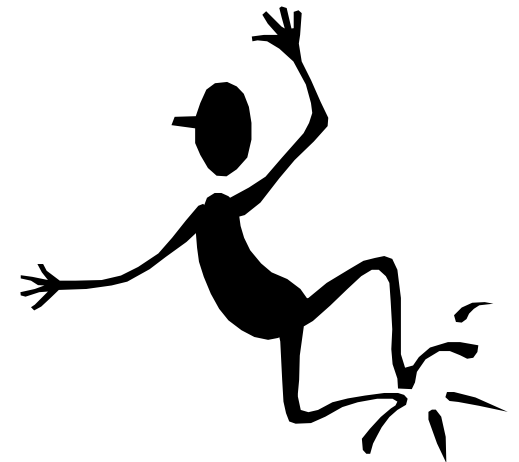


# **Biologically Inspired Multi-Agent Systems for Information Technology**

**Arvin Agah**



*University of Kansas*



<b>ANALOGY</b>	<b>ANT COLONIES</b>	<b>INFORMATION TECHNOLOGY</b>
Members	Ants	Information Agents
Gather	Food/Building Material	Information/Data
From	Environment	Communication & Data Networks
Build	Ant Hills	Individual User Knowledge base
Communication	Chemical Trails	Information Beacons
Goal	Serve the Colony/Queen	Serve the Colony/User
Interaction	Cooperation & Competition	Cooperation & Competition
Intelligence	Individual Members Simple Colony Complex Superposition Principle	Individual Members Simple Colony Complex Superposition Principle



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## Applications:

- Intelligent information technology (storage, sharing, and retrieval)

## Research Issues:

- Multi-agent interaction & communication
- (local vs. Global) & (implicit vs. Explicit)) (competition & cooperation)
- Recognition, gathering and storage of “useful” knowledge

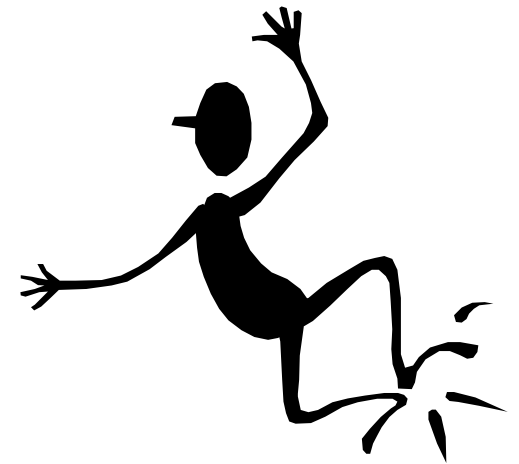


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# Tele-Communication for Tele-Presence

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Tele-presence as an alternative,  
when real presence is:

- Hazardous
- Costly (Time & Money)
- Not possible due to physical properties

More “real” than virtual reality.



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## Applications:

- Education & training
- Entertainment
- Search & rescue
- Surveillance

## Research Issues:

- User interfaces
- Multimedia
- Intelligent control & robotics
- Telecommunication & networking



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# Augmented Reality & Enhanced Multimedia

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Augmenting and enhancing the human interface with the computer and the world.

Building intelligence into multimedia devices.

Current limitation of multimedia (images & sounds).

Adding the medium of touch (force, haptic) to multimedia.



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## Applications:

- Enhanced multimedia incorporating the feeling of touch
- Augmented reality with visual cues
- Understanding of user's implicit commands
- User interfaces for the visually impaired

## Research Issues:

- Force feedback
- Image processing
- Networking of Multimedia data
- Telecommunication of touch information



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# Distributed Shared Virtual Reality

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## Applications:

- Tele-conferencing
- Entertainment

## Research Issues:

- Telecommunication of user sites
- Real-time networking of all users
- Multimedia interfacing tools
- Interactions among users & interactions between users and the world
- Real life “quality” of virtual worlds
- “Feeling” of presence



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