PHIL 371
Week 9: Action and Robots
Please turn off and put away all electronics.

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Why Did Consciousness Evolve?

Side effect of increasing brain size and representational capacity?

Useful for social interactions?
Social brain hypothesis (Dunbar)
Cooperation (Tomasello)
Alloparenting (Hrdy)
Social foraging (Sterelny)
Social learning and *teaching*

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Levels of Consciousness

1. Basic feelings

2. Feelings **about** situations

3. Self awareness (macaques too?)

4. Awareness of self in social context

Conjecture: 1-2 are side effects, but 3-4 are advantageous for social functioning.

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Make Computers Conscious?

No current computers/robots display behaviors that indicate consciousness.

Reasons to want conscious computers: better social interactions, ethical behavior?

How to build a conscious computer:
1. Multimodal representations
2. Recursive binding
3. Attention bottleneck and competition

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Conscious Action

1. Most action is unconscious, automatic, and fast, e.g. walking to class.

2. But some actions seem to be conscious, deliberate, and slow, e.g. choosing a job.

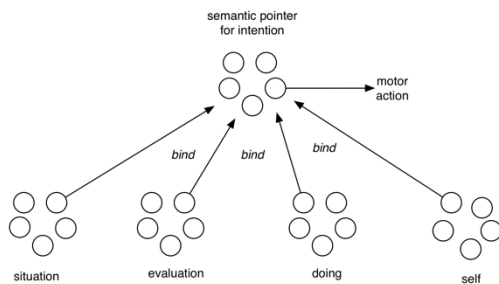3. Question: does conscious thought contribute to action?

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Discussion Questions

1. Does consciousness contribute to actions as reasons, causes, or neither?

2. Would you want a robot to have conscious control of action?
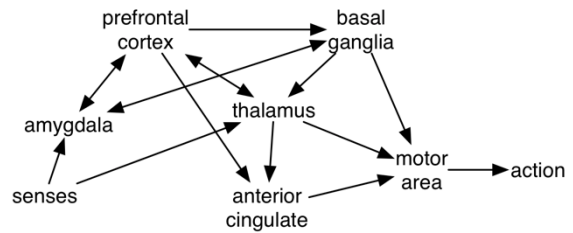
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Intentions as Semantic Pointers

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Brain Mechanism

Expanded from Schröder, Stewart, and Thagard, "Intention, Emotion, and Action", *Cognitive Science*.

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Will Alternatives

Will: Direction of action by deliberate conscious control.

Libertarian: People have complete free will.

Determinism: All events have causes.

Hard determinism: All events have causes, so there is no free will.

Soft determinism (compatibilism): All events have causes but people have free will.

Hard *in*determinism: Not all events have causes, but mental acts do, so there is no free will.

Free-ish will: people are responsible for actions that are not coerced or diseased.

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How BigDog Works

Representations: 50 sensors: body attitude and acceleration, joint motion and force, temperature, speed, etc.

Procedures: Integrate sensory information, estimate movement, control joints, regulate ground interaction to maintain propulsion, communicate with human operator, control locomotion such as walk, squat, trot.

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BigDog Strengths

1. Walks over rough terrain

2. Integrates many senses

3. Various kinds of action

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BigDog Limitations

1. Requires human controller (not later versions?)

2. Limited inference and planning

3. Limited sensors: later versions add LIDAR (laser sensing)

4. No conscious will

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Discussion Question

Can robots be built that act the way that humans do?

Should such robots be built?

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Robots Versus Humans

1. Advantages of robots: no fatigue, pain, emotional distractions.

2. Advantages of humans: motivations, intentions, complex inferences, flexibility.

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