

# Enhance Presence in Telepresence Robot with Nonverbal Communication

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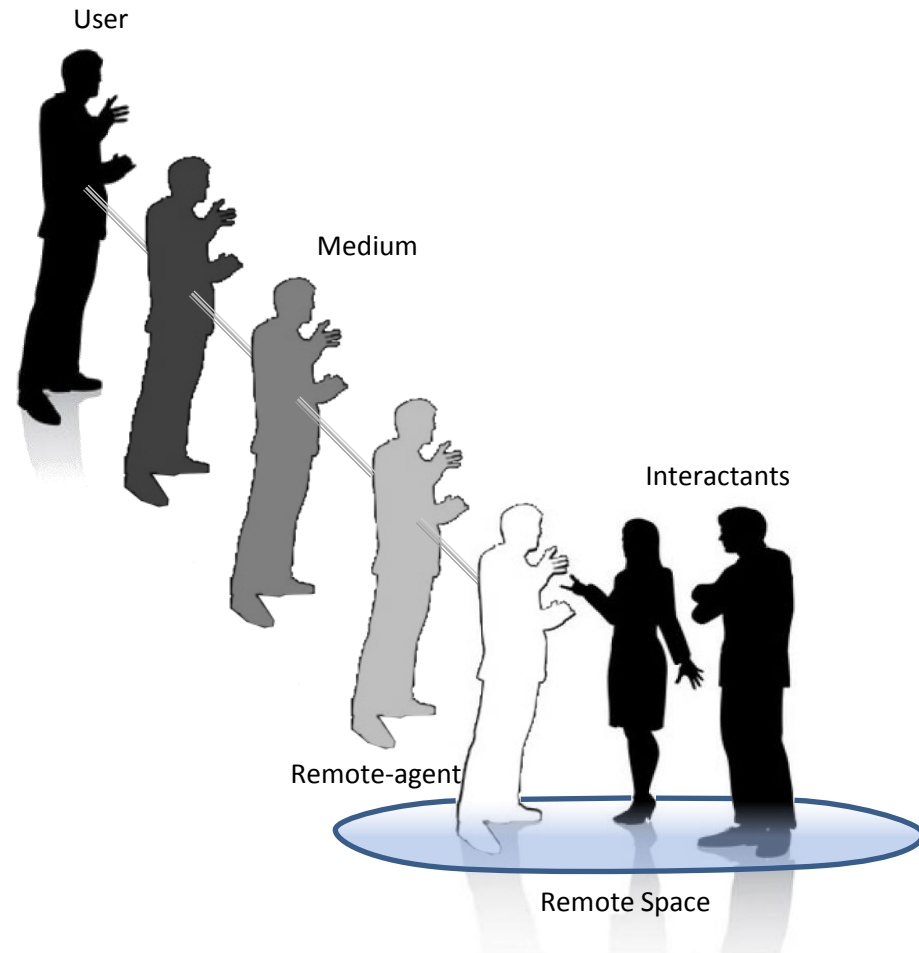
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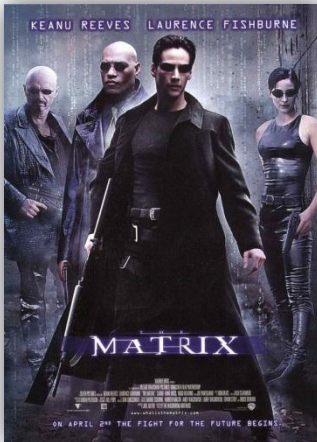
# Terminology

- **User**
  - The person who uses the medium to project his presence
- **Medium**
  - The technology involves to bring across the user's presence
- **Remote Space**
  - The environment where the Remote-agent and interactant co-exist
- **Remote-agent**
  - The entity that is presenting the user in the remote space
- **Interactants**
  - The other beings who are co-located with the medium.

