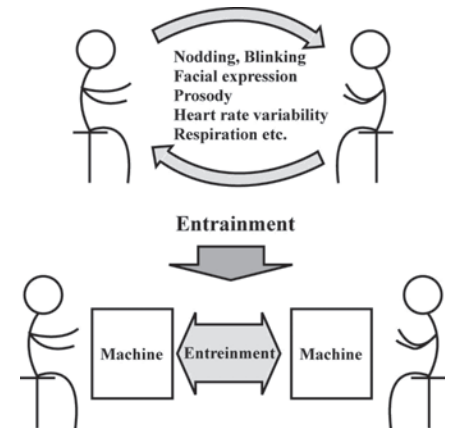


Human-Entrained Embodied Interaction and Communication Technology

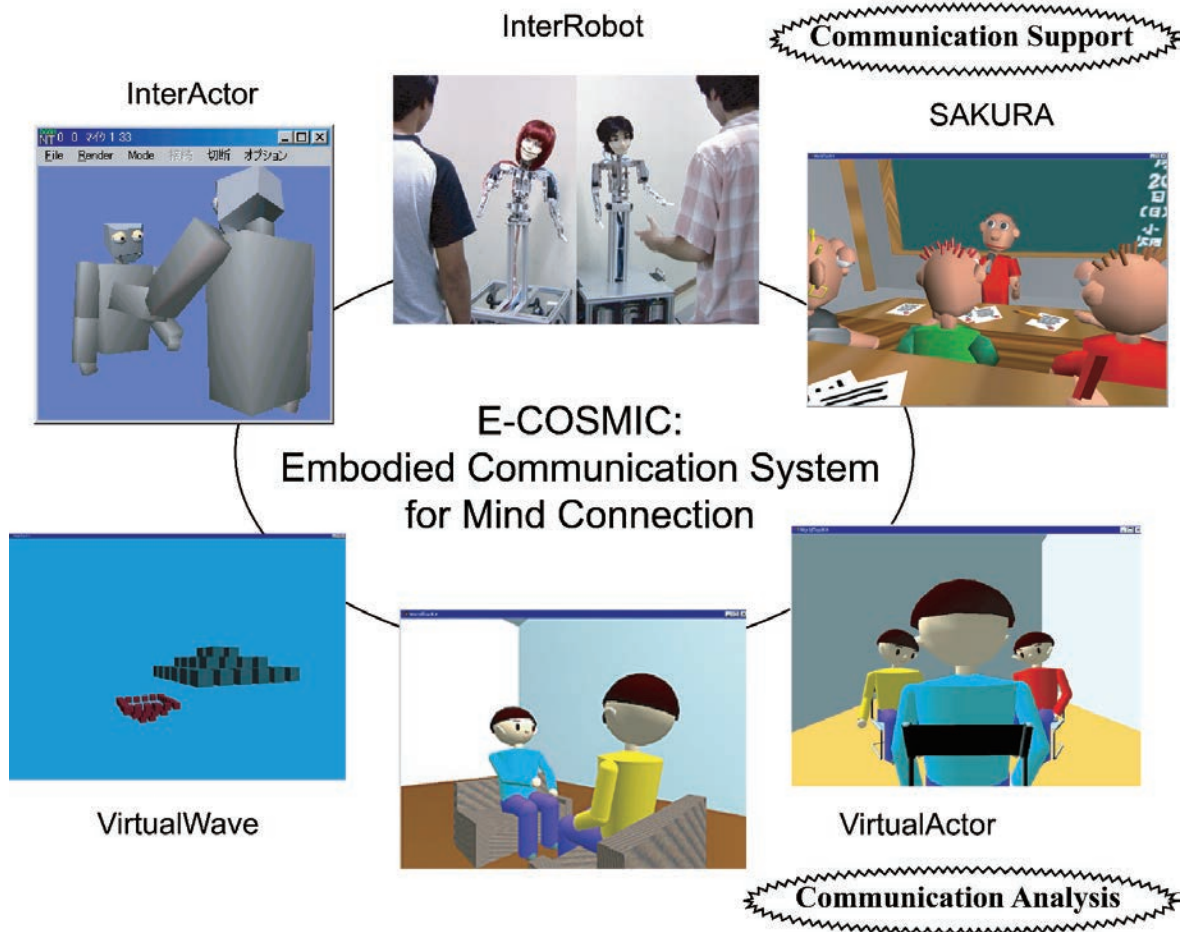
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- In human face-to-face conversation, embodied rhythms between speech and body motions such as nodding are mutually synchronized not only between talkers but also in a talker.
- This synchrony called entrainment in communication generates the sharing of embodiment in human interaction, which plays an important role in human interaction and communication.
- Focusing on the embodied entrainment, the embodied communication system for mind connection (E-COSMIC) has been developed by applying the entrainment mechanism of embodied rhythms of nodding and body movements to physical robots and CG characters in verbal communication.
- E-COSMIC comprises an embodied virtual communication system for human interaction analysis by synthesis and a speech-driven embodied interaction system for supporting essential human interaction and communication based on the analysis that uses the embodied virtual communication system.

