

PURPOSE PROCESS MONITORING FRAMEWORK



A Comprehensive New Framework for
Auditing Algorithmic Systems in Housing
Opportunities

Presentation by:
Dr. Michael Akinwumi & Snigdha Sharma
National Fair Housing Alliance

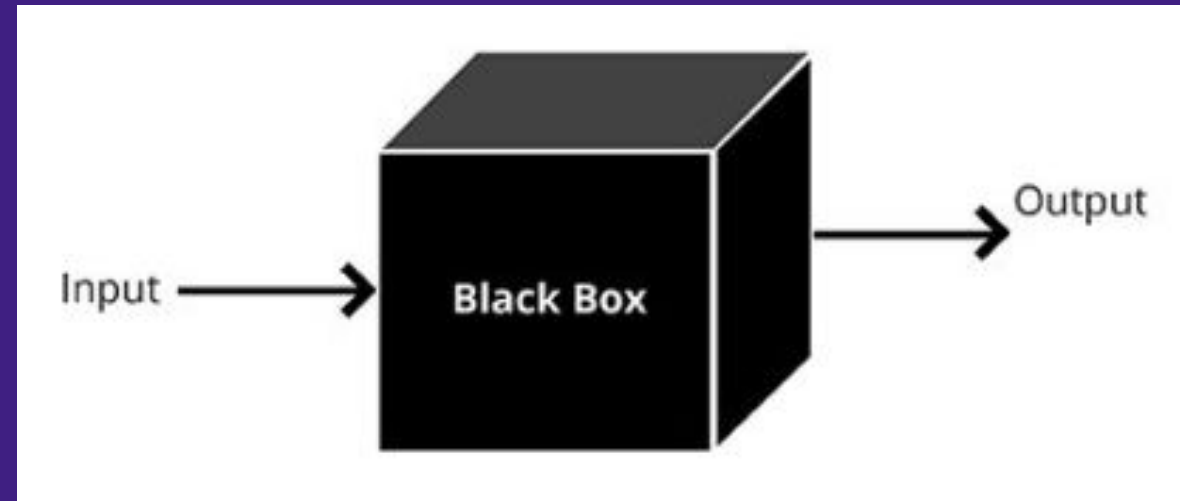
PPM Framework:

AGENDA

Purpose
Process
Monitoring
Discussion

PURPOSE: What job does PPM do?

- Examines every stage of algorithm solution development
- A trust tool regulators can use to gather information that could be used to decide how fair, transparent and explainable an algorithmic system is.
- Helps policymakers see what aspects of algorithmic systems need mitigation and can lead to algorithmic risks to consumers
- Helps policymakers hold those developing algorithms accountable for any decisions they made while building the system



Quora.com, 2022

Business Problem -

Would this person meet their rent obligation or not?

Input

application information, employment, bank statements etc. of previous or current tenants

Black box

a classification algorithm like Random Forest

Output

tenant score that rates an applicant and is used to decide if an individual is given a lease or not



Business Understanding -

- The Purpose section asks why the model is being built and what are the business objectives.
- Auditors are guided to seek information to make informed decisions about risks the business problem may pose to consumers, institutions, and society at large.
- Does the system pose too great a harm that it should not be built or put into production?
- What exactly is the business problem being solved?



Francesco Pochetti

@Fra_Pochetti

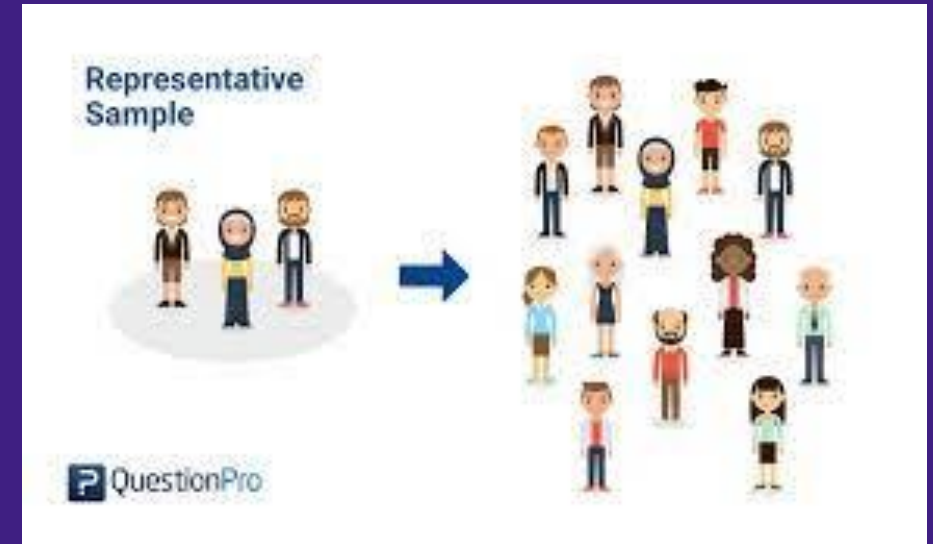
All ML projects which turned into a disaster in my career have a single common point:



I didn't understand the business context first, got over-excited about the tech, and jumped into coding too early.

Data Understanding -

- Is there data to represent the business problem?
- Were any techniques used to mitigate risks associated with data paucity or data quality?
- Is there proxy testing for discriminatory variables?
- What metrics are being used to test model accuracy and fairness?



