



# Misperception, Self-Deception and Information Warfare

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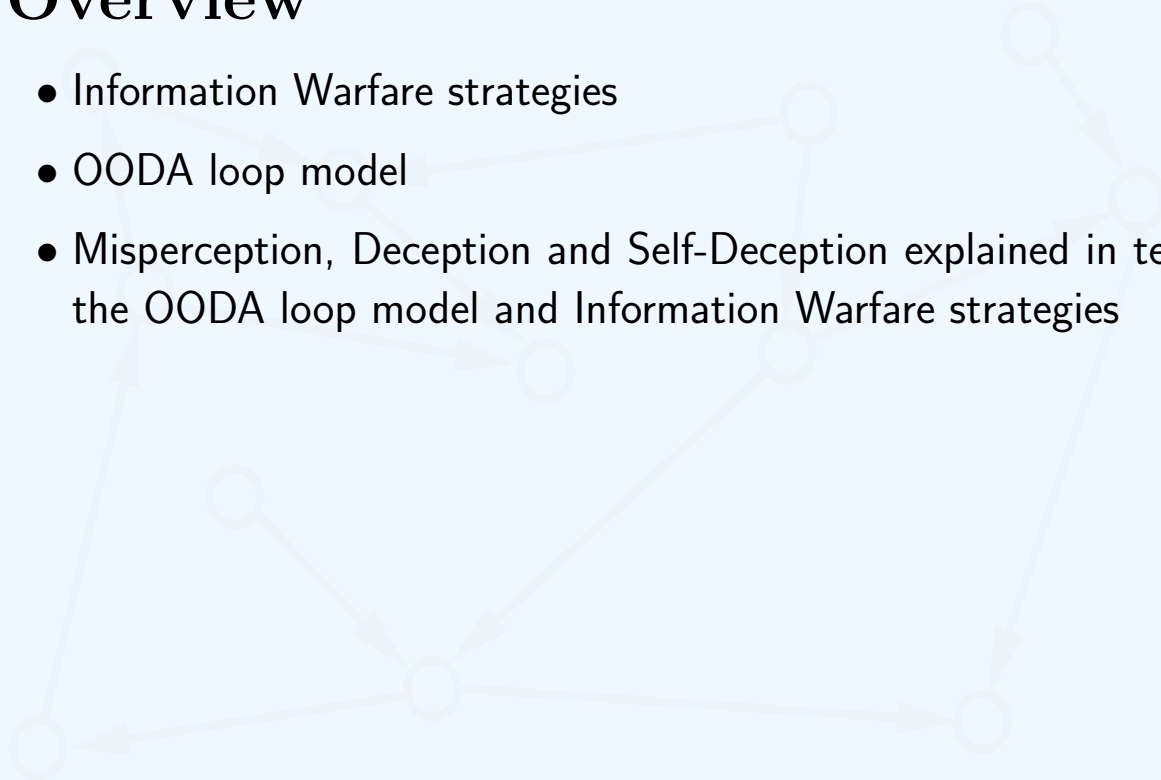
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# Overview

- Information Warfare strategies
- OODA loop model
- Misperception, Deception and Self-Deception explained in terms of the OODA loop model and Information Warfare strategies



# Information Warfare Strategies

The canonical Information Warfare strategies are as follows:

1. Degradation or Destruction / Denial of Information
2. Corruption / Deception and Mimicry
3. Denial [1] / Disruption and Destruction
4. Denial [2] / Subversion
5. Exploitation

Exploitation is not considered to be an IW strategy, as it does not manipulate the information channel. However it has been included here for completeness.



# Decision - Action Models

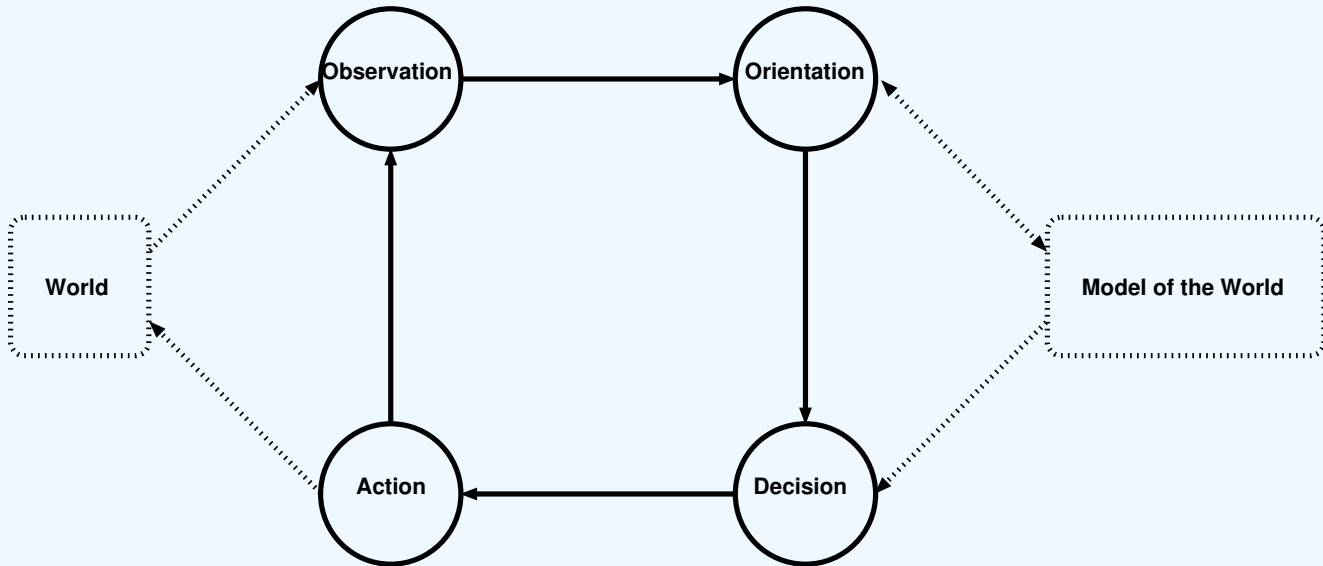
- Information Warfare/Strategy - OODA Loop (Boyd)
- Psychology - Perception Action Cycle (Neisser)
- Psychology - Human Action Cycle (Norman)
- Artificial Intelligence, Robotics - Perception Action Loop (Russell and Norvig)

Two things that these models all have in common:

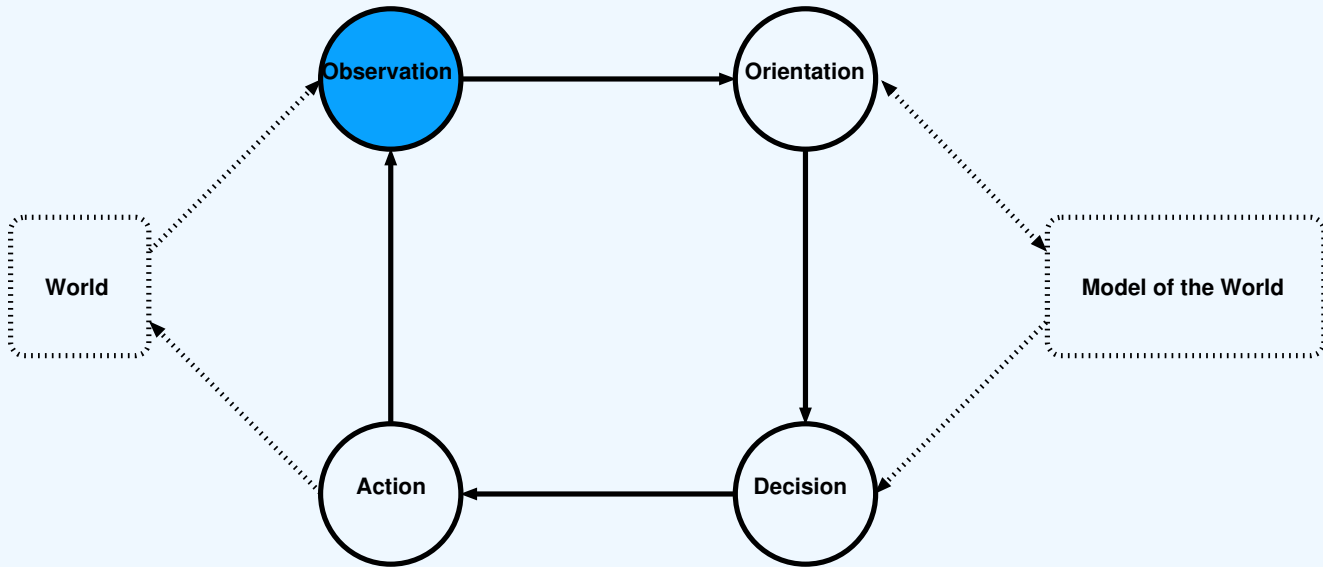
1. Event Loop. In all these models, the individual gathers and analyses information, then decides what to do and finally does it
2. Feedback. Actions from past decision cycles alter the world, the results of which are observed in present and future decision cycles



