

# Computational Intelligence: Where is it Taking Us?

# Can Computers Mimic Human Intelligence

- Can computers have the same intelligence as humans
  - Difficult question because human intelligence is ill-defined and not well understood
  - For example: Free-Will/Agency in humans vs. deterministic computers
  - Many human characteristics are tied to agency: Emotions, etc.
- Even if computer and human intelligence differ, can a computer mimic human intelligence

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- Even if computer and human intelligence differ, can a computer mimic human intelligence
  - Sufficient that an outside observer could not differentiate a human from a machine
  - Can mimic agency through stochastic decision processes

# Many Possible Issues and Decisions

- New Applications
  - Expect a continued increase in success with subjective tasks which traditionally have been considered human-only tasks
- Expansion of Immediate Knowledge Access
  - From web to embedded interface with wireless access
- Ubiquitous Computing - Sensors and Computing Devices in Diverse Areas
  - In buildings, office, home, car...
  - In the body (eyes, limbs, embedded computing access, etc.)
    - Going blind, improved sight, enhanced sight, ...
    - What is appropriate limit?

# How Will Machine Intelligence Influence Us

- *For most (many) traditional tasks machine performance will eventually be better than current human performance*
- Machines will take over many critical tasks which we now do
- This can free up time to
  - Do other tasks
  - Leisure
  - Etc.?
- This trend has already led to much of our advancement
  - If we don't have to keep going outside to fetch water or chop wood for heat, we have more time to focus on new tasks

# From Basic Tasks to Decision Making

- Basic Tasks (entail less critical decision making)
  - Robot to Vacuum house
  - Computers to do surgery. Already better than us in some areas (LASIC)
  - Usually a short lag before we embrace
- Decision Making Tasks (Computational Intelligence)
  - Air Traffic Control (Computer already flies the aircraft)
  - Medical diagnosis and prescription of treatment (Eventually more accurate, cheaper, and more convenient) – second opinion (ensemble)
  - Many more scenarios
- For Example
  - Technology makes and cleans up breakfast (non-decision making)
  - Technology decides what you will have for breakfast? (decision-making)
  - Sleep, exercise, etc.?

# Appropriate Limit?

- *For every type of decision making task, we will need to decide to what extent will we allow computational intelligence to be involved*
- When is it too Much
  - Who should get the loan, the job, etc.?
  - Too much? (Jury, Dating, ...)
- Eventuality of too much leisure time, etc?
  - Working is good for mankind
  - Virtual Reality - The Great Opiate?
- Potential is Un-Bounded
  - But will we want to place some bounds?
  - “Little Black Box”