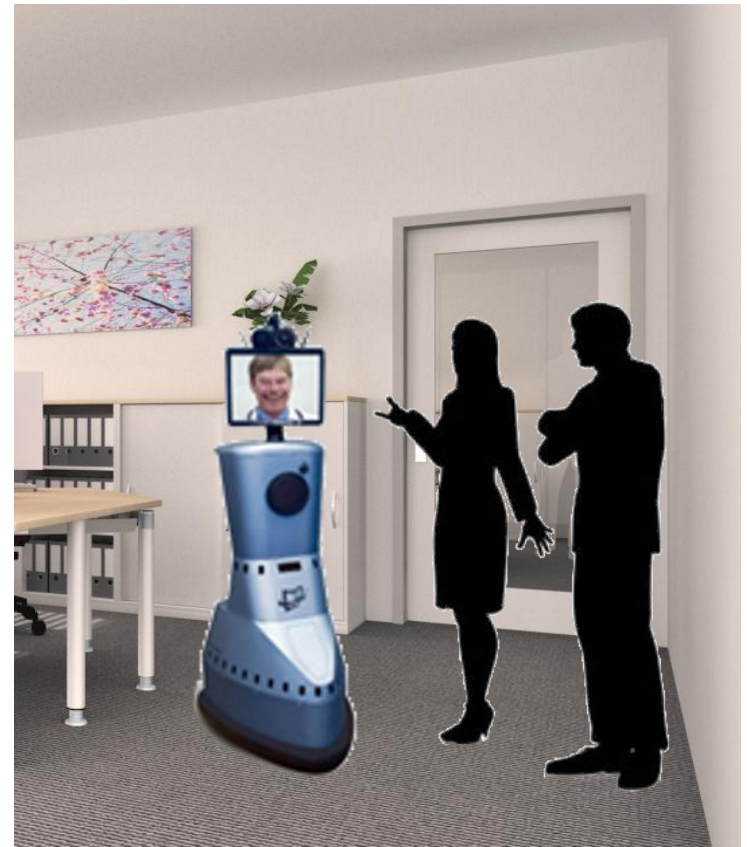


# Frictional Examples

- Virtual Reality
  - Remote Agent (user)
    - Virtual agent
  - Remote Space
    - Virtual environment
    - Virtual objects
    - Virtual agent (might be human control)
- Telepresence robot
  - Remote Agent (user)
    - Robotic platform
  - Remote Space
    - Real environment
    - Physical objects
    - Humans or robotic agent



# Current State of Telepresence robot



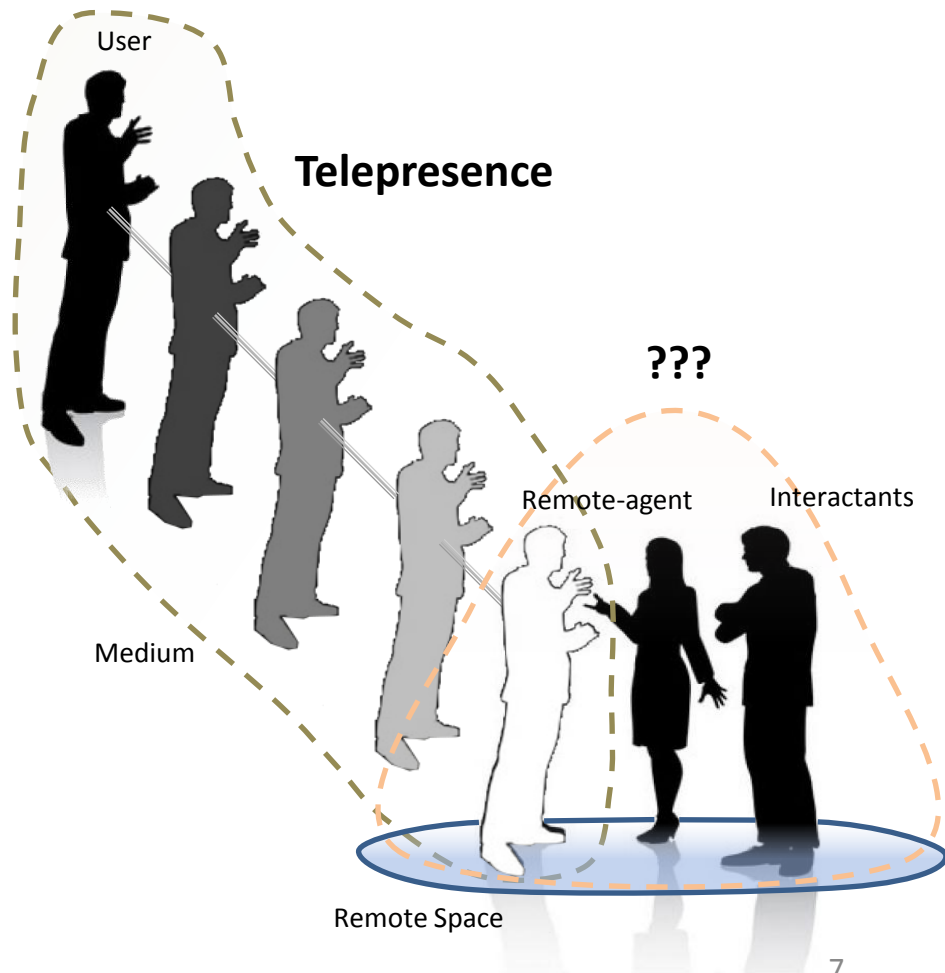
# What is telepresence?

