



Machine Learning for Business Processes

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Outline

- Business Processes
- Machine Learning
- Labelled Data
- Active Learning
- Closing Notes

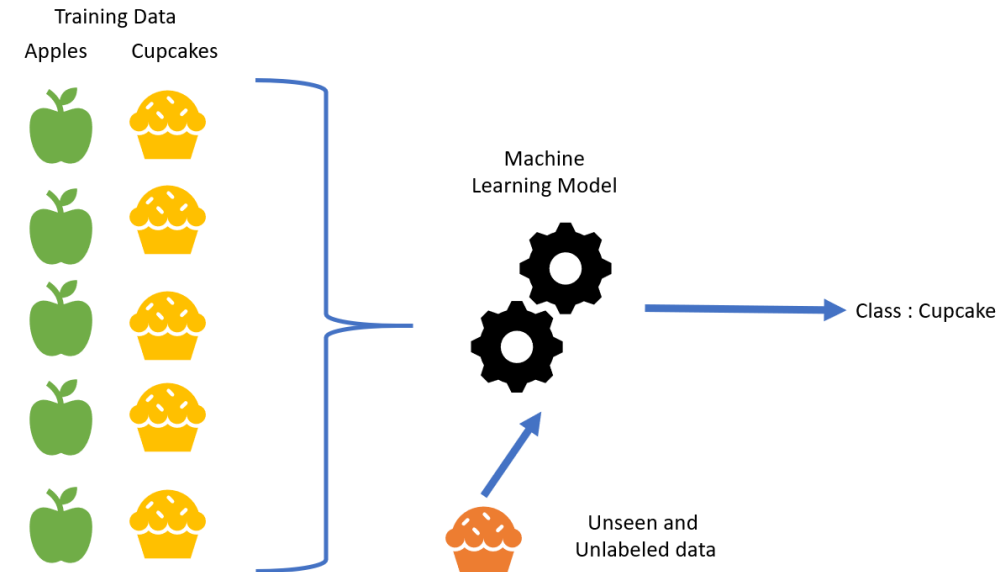
Business Processes

- A small process of some big business
- Take an example:
 - Business: Regulatory Management
 - Process: Identify the source of regulatory documents
- Classifying a bunch of documents
 - A Machine Learning task



