

# **Chapter 33. Ubiquitous Artificial Intelligence**

**The Quest for Artificial Intelligence, Nilsson, N. J., 2009.**

## **Lecture Notes on Artificial Intelligence, Spring 2012**

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# Overview of Chapter 33

- Applications of the AI
  - At home
  - Driving
  - Navigating
  - Game

## Chapter 33. Ubiquitous Artificial Intelligence

# 33.1 AI at Home

# AI at Home

- What you might find today (or sometime soon)
  - thermostats for heat and air-conditioning systems that anticipate temperature
  - microwave ovens that read barcodes on packages to determine how long to cook an item
  - washing machines that automatically adjust to different conditions to wash clothes better
  - refrigerators that automatically inventory their contents and inform owners of needed items
  - cameras with computer vision systems to identify faces and to control focusing, exposure, and framing
  - hearing aids that adapt to ambient sound levels and block out 'cocktail party' chatter
  - robotic pet "animals" and toys that interact with people

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# **33.2 Advanced Driver Assistance Systems**

# Advanced Driver Assistance Systems

- **ADAS (Advanced Driver Assistance Systems)**
  - adaptive cruise control (ACC) for providing more intelligent control of speed
  - intelligent speed adaptation (ISA) for monitoring local speed limits
  - lane control systems for monitoring the presence of vehicles or obstructions in adjacent lanes and for monitoring when a driver drifts into an adjacent lane or off the roadway
  - automatic parking systems for assisting a driver when executing a parallel parking maneuver
  - traffic sign recognition systems
  - driver drowsiness detection systems
  - intelligent tire pressure control systems

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## **33.3 Route Finding in Maps**



# Route Finding in Maps

- Navigation device for automobiles
  - Specialized A\* algorithm for two-dimensional maps
  - Google
- Estimated travel times
  - Microsoft's 'ClearFlow'
  - Using Bayesian networks
  - Traffic-monitoring sensors to estimate traffic densities

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## **33.4 You Might Also Like...**

# You Might Also Like...

## ■ Collaborative (social) filtering

- Recommendation system of 'Amazon.com'
- A DB of preferences (books, movies ...) is maintained for every user
- iTunes, TiVo and Netflix have same recommendation systems

## ■ Content-based filtering

- Analyzing to find similarities with other items and the most similar items are recommended

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## **33.5 Computer Games**

# Checker-Playing Program

- The late 1960s~the mid-1970s
  - Computer chess programs gradually improving from beginner-level to middle-level
- 1959-1962
  - John McCarthy & a group of MIT students developed a chess-playing program
- 1967
  - Kotok-McCarthy program : The first match to be played by a computer against a computer
  - MAC HACK VI : the first program to play against human
    - It won two games, drew two games, 1450<sup>th</sup> on US
- “The basis of human chess strength, by contrast with computers, is accumulated knowledge” -Berliner