- A few definition
  - **Immerse** into the remote space in teleoperation system. <sup>1</sup>
  - **“Being there”** in a virtual environment. <sup>2</sup>
  - **Use of technology** to connect the user’s senses and state of mind to a mediated content without noticing the use of the mediation. <sup>3</sup>
  - Empowers humans to **explore and interact** at a distance. <sup>4</sup>
  - Recreate the **closeness a remote person** would have if s/he were physically present <sup>5</sup>

1. R. Zahorik, Presence: Teleoperators and Virtual Environments, 1998
2. F. Biocca, International Workshop on Presence, 2001
3. G. Pettey, Virtually Reality, 2010
4. E. Paulos, Robotics and Automation, 1998
5. K. Tsui, Performance metrics for intelligent systems workshop, 2012

# What is telepresence?

- Telepresence
  - Sense of “Being there”
- Presence<sup>1</sup>
  - Immersion
  - Transportation
  - Social actor within medium



1. M. Lombard, International Workshop on Presence, 2009

# Social Presence

- Some of the definitions include:
  - Degree to which a person is **perceived** as a “**real person**” in mediated environment. <sup>1</sup>
  - **Sense of “Being together”** with others<sup>2</sup>
  - **Awareness** of the various communicating participants<sup>3</sup>

1. C. Gunawardena, American journal of distance Education, 1997

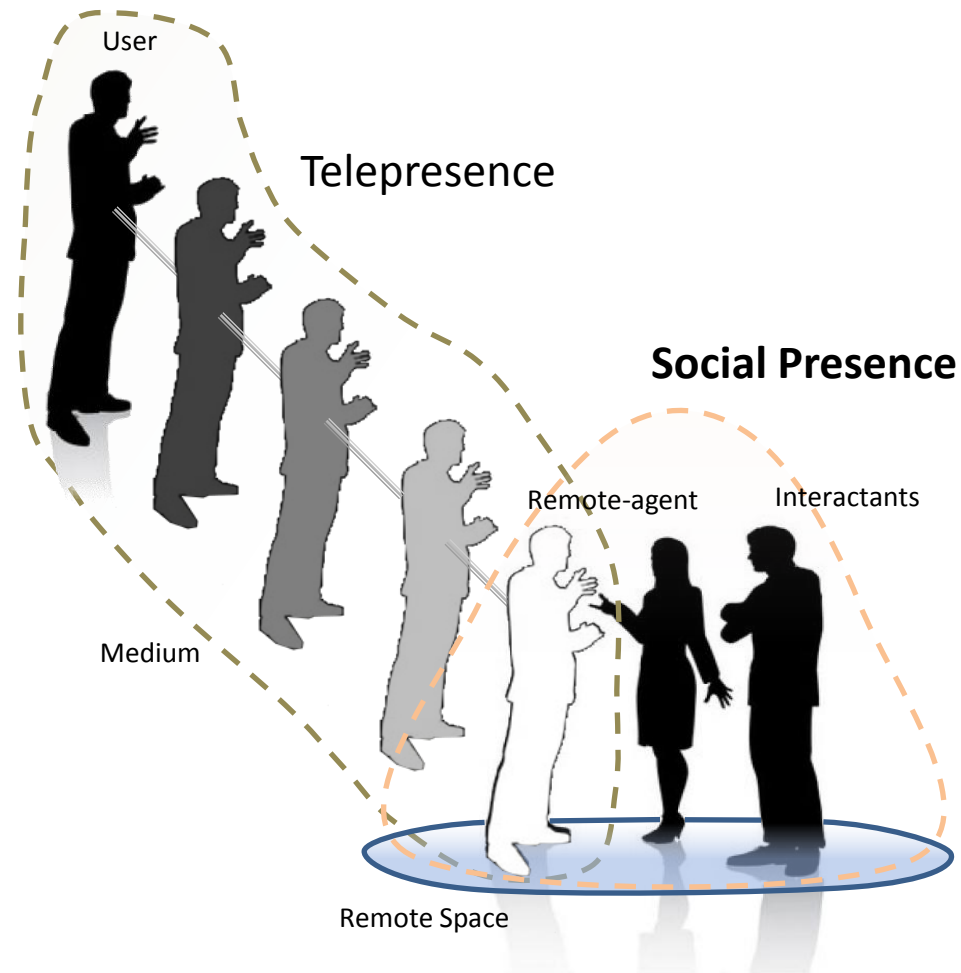
2. F. Biocca, International Workshop of Presence, 2001

3. E. Paulos, PhD Thesis : Personal Embodiment, 2002



# Social Presence

- Social Presence
  - Sense of “Being Together”
- Presence<sup>1</sup>
  - Social Richness
  - Realism
  - Medium as a social actor