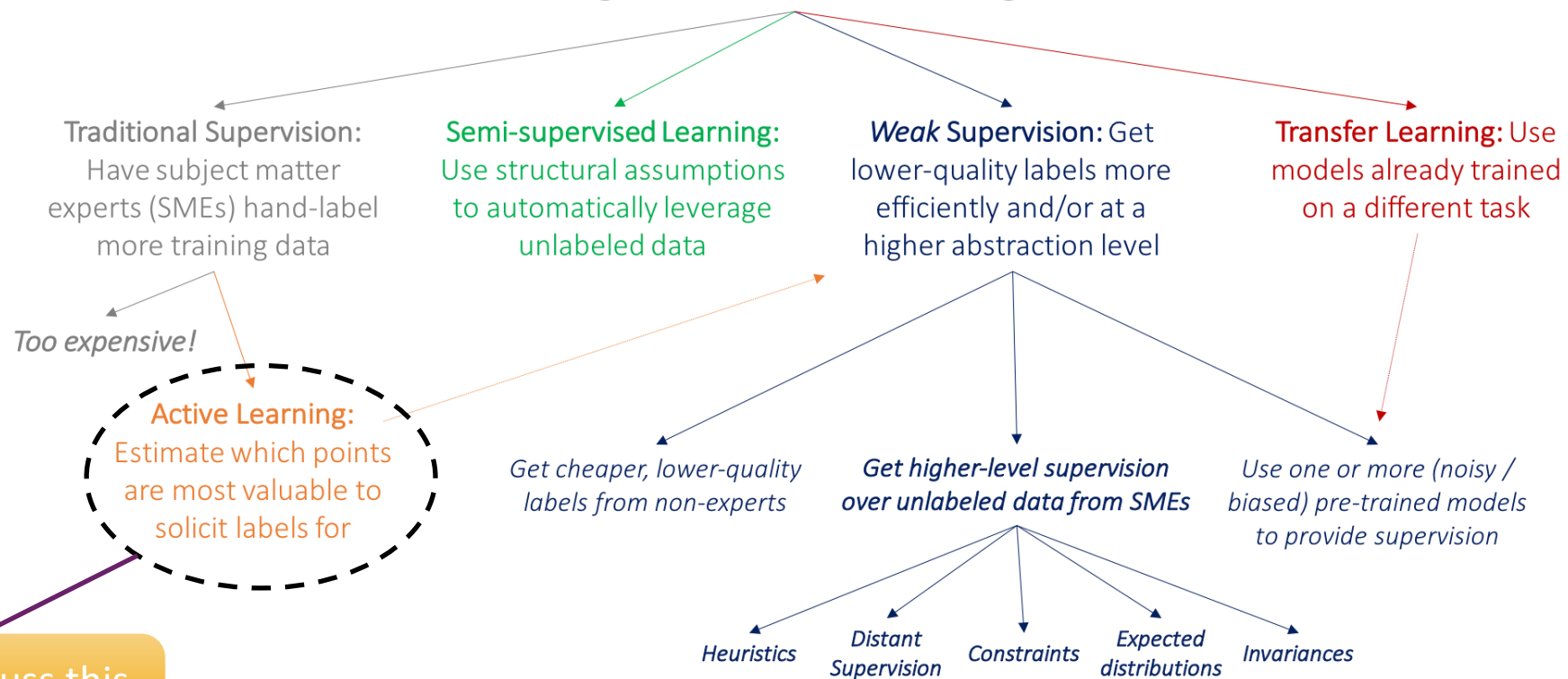
Machine Learning

- Learning relation between input and output space
 - Using labelled data
- We need **Data, Labelled Data!**
 - ML algorithms are data hungry
- Getting labelled data
 - Expensive and time consuming
- Biggest question:
 - How do we get labelled data?