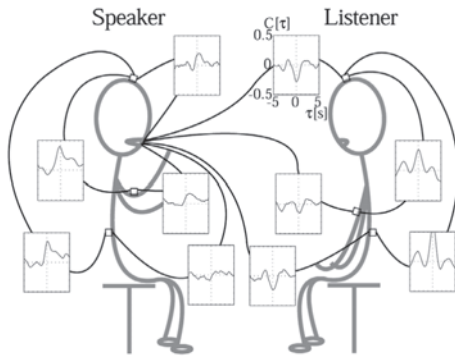


Voice Driven Embodied Interaction System

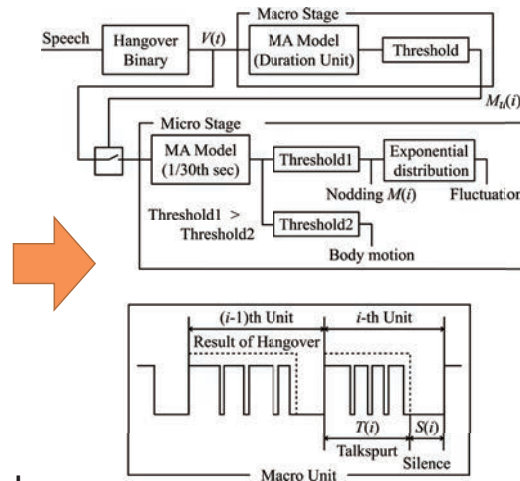


Embodied Virtual Communication System

Robot motions are generated automatically based on voice!



Relation among speaker's speech and his own motions and listener's motions.



$$M_u(i) = \sum_{j=1}^J a(j)R(i-j) + u(i)$$

$$R(i) = \frac{T(i)}{T(i) + S(i)}$$

$a(j)$: linear prediction coefficient
 $T(i)$: talkspurt duration in the i -th duration unit
 $S(i)$: silence duration in the i -th duration unit
 $u(i)$: noise

➡ The macro stage estimates whether a nodding response exists or not.

$$M(i) = \sum_{j=1}^K b(j)V(i-j) + w(i)$$

$b(j)$: linear prediction coefficient
 $V(i)$: voice
 $w(i)$: noise

➡ The micro stage predicts the timing of nodding.

Nodding prediction: MA (Moving-Average) model



Applications of the human-entrained embodied interaction and communication technology

Presentation



Discussion Support



e-Learning



Navigation



Media Robot



Medicine / Care



Contents Production



Mobile



Toy / Game



From the viewpoint of human interface in the advanced media society and super aged society, the embodied interaction and communication technology is introduced as the basis of human connected IoT smart technology.