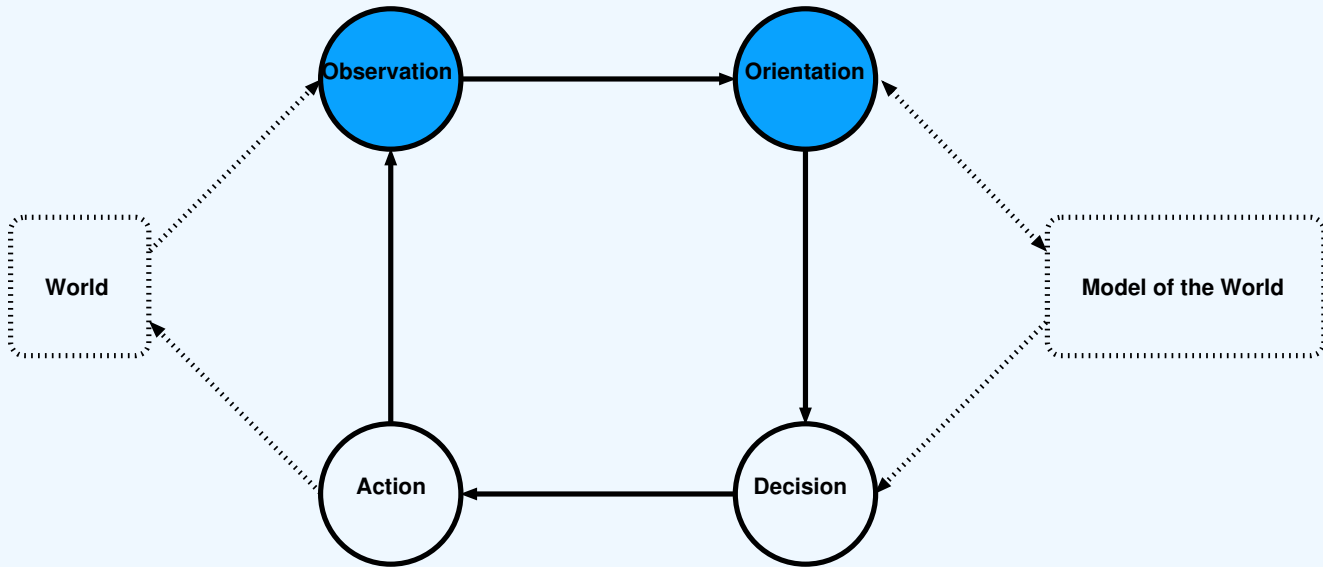
# Boyd's OODA Loop



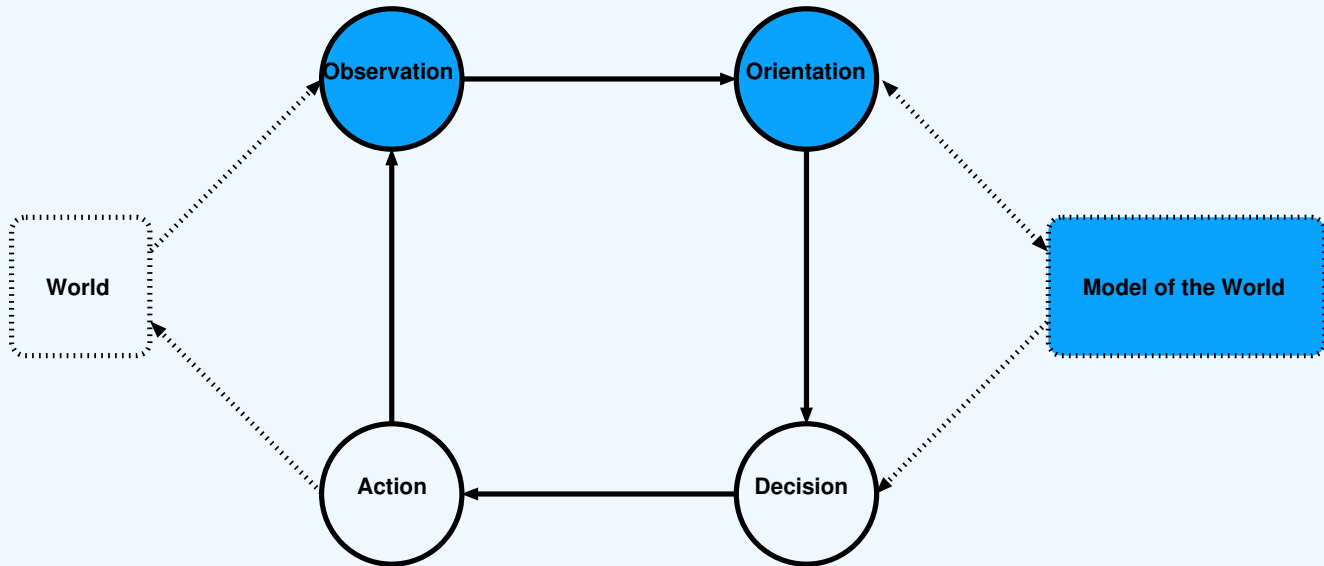
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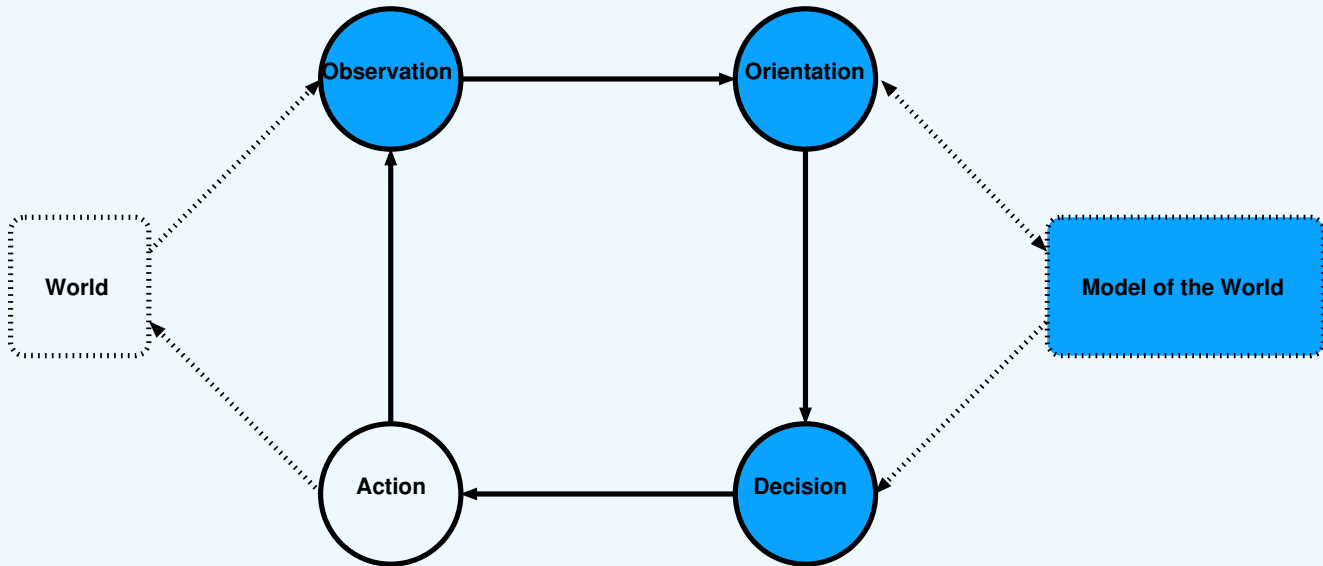