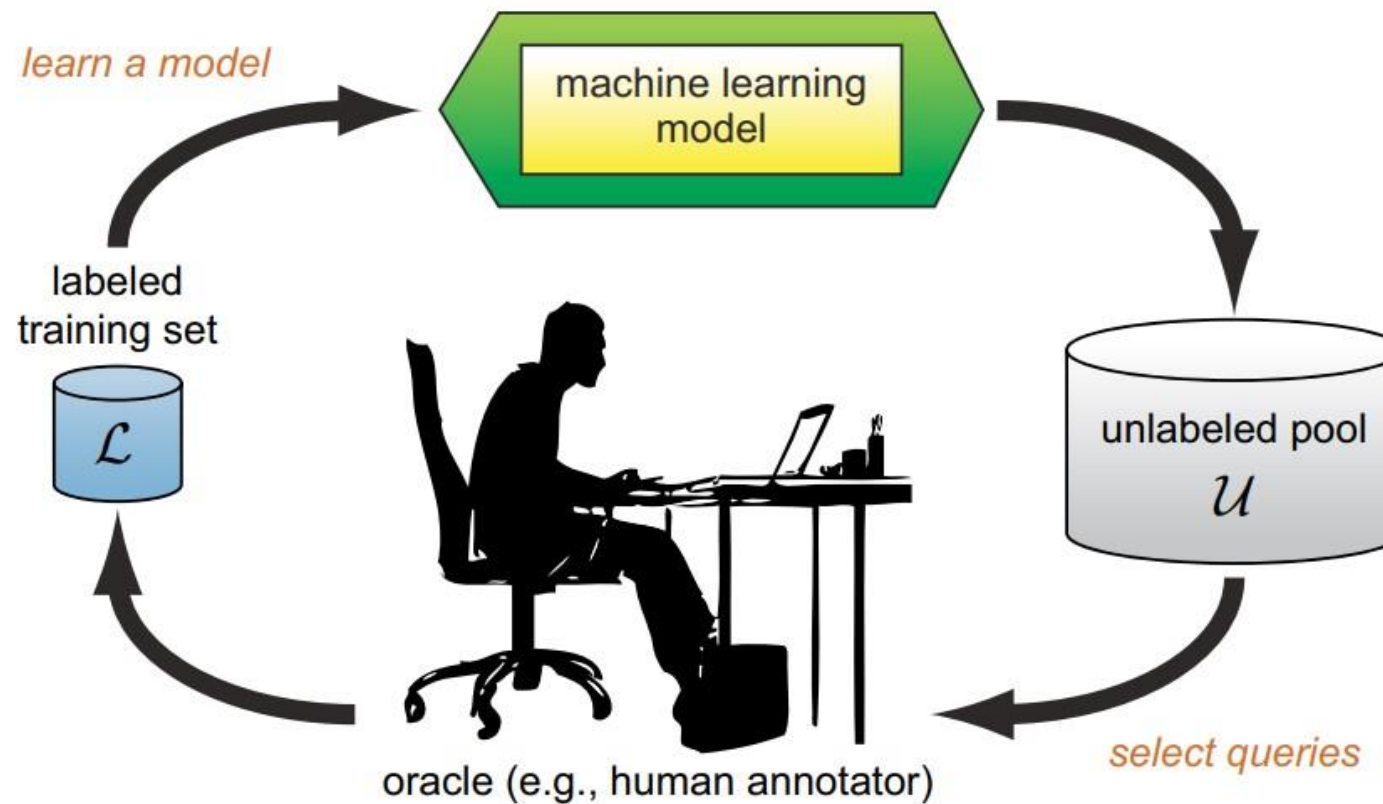
Labelled Data

How to get more labeled training data?



