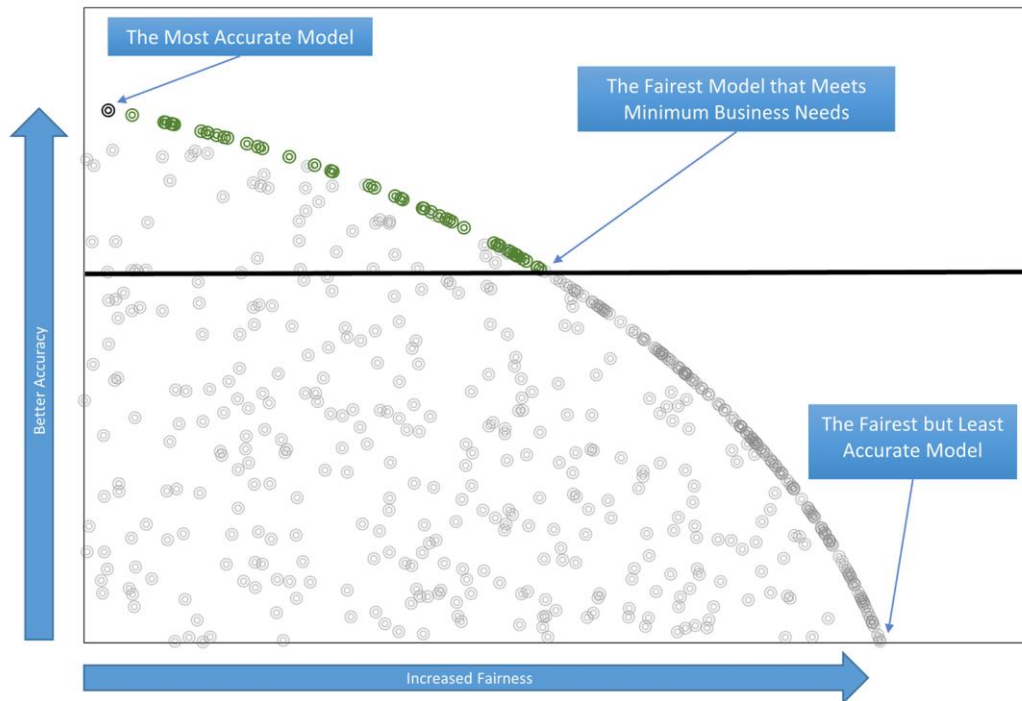


Auto-generate
alternatives with less
disparity

The **SolasAI** Software

Providing the best of both worlds: “The Pareto Frontier”

Finding Fair and High-Quality Models



The best improvement in Disparate Impact for the minimum drop in accuracy

Looking for *fair* and *predictive* models is a “Multi-Dimensional Optimization Problem”

- are high quality, less discriminatory models along the Pareto Frontier

How the **SolasAI** Platform Works

MODELER

COMPLIANCE / LEGAL

CHIEF DATA OFFICER

STEP

0

You are the best at building models for your company
- We don't ask you to change



STEP

1

We take testing for disparity and alternatives off your plate so you can focus on generating good models for your company



STEP

2

We provide you additional insight to make your model better



STEP

3

We preserve and expand the great work you have done



STEP

4

We provide you the information you need to choose the best viable alternative for you business

How the **SolasAI** Platform Works

MODELER

COMPLIANCE / LEGAL

CHIEF DATA OFFICER

STEP

0

You don't have to
get your modelers
to change



STEP

1

We test using
accepted standards
that will give you
the greatest
protection possible



STEP

2

We openly clarify
what is happening
in the models so
you understand it



STEP

3

We generate
justifiable
alternatives that
have a minor
impact on
predictive value



STEP

4

We provide you the
information you
need to choose the
best alternative for
your business and
justify it to
regulators

How the **SolasAI** Platform Works

MODELER

COMPLIANCE / LEGAL

CHIEF DATA OFFICER

STEP

0

We aren't trying to
replace your
modelers

We just want to
make them more
efficient



STEP

1

We continually
update our testing
module based on
the latest guidance,
research and
accepted standards



STEP

2

We illuminate
what is driving
value and
disparities in your
models



STEP

3

We generate viable
alternatives that
ensure overall
model quality



STEP

4

We provide your
subject matter
experts the best
alternatives and
information to
grow and protect
your business

You Use Your Tools and Your Expertise to Create the Best Predictive Model

SolasAI – A highly flexible toolkit

1. Easily set model performance and fairness compliance standards
2. Can support virtually any supervised learning algorithm
3. Built in Python, but running with models built using other languages often requires little additional effort

