



IBM Haifa Research Lab

Live Ecology

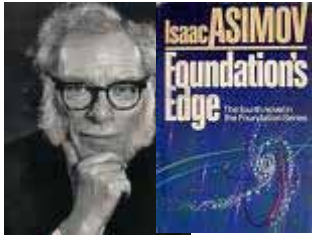
Getting Asimov vision into reality

Opher Etzion

# The grand challenge: Live Ecology



The Internet has dramatically changed life as we know it, but the real revolution is still ahead of us...



In his book "The Foundation's Edge" Asimov introduced the concept of Gaia as a planet that behaves as a single organism



Our vision is live ecology, in which robots, people, enterprises and other objects can act as a *singularity* to achieve common purposes, this will realize many of Asimov's concepts that today still look like science fiction

# The Analogy to a human body



The brain is distributed and includes human brain, robotic brain, and various kinds of computers



Sensors serve as senses: hearing – eyes and ears.

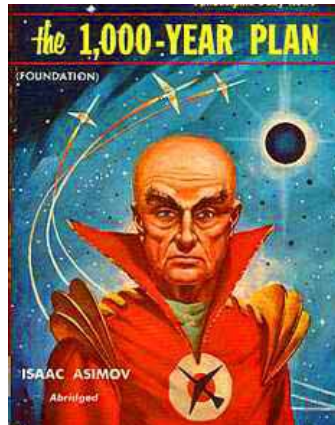


Robots and other actuators serve as hands and ears



Enhanced event processing infrastructure will serve as the nervous system – everybody talk with everybody in the *intergalactic event speak*

# Society level applications



Asimov's  
Psychohistory:  
modeling the  
evolution of social  
processes



Mutual help:

Alert to a driver: the  
person crossing the  
street now is an  
Alzheimer patient who  
apparently lost his  
way

## Biological level applications



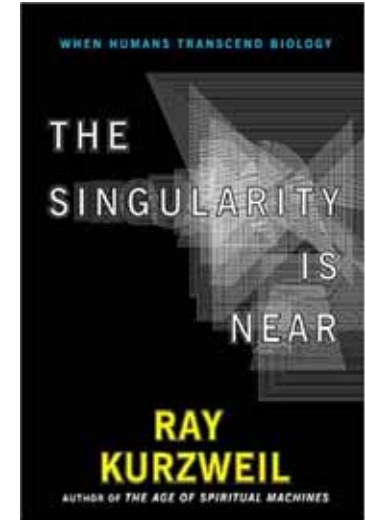
Asimov's Fantastic voyage:

Injecting robots as sensors and actuators within the human body to sense and effect biological and chemical processes



Asimov and Silberberg's positronic man:

Bionic man or human-like android.



## Some commercial applications



Flexible dynamic manufacturing systems



Insightful crisis management:  
Individual per flight decision on flight in the ash



Neighborhood security

## Scientific breakthroughs and revolutionary impact

- ❑ Multi-disciplinary effort: sociology, biology, ICT, engineering, robotics and more...
- ❑ The whole is bigger than the sum of its components
- ❑ ICT breakthrough:
  - The Web is going from passive to active mode
  - Event based technologies as leading paradigm
  - ICT is becoming pervasive
- ❑ Bottom line: enabling live ecology, making much of Asimov visions come true, and changing the way our world behaves