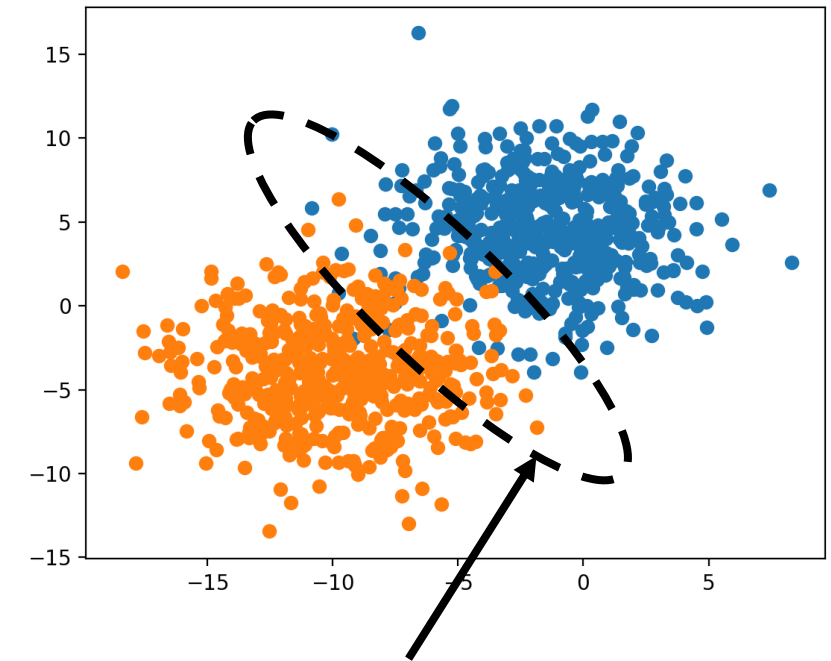
We'll discuss this today

Active Learning: Human-in-the-Loop



Active Learning – An Example

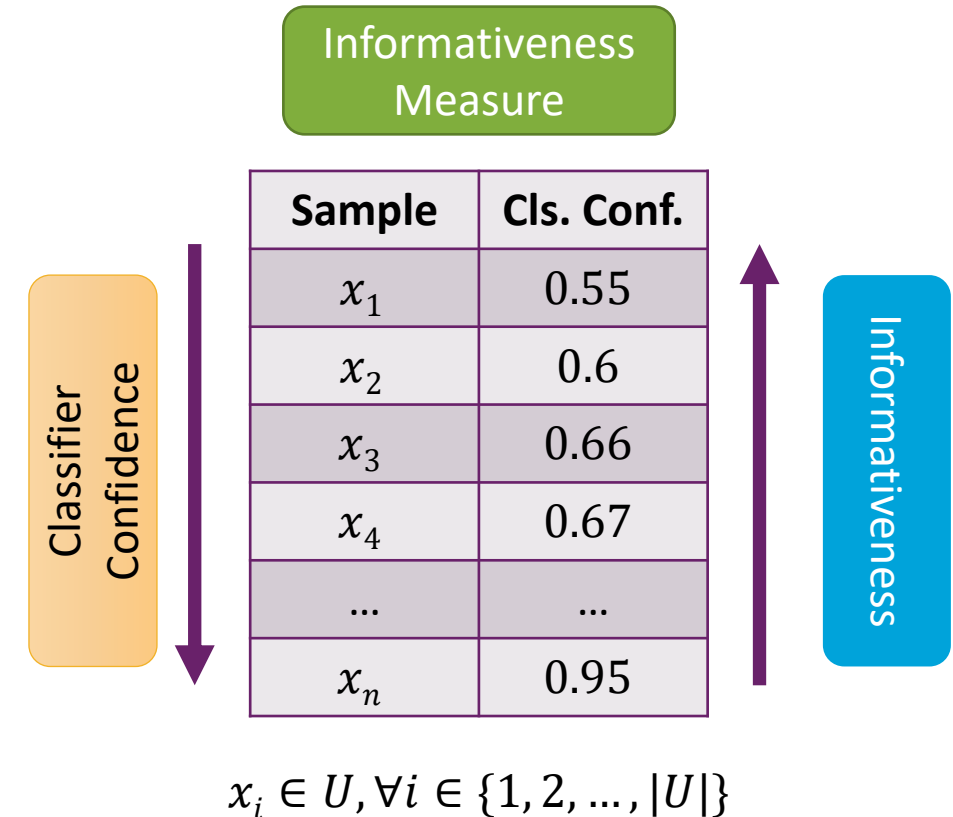
- Assumption
 - We've huge sample of *Unlabelled data* (U)
- Aim
 - Oracle should label I
- **Step 0:** Divide U into
 - *Seed* (L): some labelled samples from U
 - *Unlabelled pool* (U): rest of the dataset



