



SUNY Oswego

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USING MACHINE LEARNING TO PREDICT FALLS IN INPATIENT REHABILITATION RESIDENTS

PROJECT MISSION

Preventing falls and improving residents' quality of life through the meaningful use of health record data and machine learning.

BACKGROUND

- ✘ Falls are the second leading cause of accidental injury deaths worldwide, 646,000/yr (WHO 2017).
- ✘ The CDC (2016) reports that “every second of every day in the United States, an older adult falls, making falls the number one cause of injuries and deaths from injury among older Americans.”
- ✘ The CDC estimates the annual Medicare cost of falls in older Americans to be \$31 billion.

World Health Organization. (2017). Falls Fact Sheet. Retrieved 10/12/2017 from <http://www.who.int/mediacentre/factsheets/fs344/en/>

Centers for Disease Control and Prevention. (2016). Falls are leading cause of injury and death in older Americans. Retrieved 10/12/2017 from <https://www.cdc.gov/media/releases/2016/p0922-older-adult-falls.html>

BACKGROUND, CONTINUED

- ✘ List of common risk factors for predicting fall:
 - 1) muscle weakness, 2) **history of falls**, 3) gait deficit, 4) **balance deficit**, 5) use of assistive device, 6) visual deficit, 7) arthritis, 8) impaired activities of daily living (including **ambulation and transfer**), 9) depression, 10) **cognitive impairment**, and 11) **age > 80 years**.

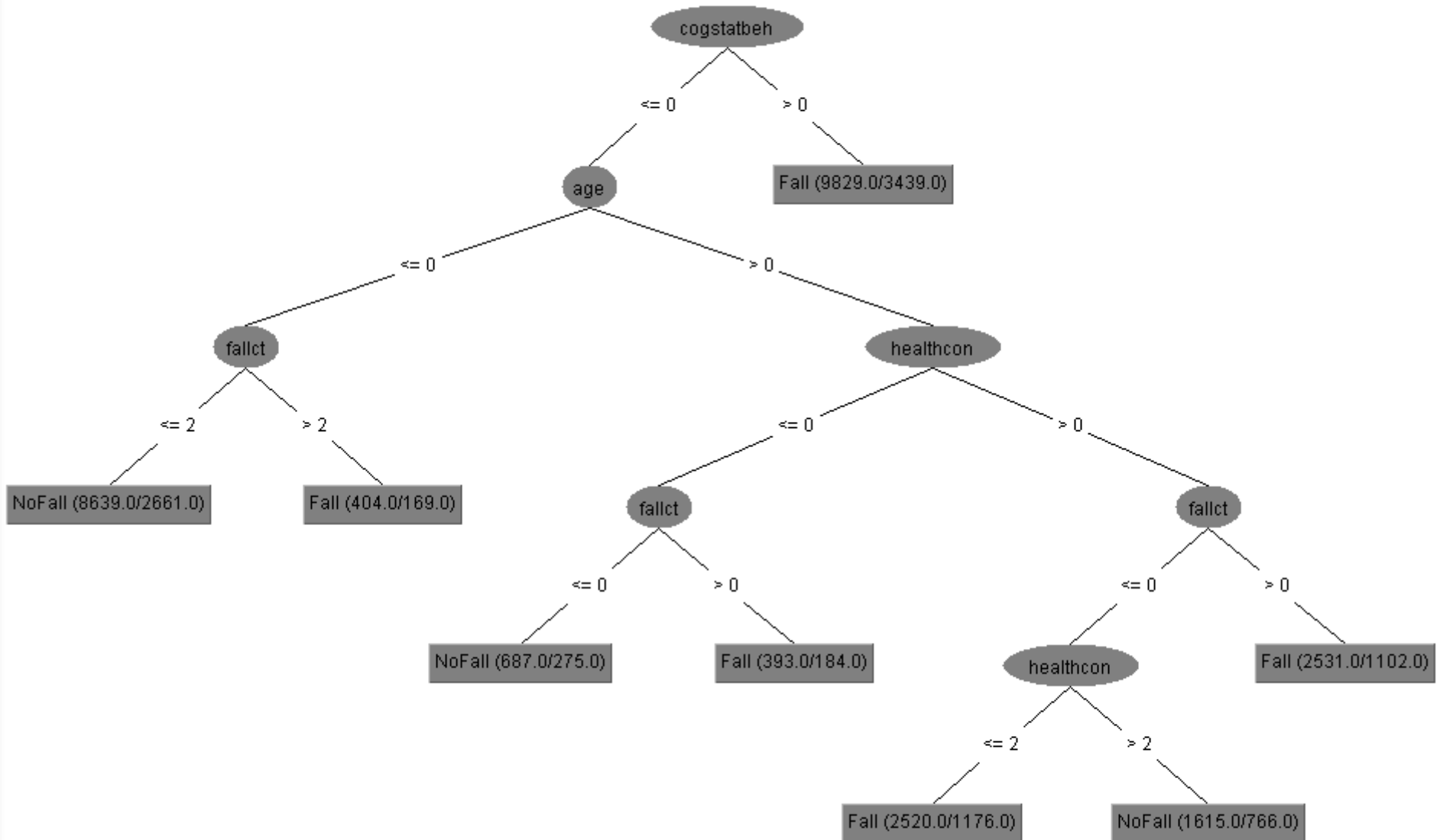
DATA ANALYZED

- ✖ 22 comma-separated value (csv) tables with 11843 resident records from January 2005 to present
- ✖ The four tables used:
 1. ICD
 2. General Admission Observation
 3. Fall Assessment
 4. Norton

RESULTS

	J48-18V	RT-18V	J48-25V	J48-8V	RT-8V	RT-Simple
True Pos	4321	6502	6349	7107	6790	6519
False Pos	3197	2701	2854	2647	2194	1666
True Neg	7811	8307	8154	8361	8814	9342
False Neg	6013	3832	3985	3227	3544	3815
Accuracy	56.8%	69.4%	68.0%	72.5%	73.1%	74.3%
Specificity	71.0%	75.5%	74.1%	76.0%	80.1%	84.9%
PPV	57.5%	70.7%	69.0%	72.9%	75.6%	79.6%

A RESULT VISUALIZED



THE FUTURE FOR THIS PROJECT

- ✘ Create a machine-learned test individualized for every facility!

- ✘ Any questions or comments?