# Boyd's OODA Loop

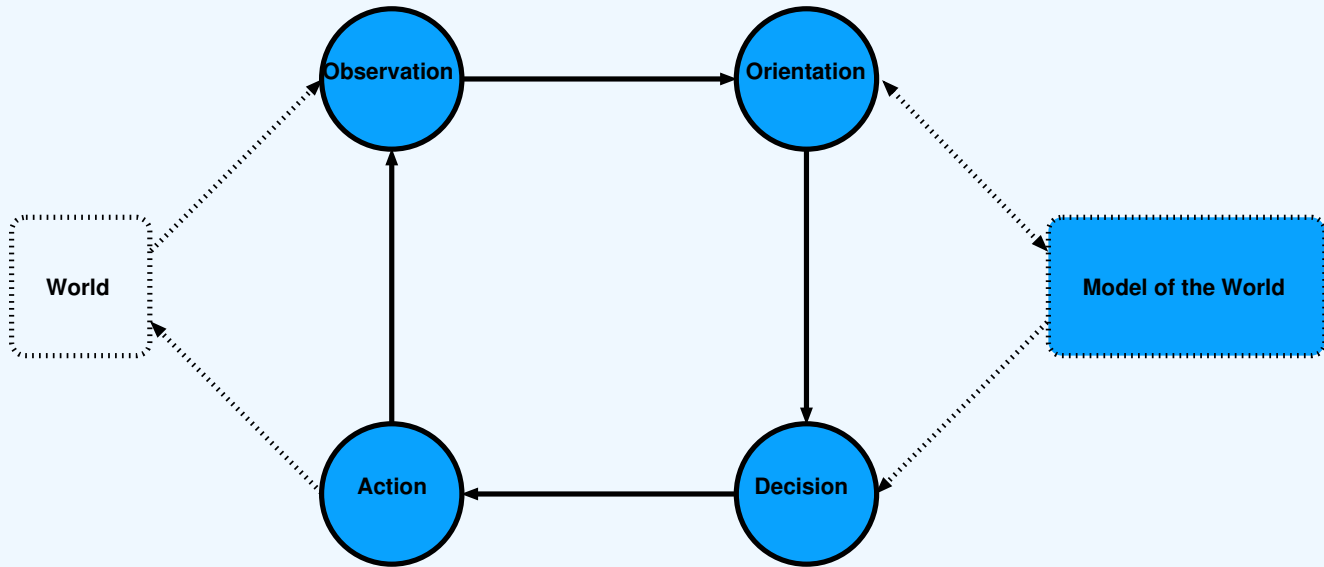




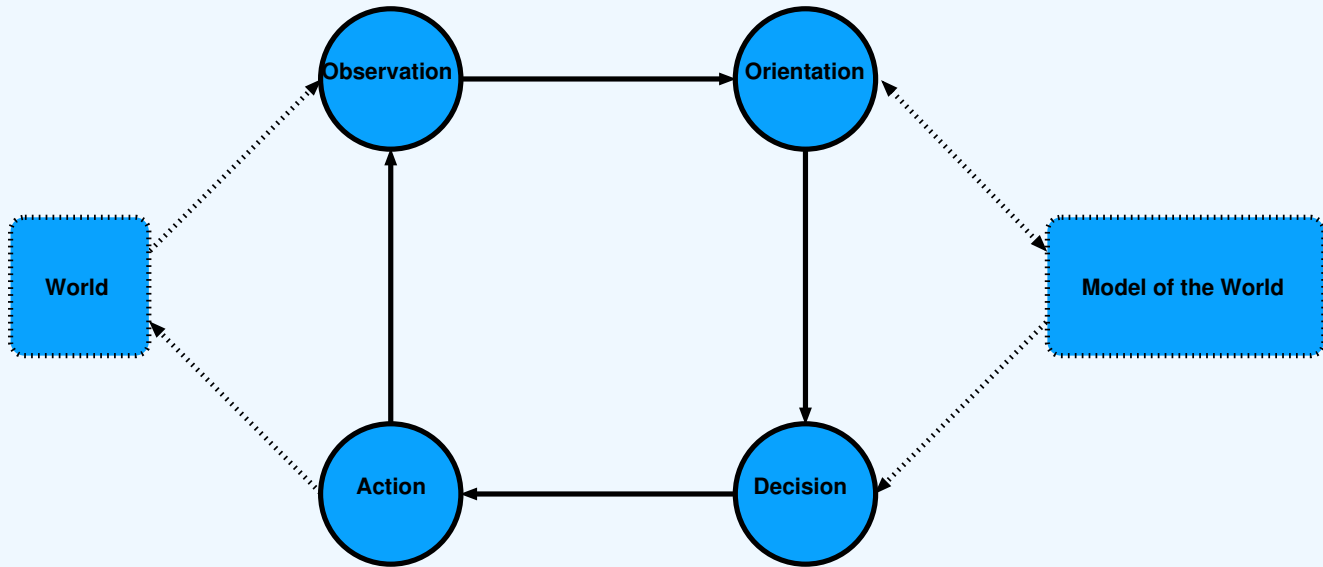
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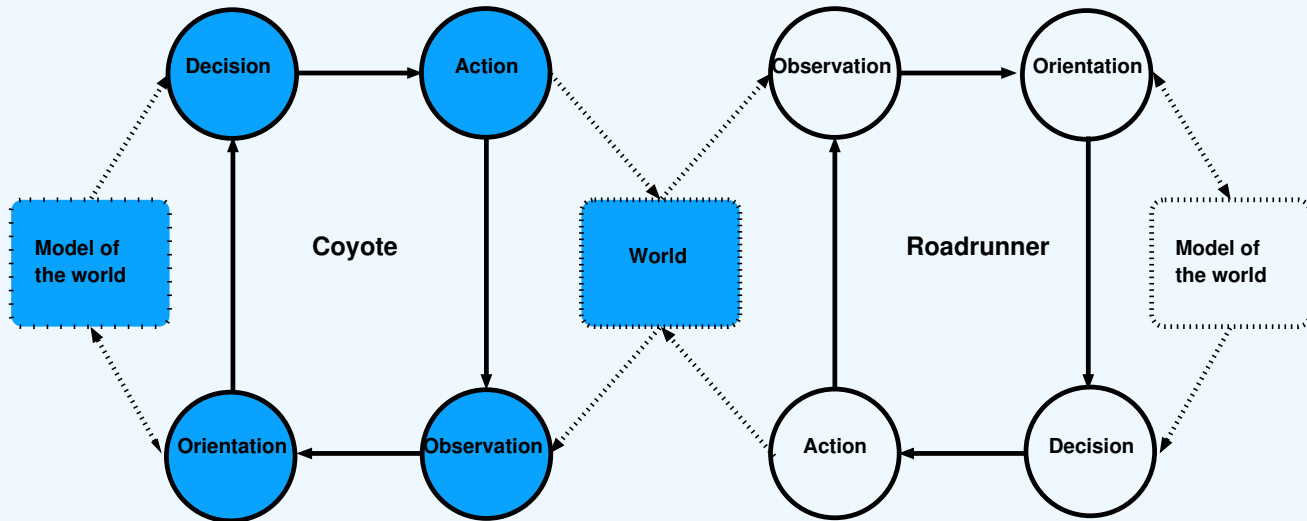


# Deception

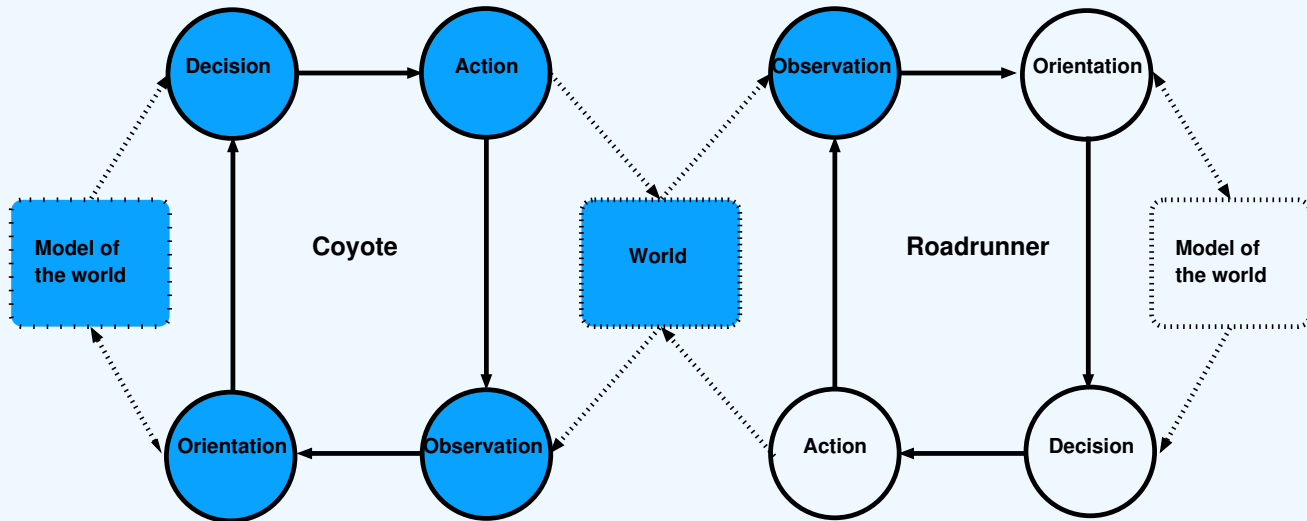
- Deception is another label for the Corruption Information Warfare strategy
- During a Deception attempt the Attacker corrupts information that will be perceived by the Defender
- The corrupted information is intended to alter the Defender's model of the world
- If the deception succeeds the Defender integrates the new corrupted information into their model of the world
- Decisions and Actions made by the Defender based on its corrupted model of the world will benefit the Attacker



