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# Week 3

## Using ML Responsibly and Ethically

### Google's AI Principles

* AI should be :
    1) Socially beneficial.
    2) Avoid creating or rainforcing unfair bias
    3) Built and tested for safety.
    4) Accountable to people.
    5) Incorporate privacy design principles.
    6) Uphold high standard of scientific excellence
    7) Be made available for uses that accord with these priciples.

* AI shouldn't be
    1) Likely to cause ovarall harm.
    2) Principle purpose to direct injury.
    3) Surveillance violating internationally accepted norms.
    4) Purpose contravenes international law and human rights.

### Avoid creating or rainforcing unfair bias

* We have to avoid the type of biases that result in unjust impacts on people, particularly those related to sensitive characteristics such as race, ethnicity, gender, nationality, income, sexual orientation, ability and political or religious belief.

## Common types of human bias

* Bias exist everywhere in the world. These bias often related to properties like gender, race and sexual orientation.

* There are two common forms of biases that stem from the real-world.
    1) Reporting bias
    2) Selection bias.

* Reporting bias :- Refers to people's tendency to under report all of the available information, especially when if pertains to themselves

    Ex :- In a wellness survey, if someone asked, how often do you exercise in a month?
    Response to above question may not disclose the information or tell you the truth.

* Selection bias :- Refers to the dataset that naturally enter our sample pool or the dataset we choose for model training.

    Ex :- In the USA presidential elections, depending on where we set up voting stations and who shows up for the voting polls, the collected data may not be fully representative of the entire population.

Q1) ... learning to predict fraudulent money transactions. Train the model using historical data

I) what is an example of reporting bias?
If customers use cash rather than cards at stores, all stores transactions might be flag as fraudant

II) What is an example of selection bias?
Most shoppers will visit large department stores. shoppers at smaller or newer stores with fewer transactions might have purchases declined.

* There are two common types of bias in data collection and labelling procedures.
    1) Confirmation bias.
    2) Automation bias.

* Confirmation bias :- Refers to only looking for data which confirms our own hypothesis.

    Ex :- Suppose that, you believe that all boaches have shark. The next time you spot a black triangular object in a body of water, you use it to confirm your own assumption without further investigation.

* Automation bias :- Tendancy to rely heavily on a system for decision making, or to create shortcuts in decision making without considering alteratives, even if the alternatives are true.

Ex :- Suppose you writting an essay and the software you using auto correct you spelling. You accept the automated correction without reading the full sentence, even though in the context of the sentence the correction is actually a misspelling.

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Q2) Use machine learning to recommend products to customers.

I) What is an example of confirmation bias in the buying lifecycle?

* if customer has purchased a tie, the system might recommend men's shirts.

II) What is an example for Automation bias?

* Data that is collected digitally or automatable is more likely to be prioritized

## Evaluating Model Fairness

Example 1

Using occupation as input for a model that issues loans

* We can use gender instead of occupation. but geder is unfair bias. there for we use occupation. but occupation also represent gender some times

| male | female |
|---|---|
| waiter | waitress |
| Actor | Actress |

* fairness constraint 1 :- Group unaware - everyone held to the same threshold.

* Fairness constraint 2 :- Demographic parity - same percentage of loans approved

* Fairness contraint 3 :- Equal opportunity - of the people who can pay, same percentage approved

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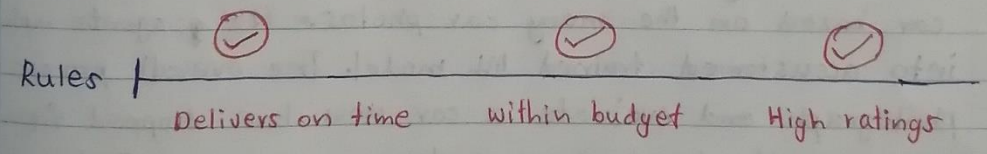
# Replacing rule-based systems with ML

* In often, we can define three areas of day-to-day business that offer opportunities for using ML.
  1) Replacing rule-based systems.
  2) Automating business processes.
  3) Understanding Unstructured data.

## Replacing rule-based systems

* Most computer programs have at their core a set of heuristic rules or rules with procedures, that help users complete a task or make a decision.

Ex:- You manage a global retail company and you need computer equipment sent to a new branch Amsterdam. You might have a rule-based system to help you choose the right supplier. Your rules for choosing the right supplier are that the company consistently delivers on time, within a specific budget.




Using rule-based system you can choose the right supplier

Q1) Acme widgets has a manual for its agent that helps them make decisions during the smoke alarm installation process. However, the mannual is long and agents can still make mistakes. How might Acme widgets use ML to replace or simplify its rule-based installation process?

* Use ML to identify a customer's existing smoke alarm setup and provide relavant installation instructions.

# Automate Processes and Understand Unstructured Data

## Automating business processes

* The purpose of automating a business process is not to reduce cost, instead, it's to reduce drudgery, increase accuracy, and to gain more visibility into the business.

* In short way, you are focusing on how to do more with less.

Ex:- Whenever customers brought in cars into the dealership, the agent had to manually upload and label photos for each car and set a price. This process took them on average about 20 minutes per car. How could a car dealership in this case do more with less by automating its processes.

* This company used ML to predict the price value of a car based on the many car photos it's agents upload into accustomed trained ML model. The overall process to photograph and evaluate a car now has dropped from 20 minutes to two to three minutes per car. That's a 95% deduction in time and massive improvements in overall service.

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## Understandin Unstructured Data

* Unstructured data is data that can't be directly compared to other data.

Ex: Suppose you have a global customer base. They are going to be speaking different languages. So how much you use the same source content to serve all of your ~~cut~~ customers in their own language. You can use ML to automatically translate your content