# Algorithmic Human-Robot Interaction

## Modeling Capability and Effect

## Modeling I

CSCI 7000

Prof. Brad Hayes

University of Colorado Boulder

# Learning from the Field:
# Deep Learning for Robot Vision in Natural Environments

Katherine Skinner
University of Michigan

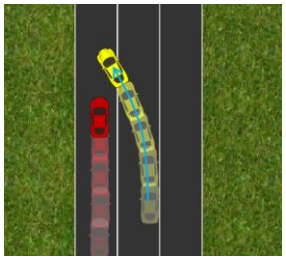
DLC 170
2:00pm Today

# Today's Papers
## Modeling Capability and Effect

**Game-Theoretic Modeling of Human Adaptation in Human-Robot Collaboration**
Stefanos Nikolaidis et al.

Pro: Ashwin Vasan
Con: Lakhan Kamireddy

**Planning for Autonomous Cars that Leverage Effects on Human Actions**
Dorsa Sadigh et al.



Pro: Nishank Sharma
Con: Ryan Leonard

# Papers for Thursday 2/28:
# Natural Language Understanding

Robust Robot Learning from Demonstration and Skill Repair Using Conceptual Constraints – Mueller et al.

Pro: Jack Kawell

Con: Matthew Luebbers

Accurately and Efficiently Interpreting Human-Robot Instructions of Varying Granularities – Arumugam et al.

Pro: Karthik Palavalli

Con: Ian Loefgren

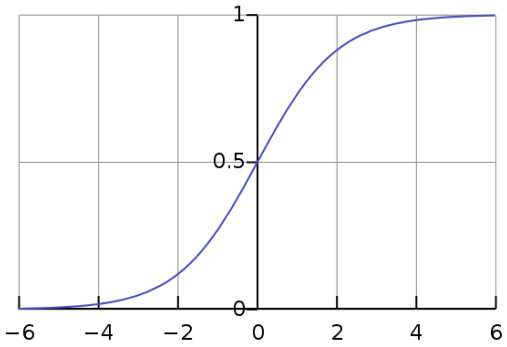
# Introduction to Machine Learning

- Regression: How much is this house worth?
- Classification: Is this a photo of a dog or ice cream?

# Linear Regression to Logistic Regression

- Linear Regression gives us a continuous-valued function approximation
  - Models relationship between scalar dependent variable $y$ and one or more variables $X$
- Logistic regression allows us to approximate **categorical** data
  - Pick a model function that squashes values between 0 and 1

$$F(x) = \frac{1}{1 + e^{-x}}$$




  - Apply it to a familiar function: $g(X) = \beta_0 + \beta_1 x + \epsilon$

$$P(Y = 1) = F(g(x)) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 * x)}}$$