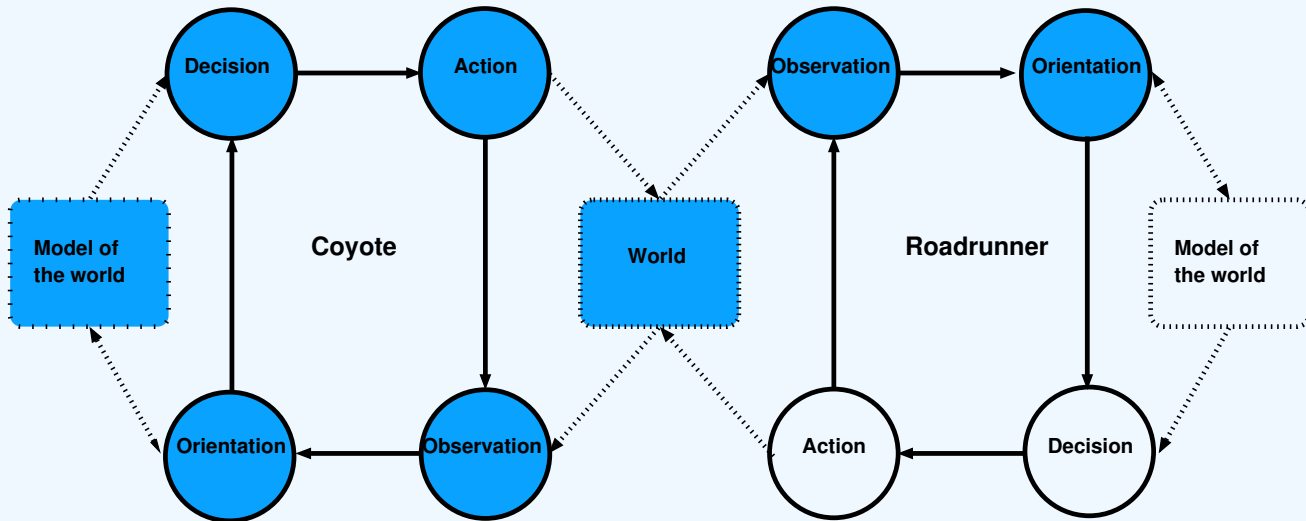
# Deception and the OODA loop



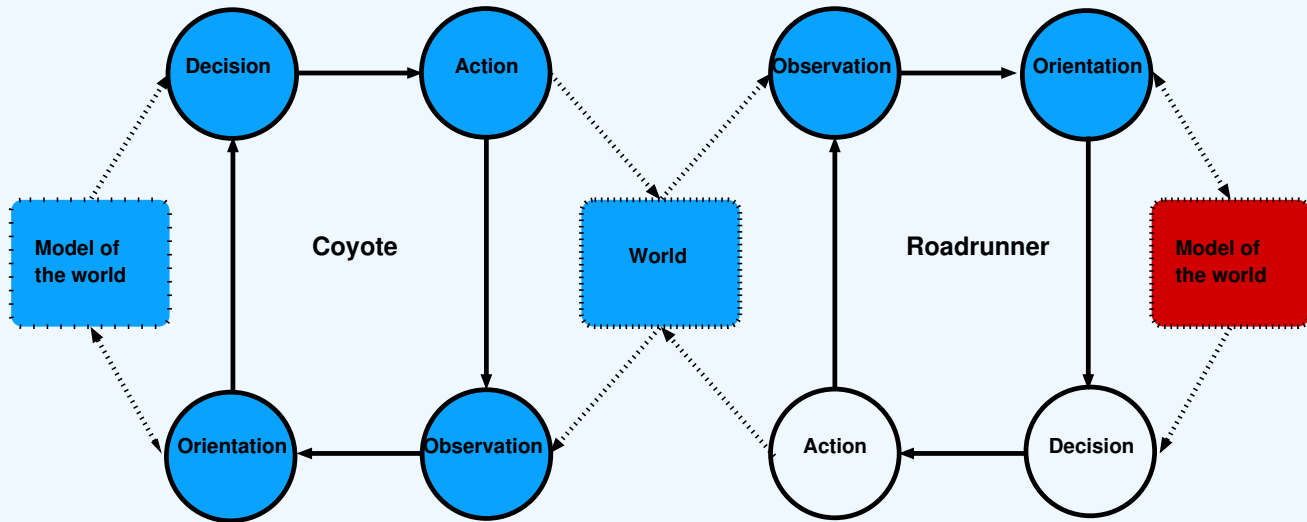
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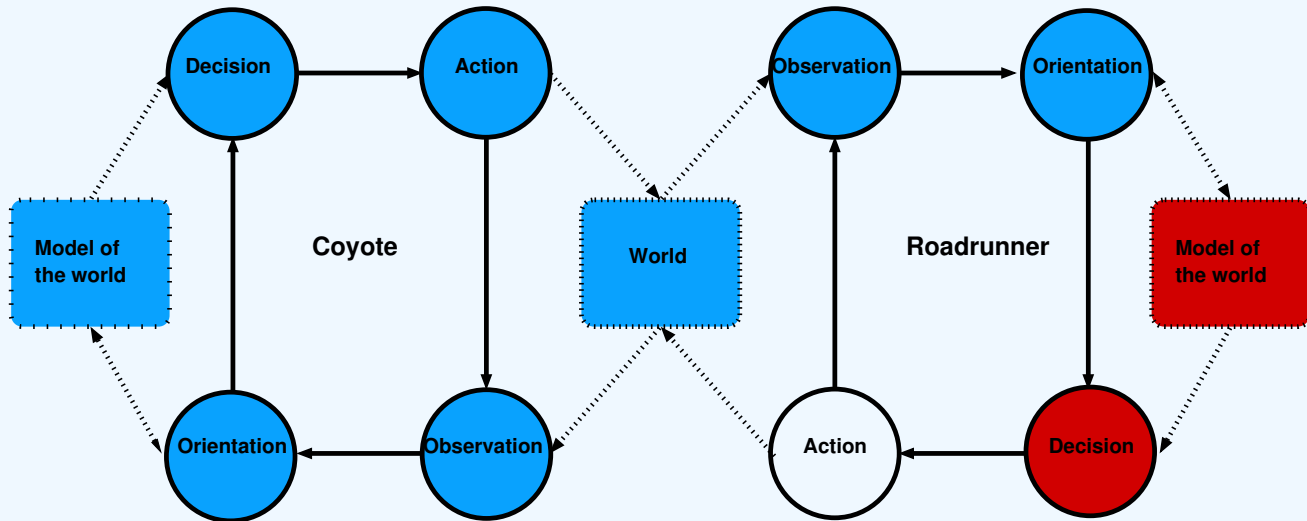