SolasAI Tests for Disparities for You

1. Reports include standard measures - not metrics that do not have regulatory acceptance
2. Disparate impact (DI) measures that you will recognize -- including the Adverse Impact Ratio (AIR), Standardized Mean Difference (SMD), and Marginal Effects
3. Proxy analyses are based on traditional measures of statistical significance - but extended to machine learning

Use Explainable AI to Determine Drivers of Disparity and Model Quality



SolasAI measures the predictive importance of a feature as well as its impact on discrimination

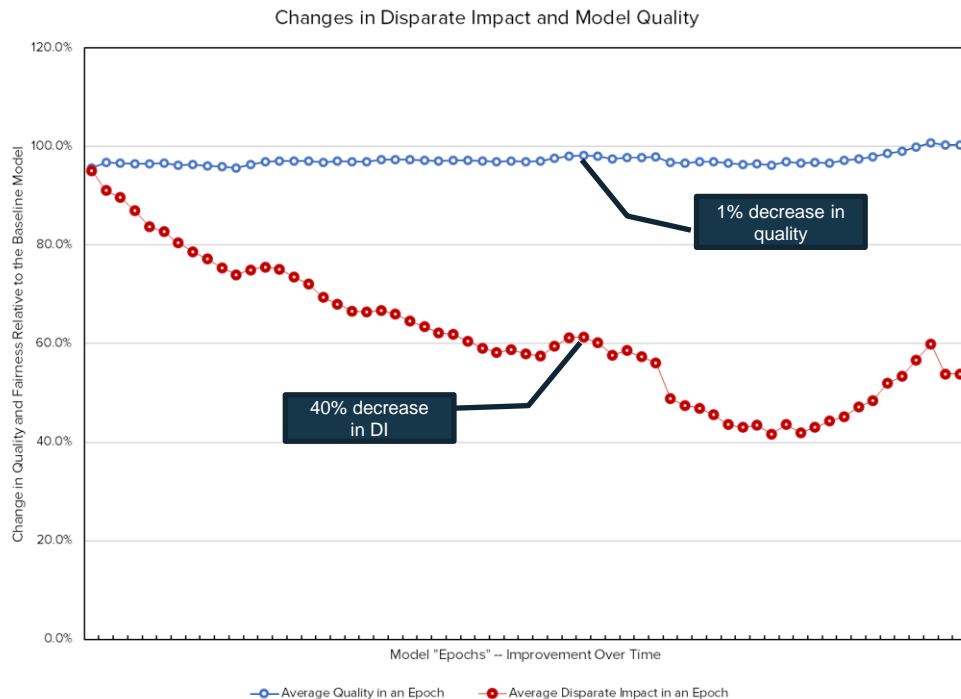
A feature's importance and fairness then informs the algorithm's search for alternative models

In SolasAI, Explainable AI:

1. Provides a guide for the algorithm to efficiently find the best possible models
2. Acts as a reporting tool for modelers and compliance

Searches for High Quality, Low Disparate Impact Models

SolasAI succeeds in finding high-quality and fairer results *quickly*



Optimized search allows SolasAI to quickly find the best models

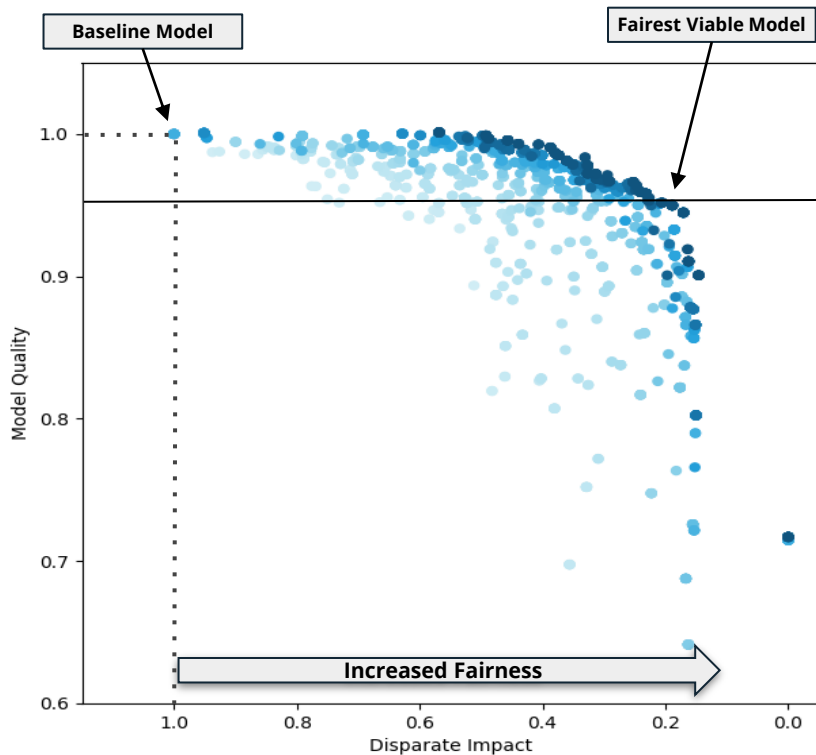
Smart optimizations means that:

- Model quality improves over time
- Disparate impact decreases quickly and substantially

“Model Epochs” are a set number of models run simultaneously

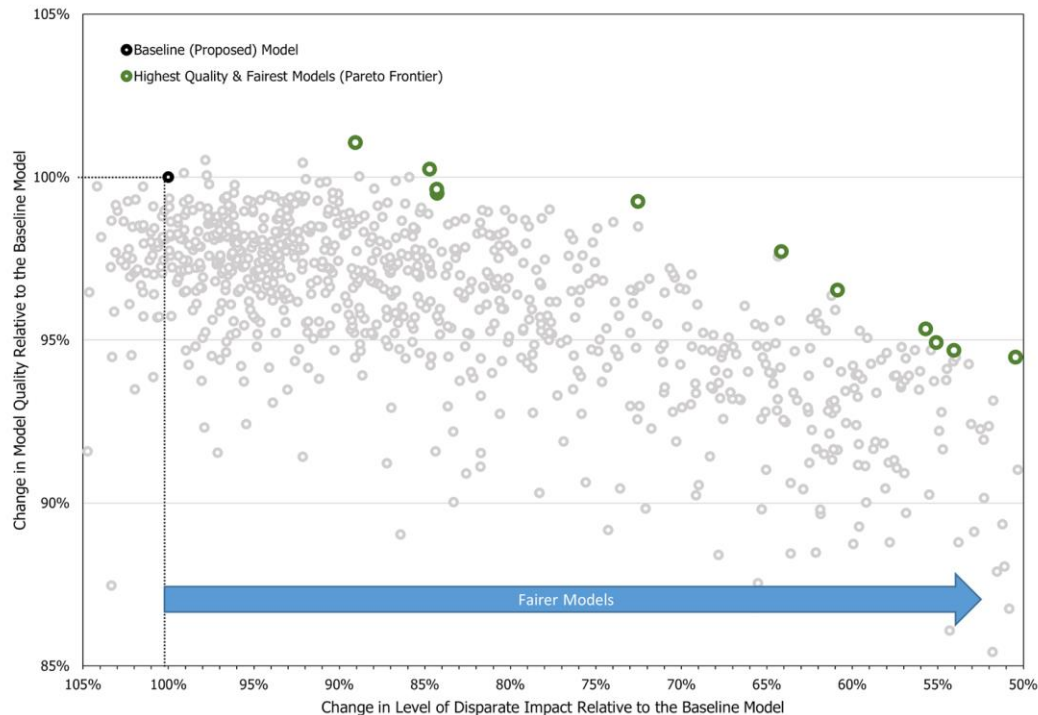
Each epoch teaches the algorithm to learn fairer and higher quality models

SolasAI searches for high quality, low disparate impact models



You Select the Final Model Based on Your Experience

SolasAI presents fairer alternative models for your experienced team to choose



SolasAI Results for an XGBoost Credit Model

SolasAI provides the user with a set of fairer models to analyze

The decision on which specific Alternative model(s) to use is a decision that is made by your experts

SolasAI Software Modules

Module	Definition
Disparate Impact and Bias Testing	<p>Calculate standard measures of disparate impact and differential validity for a variety of models or decision process outputs, along with measures of practical and statistical significance.</p> <p>Allows for the use of custom decision functions and custom DI metrics.</p>
Explainable AI: Find the sources of <u>disparities</u> and <u>quality</u>	<p>Cutting-edge explainable AI techniques to identify which features (or collections of features) are most contributing to differences in group outcomes.</p> <p>Extends standard compliance testing (eg, analysis based on correlations) to the ML setting.</p>
Optimized Alternative Model Search	<p>High-performance, dynamic, and Bayesian parallelized search of a universe of alternative models.</p> <p>Returns alternatives that have less disparity than the baseline model while maintaining accuracy.</p> <p>Identifies localized disparate treatment risk and features that serve as 'proxies' for demographic groups.</p>
Proxy Detection & Mitigation: Statistical significance for ML models	<p>Extends the current standard for testing the existence of proxy variables into the AI/ML realm. Based on the latest research in XAI and inference in the ML setting.</p> <p>Novel method for creating fair and accurate alternatives.</p> <p>Explores "black-box" models and surgically removes the causes of disparate impact or disparate treatment.</p>



For More Information:

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