1. M. Lombard, International Workshop on Presence, 2009

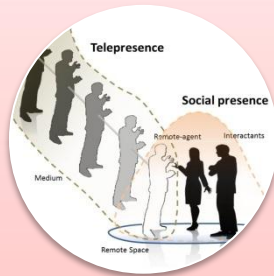
# Nonverbal Communication

- Some of the definitions include:
  - Expressing **emotion**, conveying interpersonal **attitudes**, presenting one's **personality** to others and **accompanying** speech.<sup>2</sup>
  - **Immediacy, status** and **responsive**<sup>3</sup>



1. M. Argyle, Bodily Communication, 1988
2. A. Mehrabian, Silent messages, 1981

# Social Presence and Nonverbal Communication



## Social Presence<sup>1</sup>

- Co-presence
- Behavior Engagement
- Psychological involvement



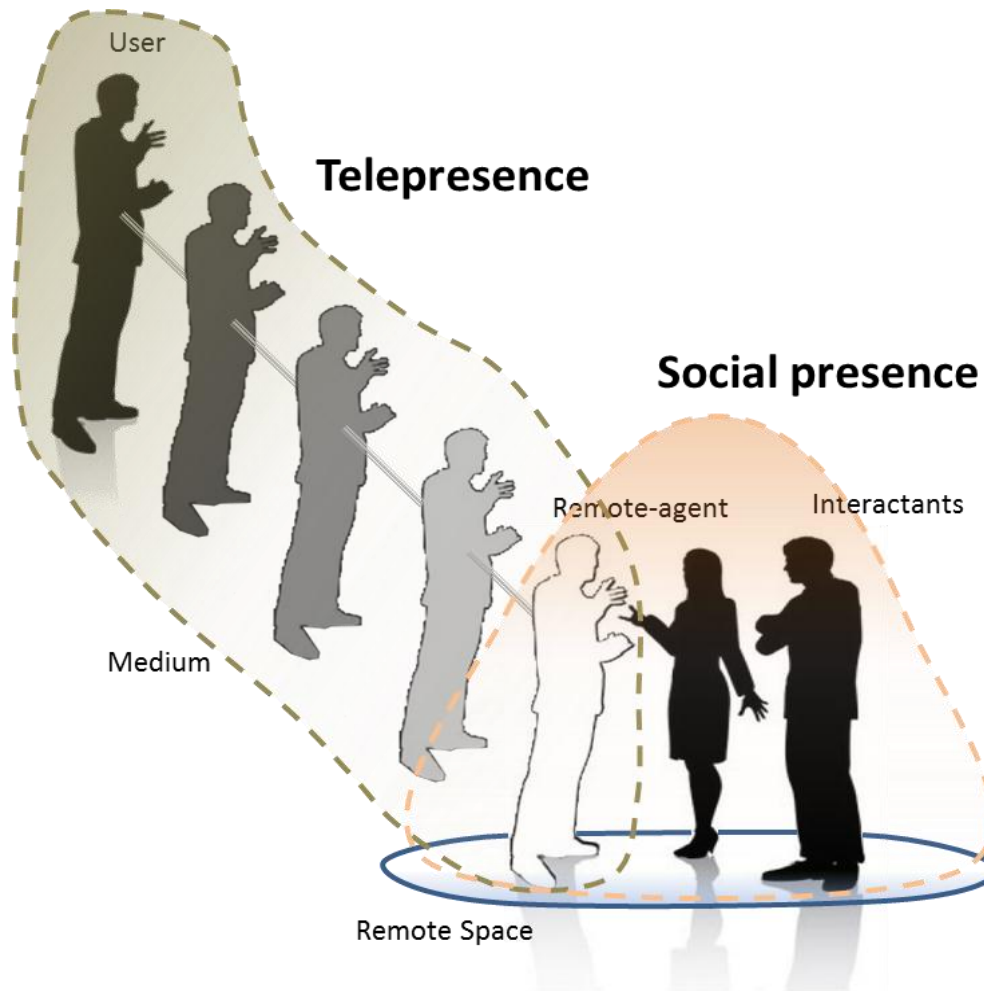
## Nonverbal Communication

- Physical Appearance<sup>2,3</sup>
- Chameleon effect<sup>4</sup> and Motor interference<sup>5</sup>
- Facial Expression, postures and gestures<sup>6,7</sup>



1. F. Biocca, International Workshop of Presence, 2001
2. H. Knapp, Nonverbal Communication in Human Interaction, 2002
3. W. Bainbridge, The 17th IEEE International Symposium on Robot and Human Interactive Communication, 2008
4. T. Chartrand, Journal of personality and social psychology, 1999
5. E. Oztop, International Journal of Humanoid Robotics, 2005
6. M. Argyle, Bodily Communication, 1988
7. A. Mehrabian, Silent messages, 1981

# Conclusion





# Question and Answer



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