# Deception and the OODA loop

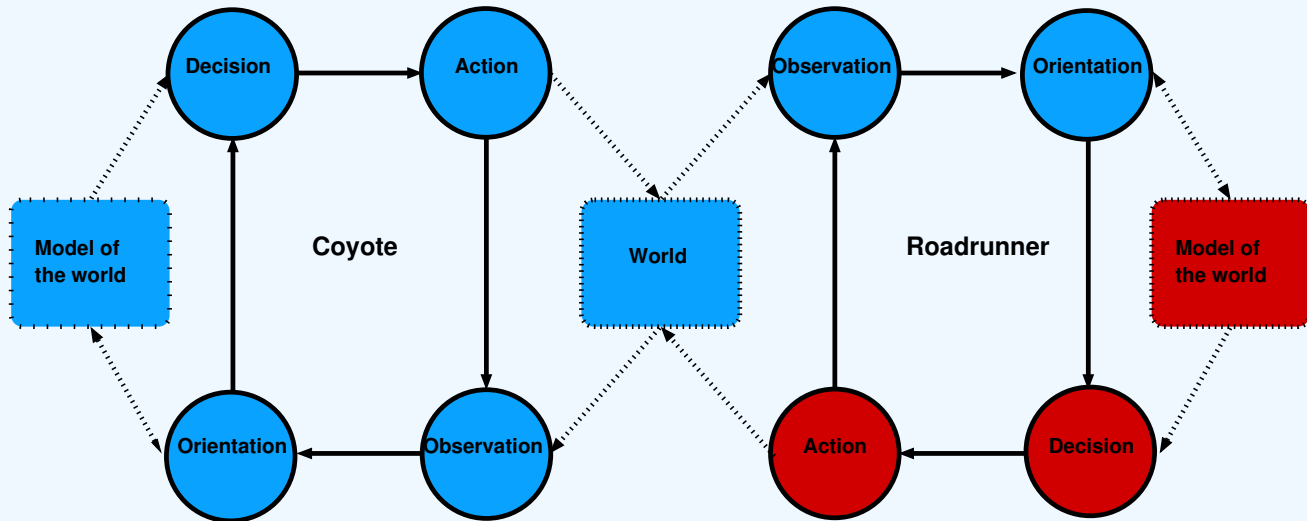




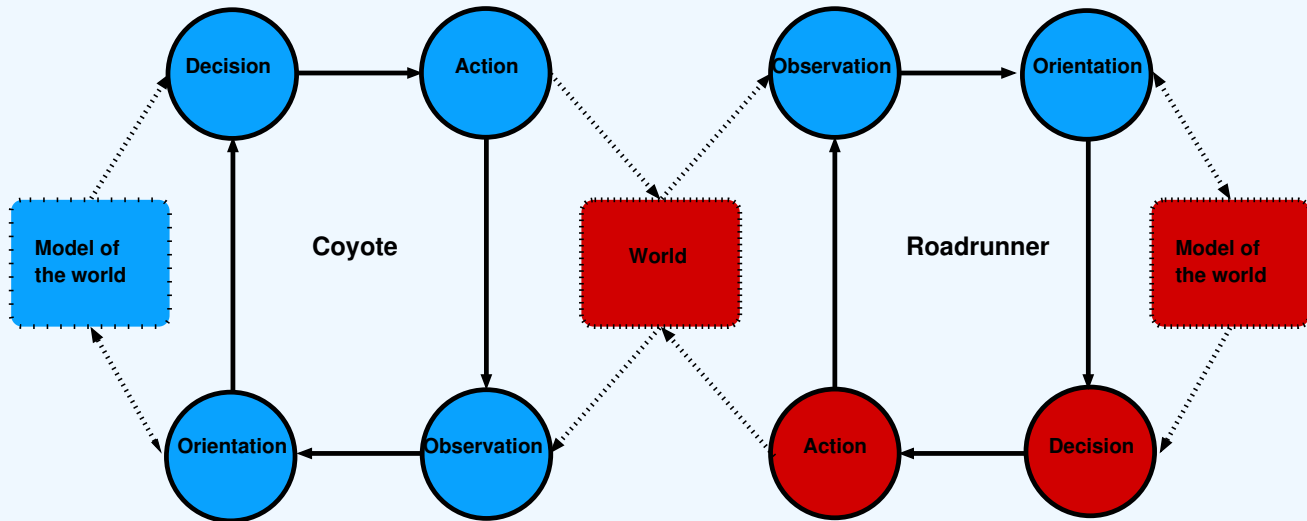
# Deception and the OODA loop



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# Misperception

There are two potential causes of an individual's misperception:

## 1. Malfunctioning information receiver

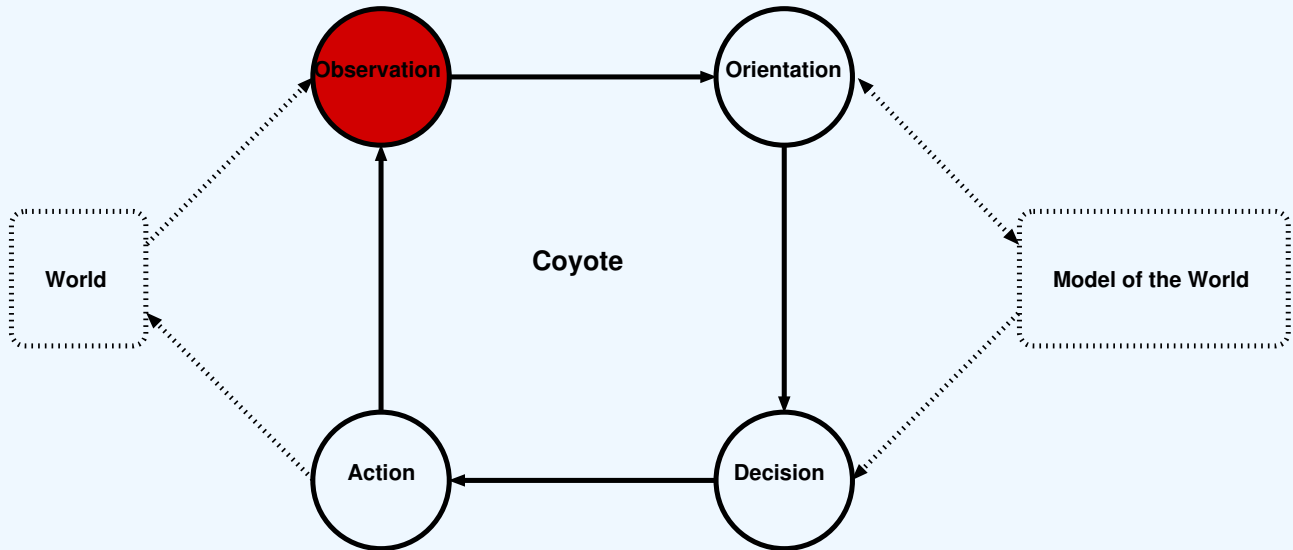
- Occurs during the Observation step of the OODA loop
- An information receiver could be eyes, ears, a radar receiver, a video camera
- The malfunction could be due to an IW attack against the information receiver (Denial [1] / Disruption and Destruction) or due to other causes

## 2. Existing bias or flawed analysis methods

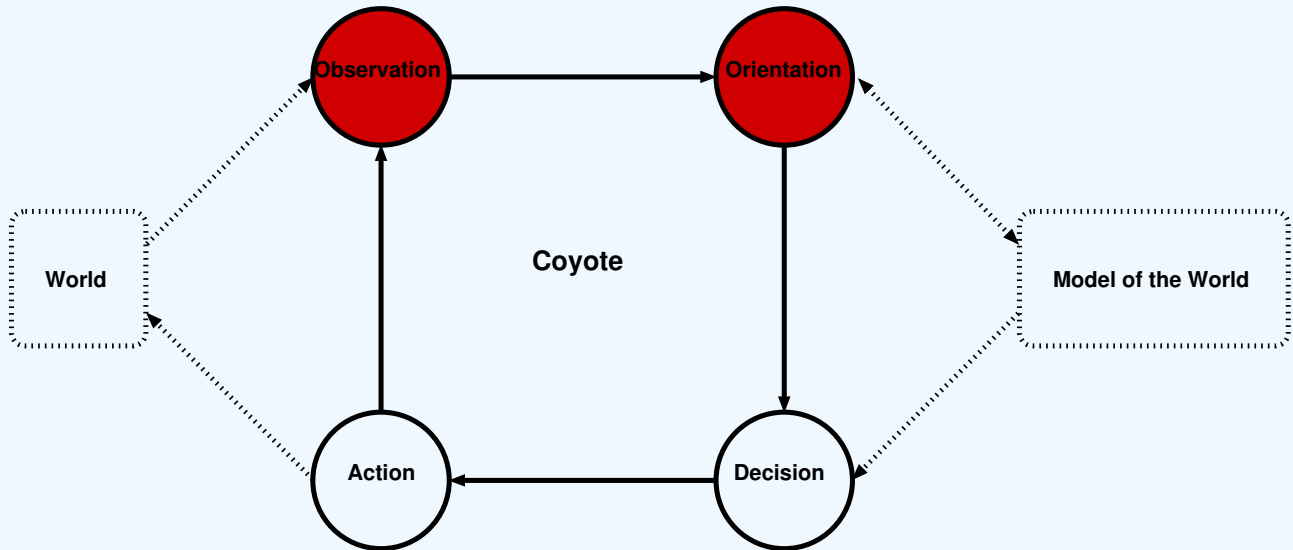
- Occurs during the Orientation step of the OODA loop
- Prevents the correct interpretation or integration of the new information



