

# Automated Injury Coding

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## Alexander Measure

Economist

Office of Safety and Health Statistics



[www.bls.gov](http://www.bls.gov)

# Rise of the Machine

Ken Jennings	Watson	Brad Rutter
\$24,000	\$77,147	\$21,600

# Survey of Occupational Injuries and Illnesses (SOII)

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- 300,000 cases per year
- Text narratives for:
  - ▶ Occupation
  - ▶ Injury/Illness Circumstances

# Example Case

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**Job title:** janitor

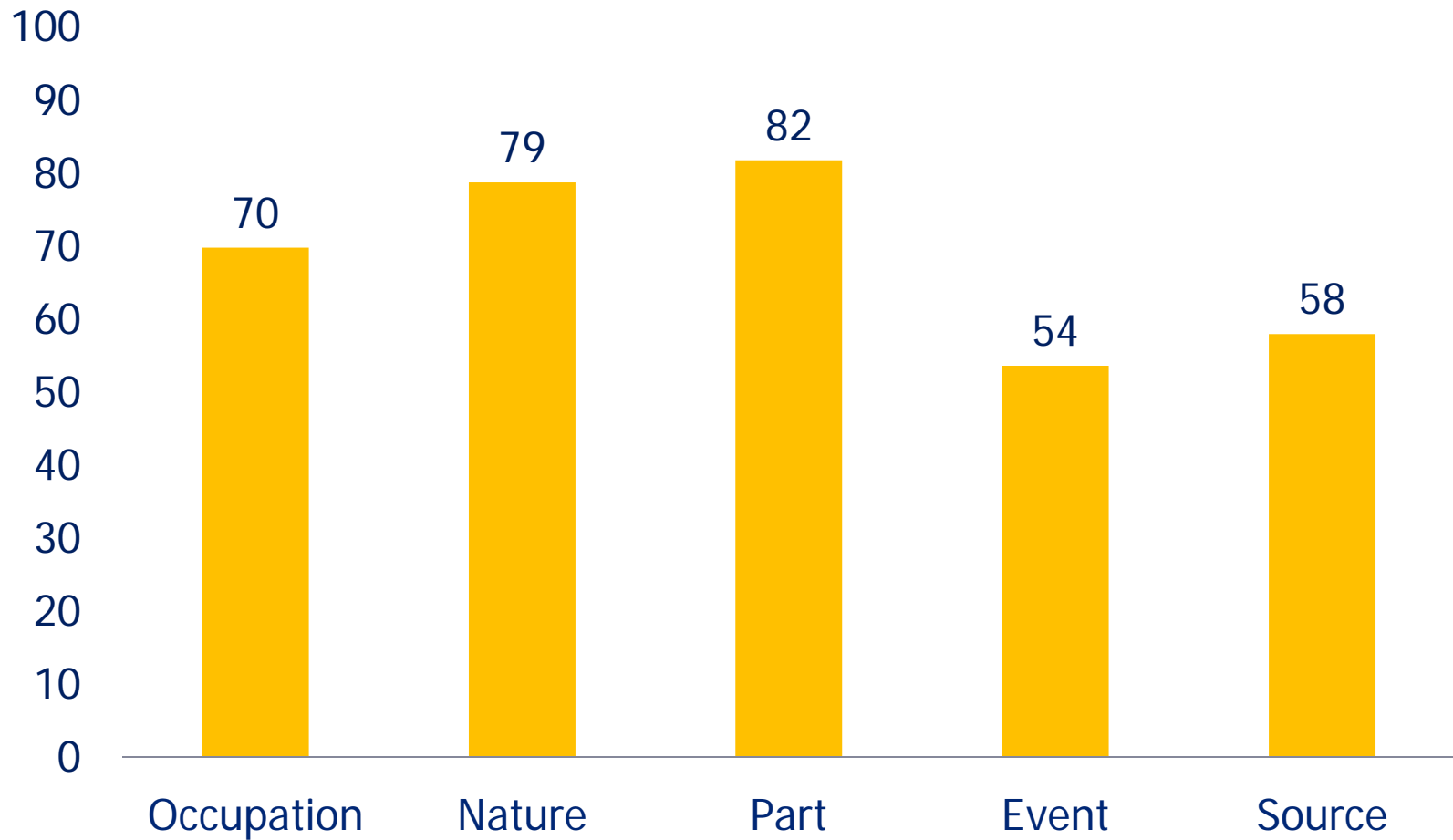
**What was the employee doing just before the incident?**  
mopping floor in gym