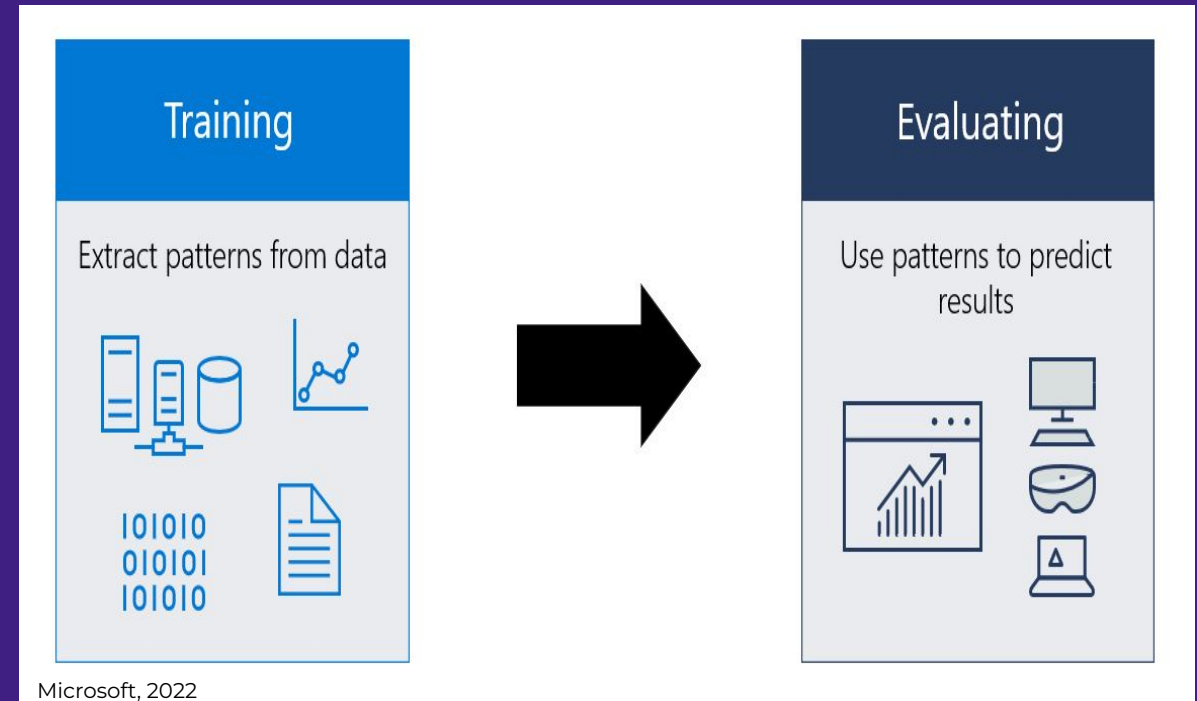
- A diverse and educated team can mitigate data issues that can lead to unfavorable outcomes for consumers
- Conscious of the history behind the data that fuel the algorithms and then can take that into consideration to account for bias in the data



- A developer needs to provide evidence justifying why model features are relevant to the business problem
- Developer needs to document how representative their data is across different underrepresented groups
- Model Developers should report any transformation performed on the raw data



- Developer needs to report on how they selected a particular model (data + algorithm + code := model).
- If a model is optimized for attributes like fairness, privacy etc., they also need to document why they selected a particular technique.
- Developers need to provide evidence that the data used to evaluate the model is similar to the data used to build the model.
- Developers should document any subjective decision they make while building the model



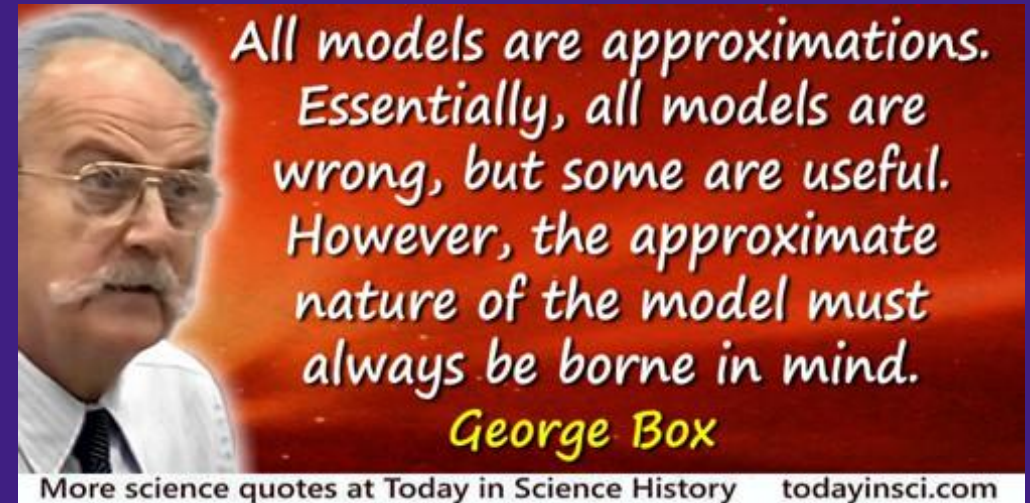
Outcome Assessment

- Model developers should demonstrate they have given enough consideration to how their model evaluation results would hold for future data.
- Developers need to provide reason codes (i.e., explanations) for sample predictions on evaluation data.



Model Use and Limitations

- Developer needs to be transparent about blind spots in their model. Every model has a limitation.
- What business problem can the model be applied to?



“All models are wrong, but some are useful.”

- Document what metrics developers plan to use for monitoring
 - The usefulness of the model and
 - Potential harms it may cause to consumers while in production
- Integrity of the model should be protected, and consumer needs to be protected in case of a hack.



PURPOSE PROCESS MONITORING FRAMEWORK



Conclusio

Discussion and Feedback