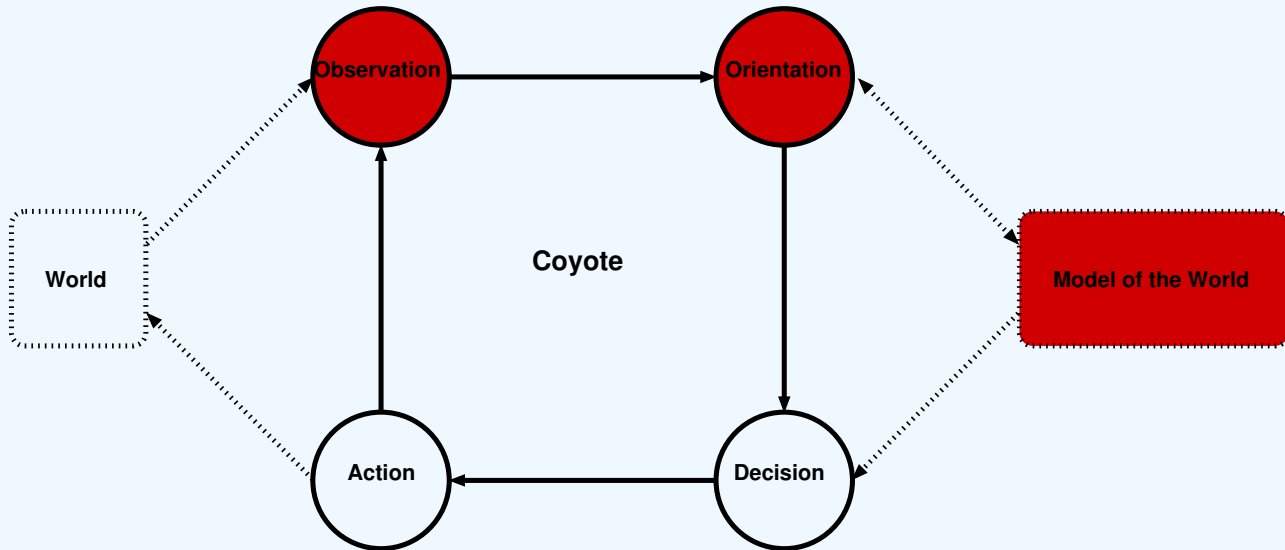
# Misperception and the OODA loop



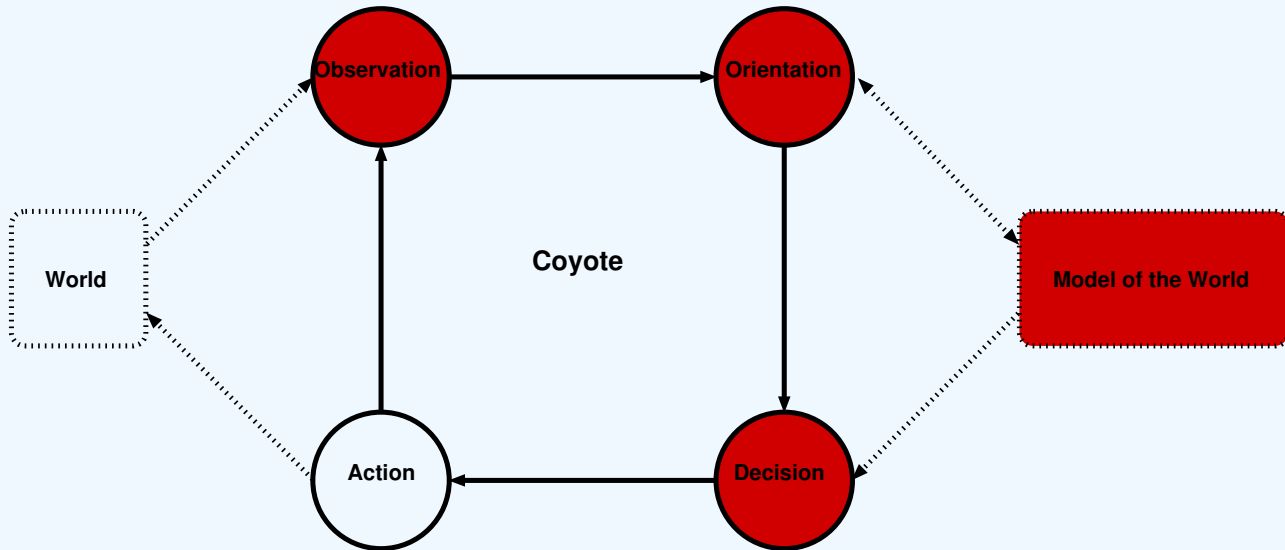
# Misperception and the OODA loop



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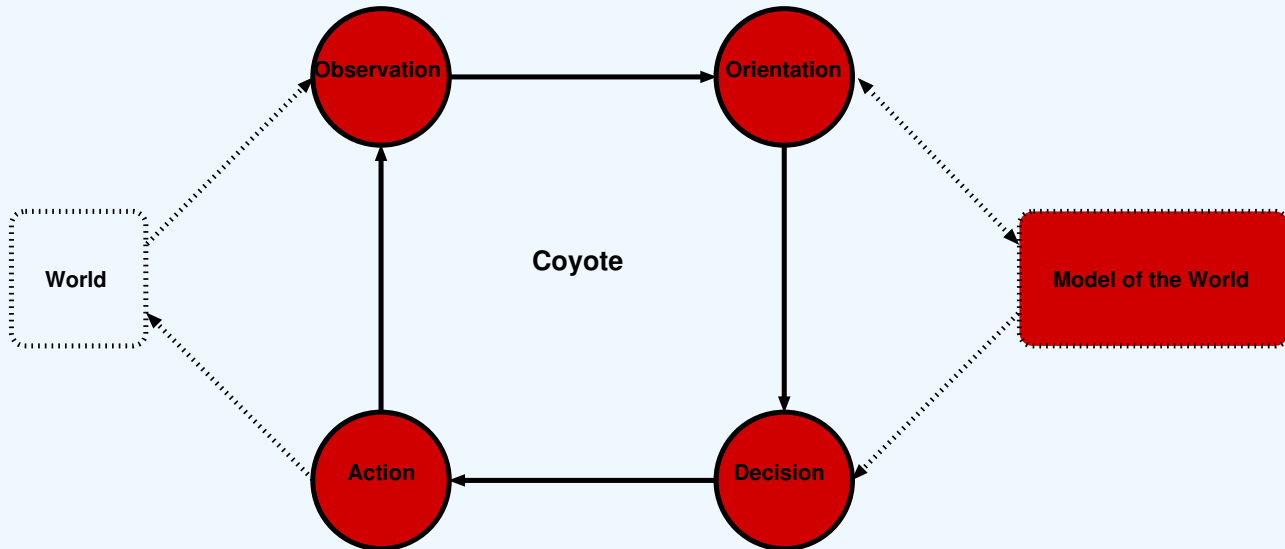


# Misperception and the OODA loop

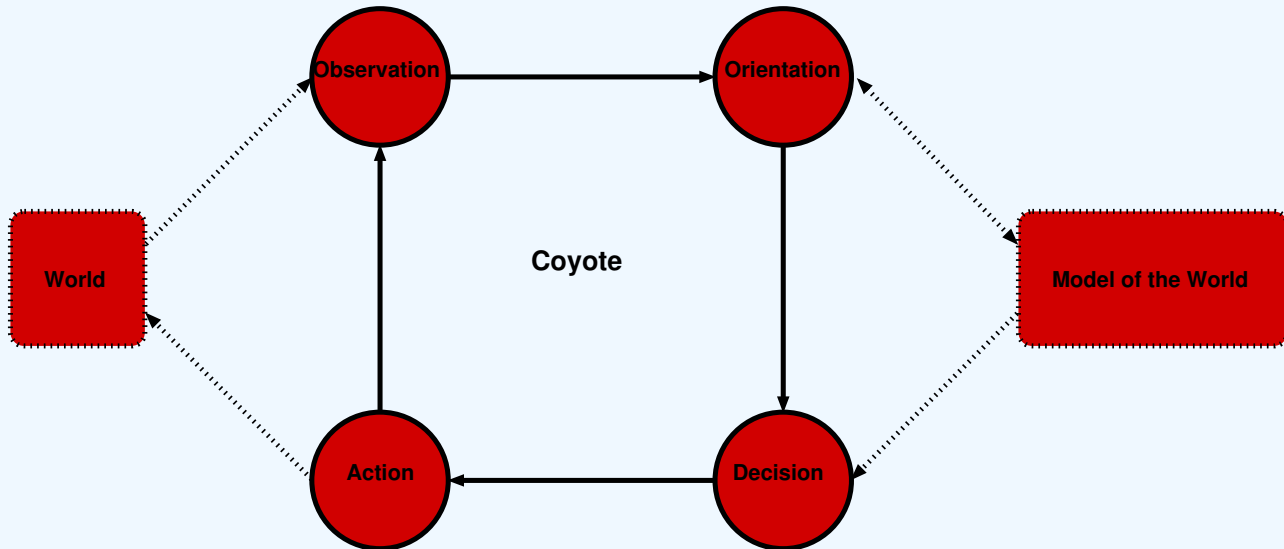




# Misperception and the OODA loop



# Misperception and the OODA loop



# Self-Deception

- Self-Deception is a special type of Deception where the Attacker and the Defender are the same entity
- There are two different proposals for how self-deception may aid the self-deceiver
  1. Self-Deception used to aid Deception (Trivers)
  2. Self-Deception used to hide information that will be harmful if perceived (Ramachandran)
- It is not necessary that a Self-Deceiver benefits from their Self-Deception. An individual may use Self-Deception to create a model of the world that is greatly different from reality. Decisions and Actions made based upon this model will not have the effects intended by the Self-Deceiver



