

# Collective Self-awareness in Multi-Robot Systems

Mohammad Rahmani

DECIDE Doctoral School

January 10, 2021

# Biological Intelligent Agent (IA)

Every intelligent agent such as human has the ability to relate what is happening outside to what is happening inside it. These events are perceivable by sensors. Outside could be observed by sensors such as eye and inside could be perceived by sensors such as cochlea

# Biological IA

- Initial knowledge



$DBN_1$

Human brain and the choice of between  $DBNs$  - free energy

## In single IA

Multi layer DBNs One maps from visual data (exteroceptive) to proprioceptive One approach: control data will be observation and position will be real states Now what we need to do is 1. To model the relationship between control data (observation/evidence/proprioceptive) and position (continuous states/proprioceptive)

the first layer says if you apply this amount of power/velocity/steering etc while you are position  $X_t$  then you expect to be at position  $X_{t+1}$

2. To map the states to compos-able semantics - to describe new situations based on previous situations

The reason to form different strategies for temporal, cause-effect super/semantic states is to enable the IA to make a distinction between meaningful and un-meaningful temporal, cause-effect sequences.

## In Collection of IAs

The relation Changes in the distance vector could have been studied. But a general solution can the co-occurrence of semantic states

# References I