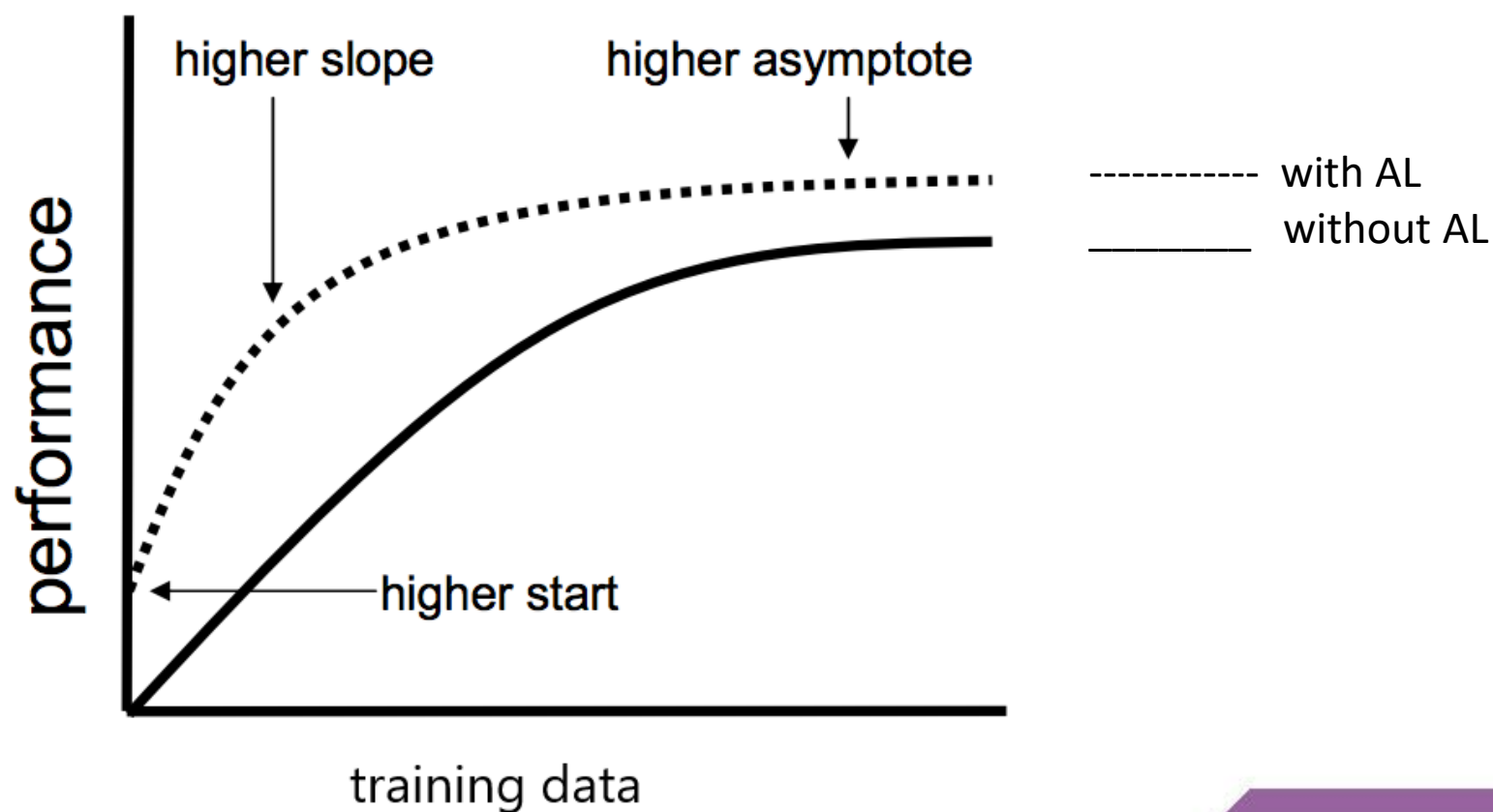
Most informative area (I)

Active Learning – An Example

- **Step 1:** Train a *classifier* (C) on L
 - Classifier based on domain knowledge
- **Step 2:** Use C to rank samples of U
 - Rank based on some *informativeness*
- **Step 3:** Label *informative samples*
- **Step 4:** Add new labelled samples to L
- Repeat until stopping criteria



Active Learning – Goal



Closing Notes

- Thumb rule of Machine Learning
 - Data first, algorithm next
 - Always try Active Learning for manual labelling
- Data preparation on your resume
 - Always set you aside from the crowd
- Must Read:
 - Settles, Burr. **Active learning literature survey**. University of Wisconsin-Madison Department of Computer Sciences, 2009.

Thank You!

- Please feel free to ask any question
- Reach me at:
 - E-mail: ashish.{rgu/iiitnr}@gmail.com
 - LinkedIn: <https://www.linkedin.com/in/ashishu007/>
- Want to know about my research?
 - I blog at: <https://ashishu007.live/blog/>
 - Soon, I'll write this talk as well