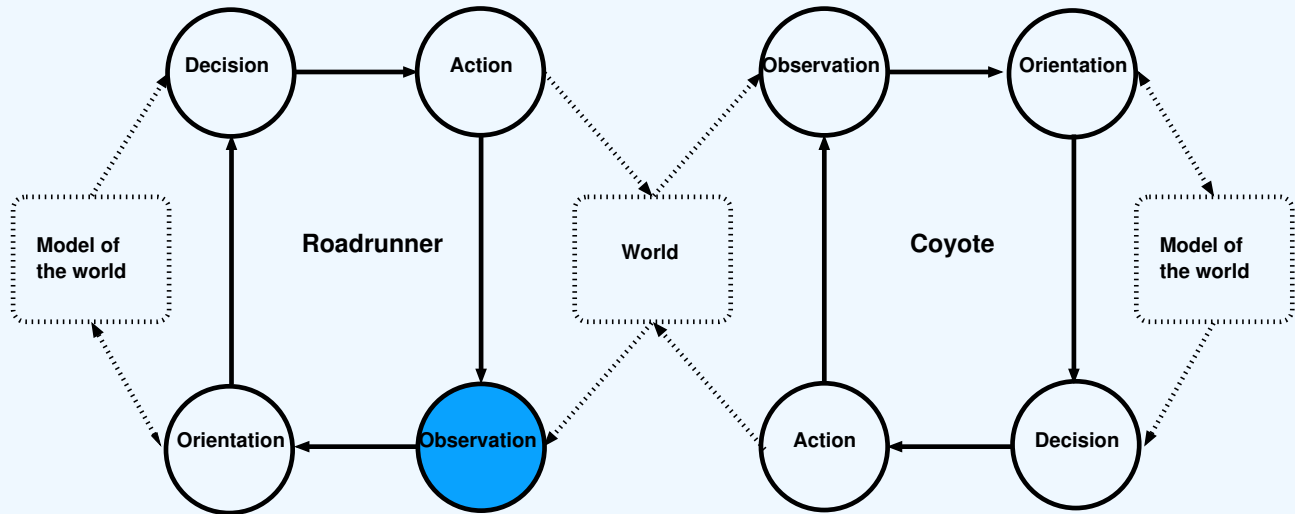
# Self-Deception (1)

Self-Deception aiding deception

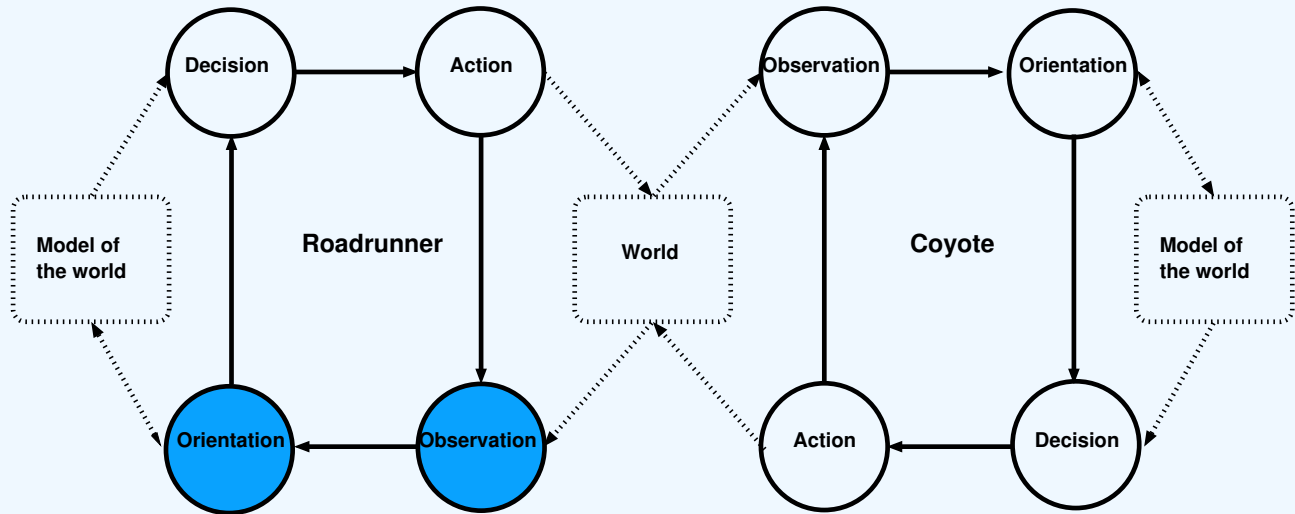
- The Attacker (Self-Deceiver) intentionally adds corrupted information to their perceived model of the world
- The Attacker then allows the Defender (Deception Victim) to perceive the corrupted information, as in normal Deception
- The Defender will also perceive the Attacker's behaviour, which will indicate that they believe the corrupted information. This will increase the chance that the Defender will be deceived by the corrupted information
- The Attacker can later remove the corrupted information from their world model and then take advantage of the Defender's actions



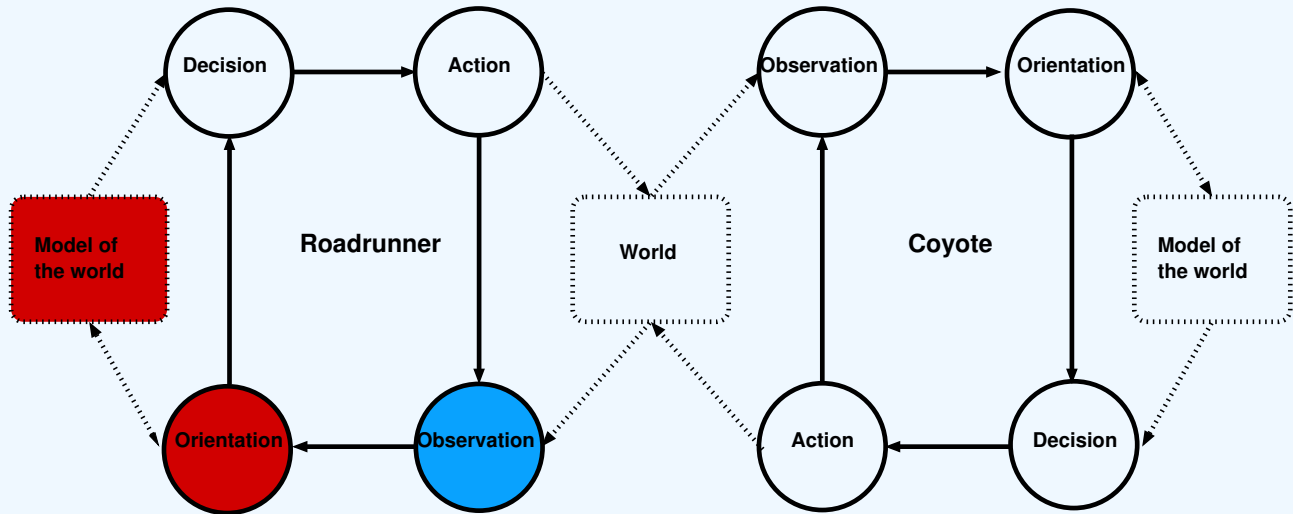
# Self-Deception and the OODA loop



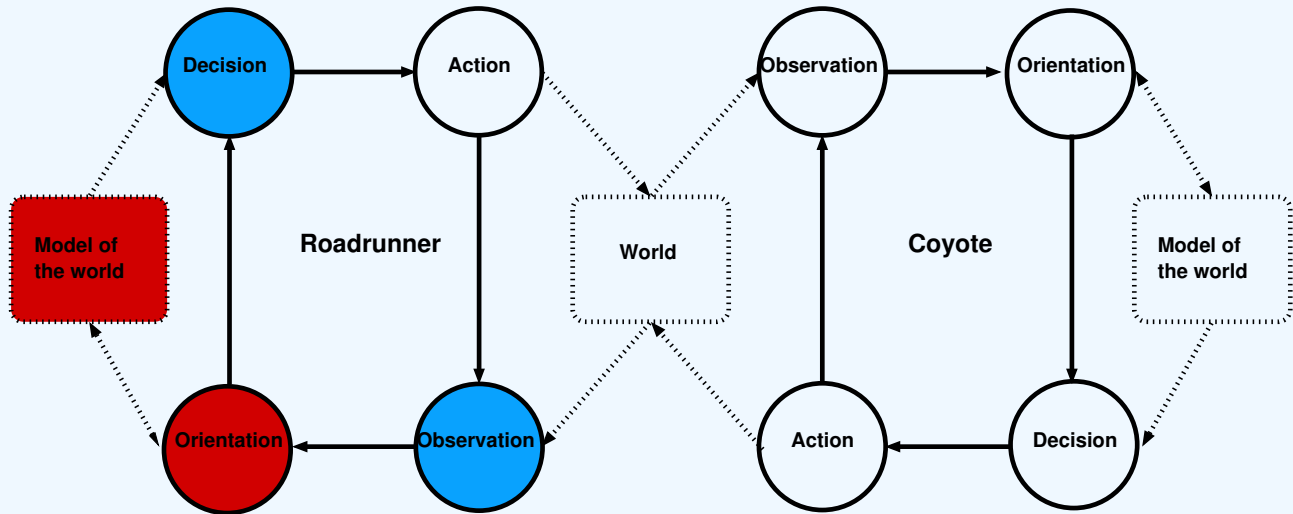
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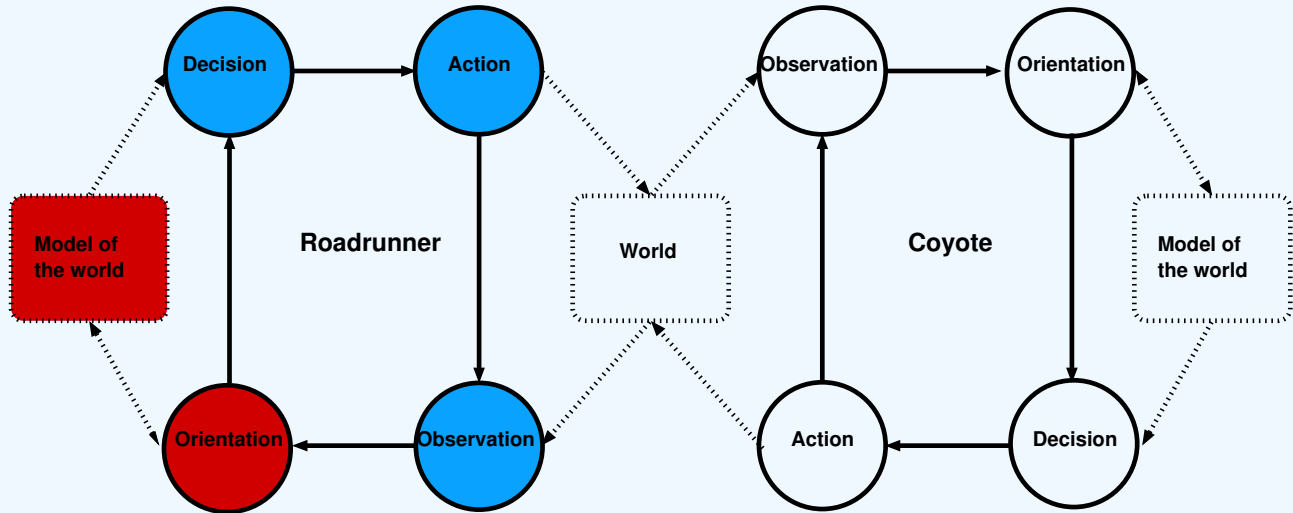


