Self-Other Motion Equivalence Learning for Head Movement Imitation

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Ideas

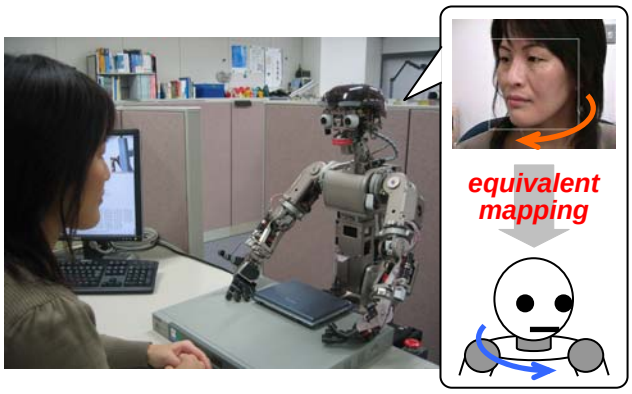
Q. What equivalence between the self and other should be used to imitate head movement?

A. **Motion** rather than posture.

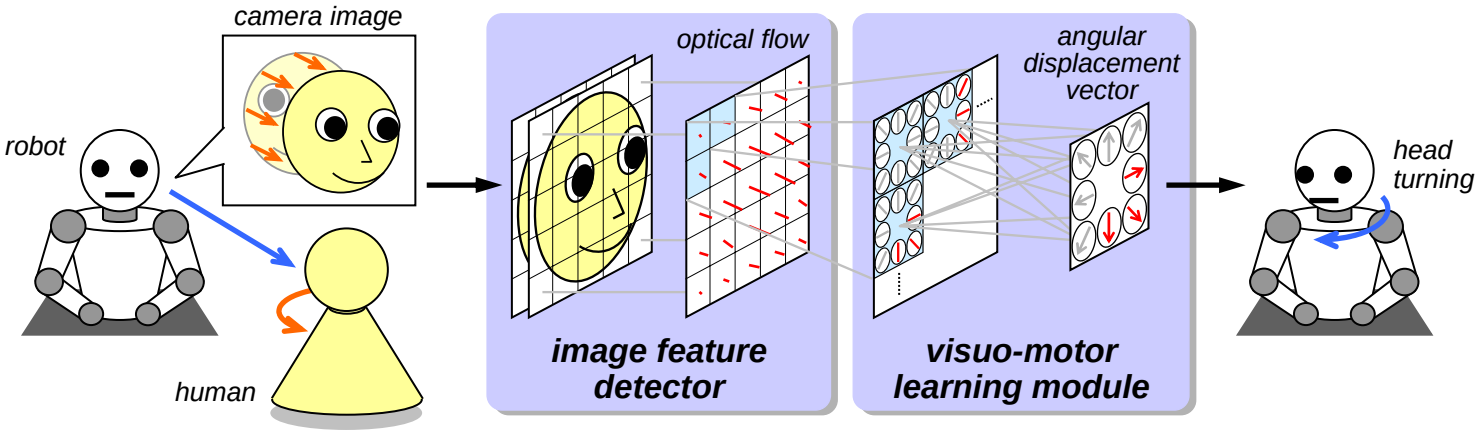
- the self → **angular displacement vector**
- the other → **optical flow**

Q. How to find the equivalence?

A. By **tracking the other's face.**



Learning Model for Head Movement Imitation



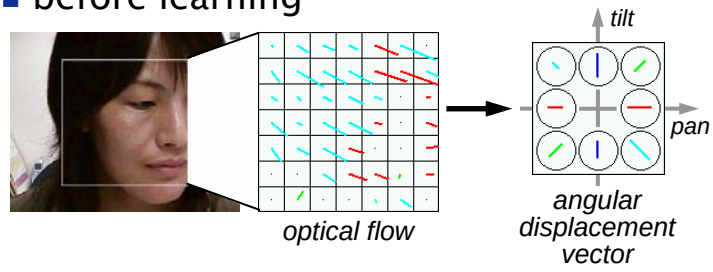
human: turns his/her head

robot: tracks the person's face → turns its head to the same direction

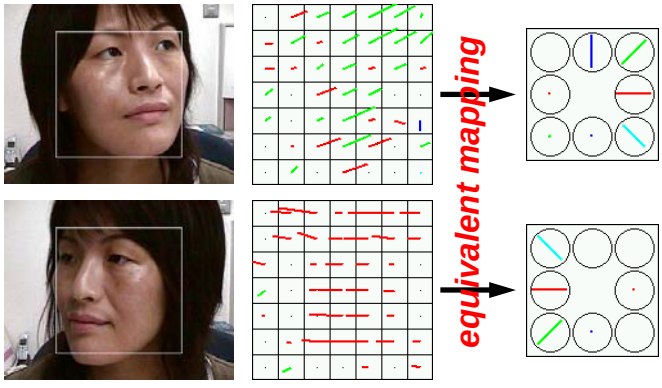
robot: Hebbian learning between the optical flow and the angular displacement vector → equivalent mapping

Experimental Results

- before learning



- after learning (online, a few minutes)



Conclusions

- **Motion** provides the self-other equivalence for imitation.
- **Tracking the other's face** enables a robot to have experiences of turning its head to the same motion direction.
- Encoding input and output into **motion selective neurons** enables one-to-one equivalent mapping.

References

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