**What happened?**  
slipped on wet floor and fell

**What part of the body was affected?**  
fractured right arm

**What object directly harmed the employee?**  
wet floor

# Average Agreement



# Artificial Intelligence

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- 2 Approaches

- ▶ Rules

- ▶ Machine learning

# Machine Learning

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- 3 Steps

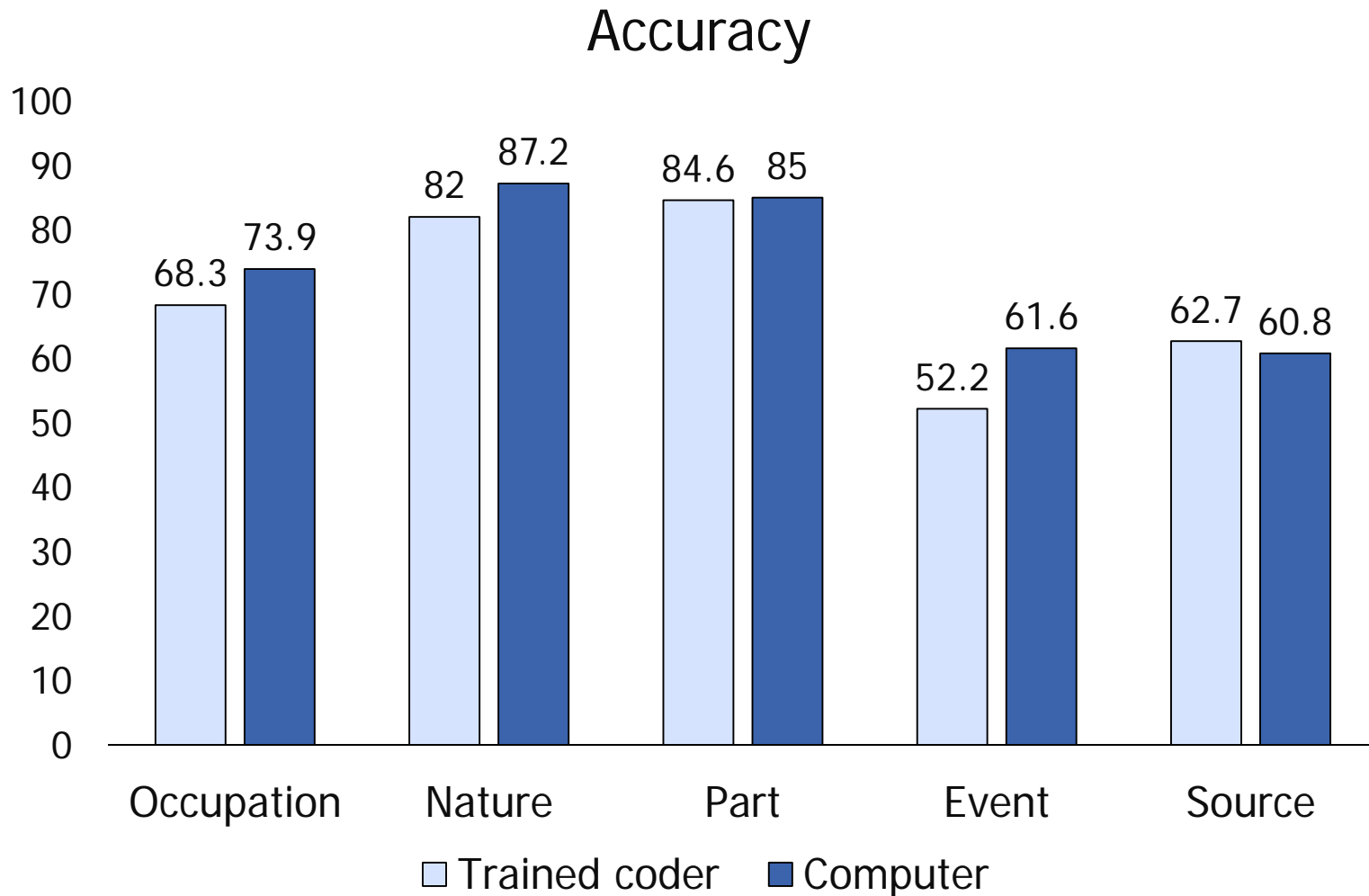
1. Select feature representation
2. Select model
3. Fit model to data

# Autocode

- Job title: teacher assistant
- Plug into model
  - ▶  $P(\text{code}=A) = .01$
  - ▶  $P(\text{code}=B) = .14$
  - ▶  $P(\text{code}=C) = .85 \leftarrow$



# People & Computer



# Assisted Review

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- Identify suspicious codes
- Focus review

# Autocode the Easy Stuff

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- Census does this already
- At ~99% accuracy we can autocode:
  - ▶ Occupation (20%)
  - ▶ Nature (30%)
  - ▶ Part (15%)

# Suggested Codes

Occupation

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***suggested codes***  
49-3023 Automotive Service Technicians  
49-3021 Automotive body and Related Repairers  
49-9099 Installation, Maintenance, and Repair

***all codes***  
11-1011 Chief Executives  
11-1021 General and Operations Managers  
11-1031 Legislators  
11-2011 Auditing and Promotions Managers

# Contact Information

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## Alexander Measure

Office of Safety and Health Statistics

[\*www.bls.gov/iif\*](http://www.bls.gov/iif)

202-691-6185

[measure.alex@bls.gov](mailto:measure.alex@bls.gov)



[\*\*www.bls.gov\*\*](http://www.bls.gov)