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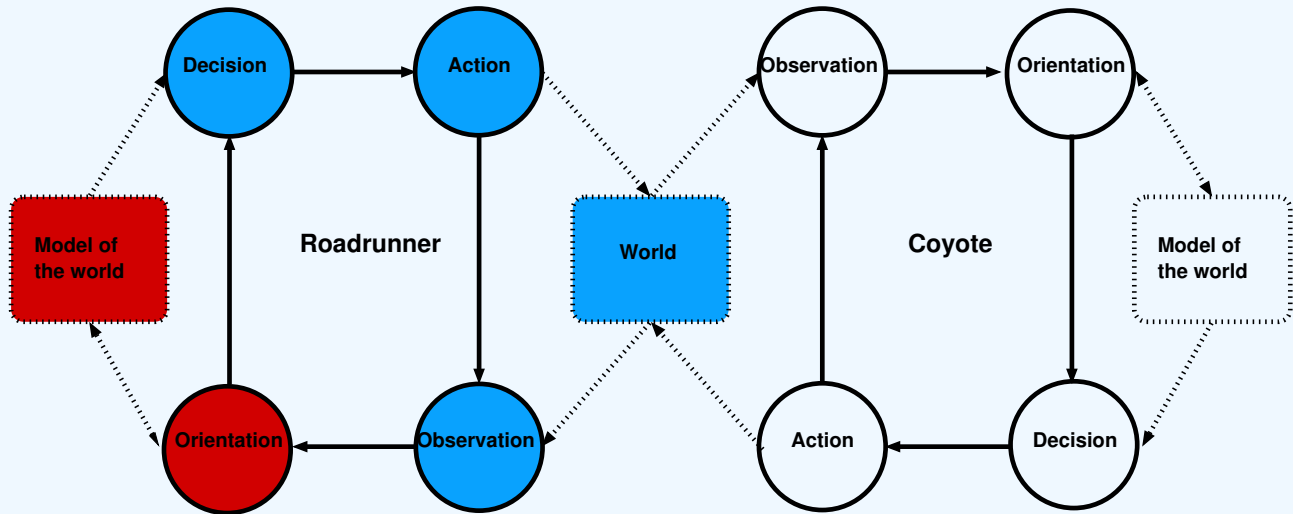




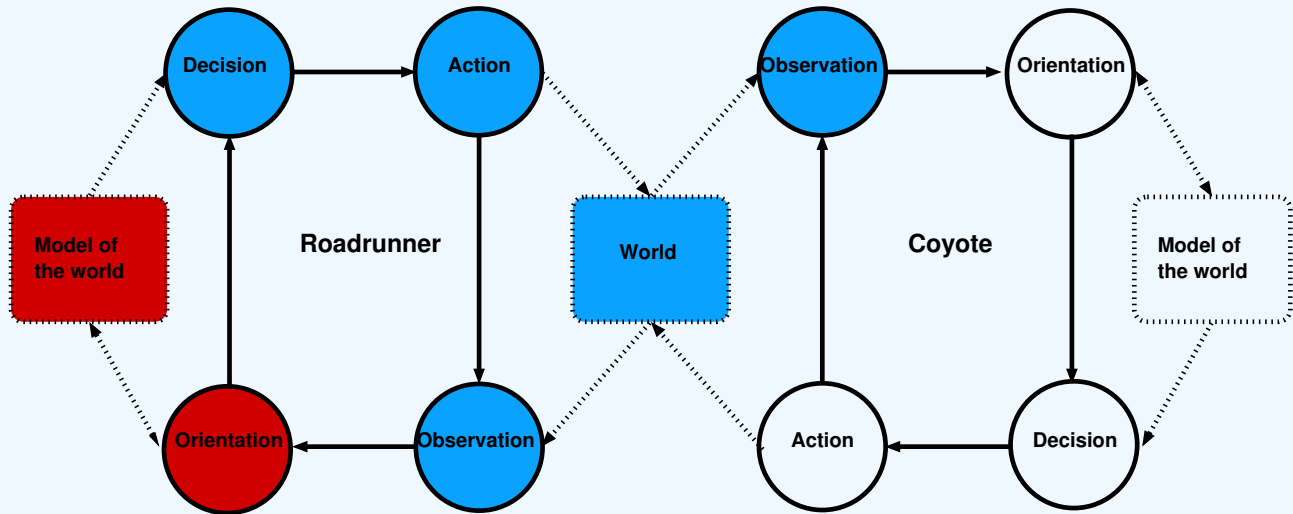
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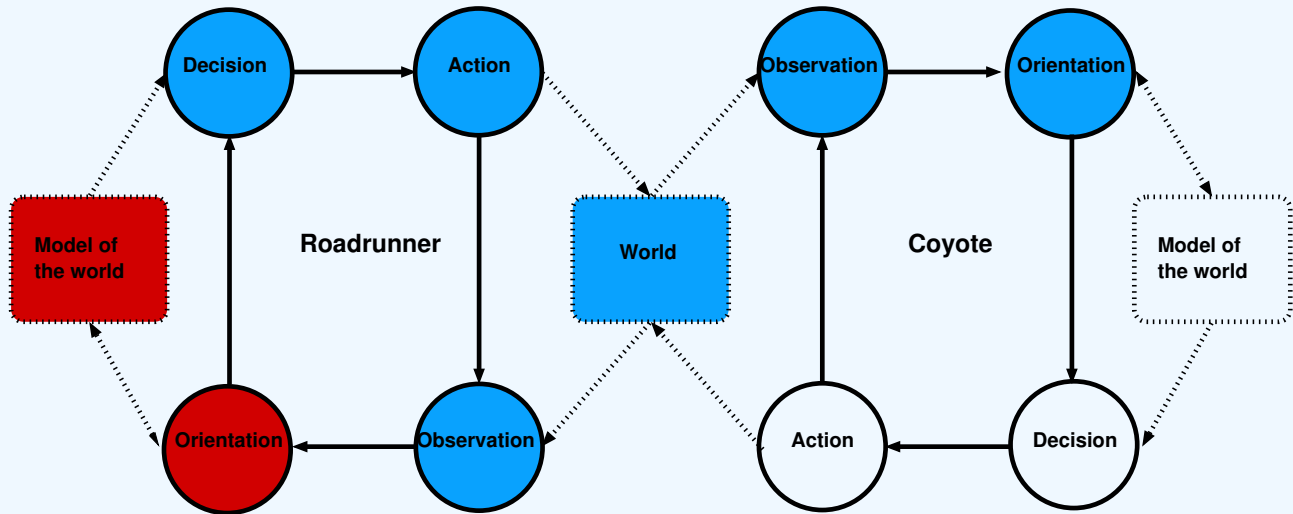
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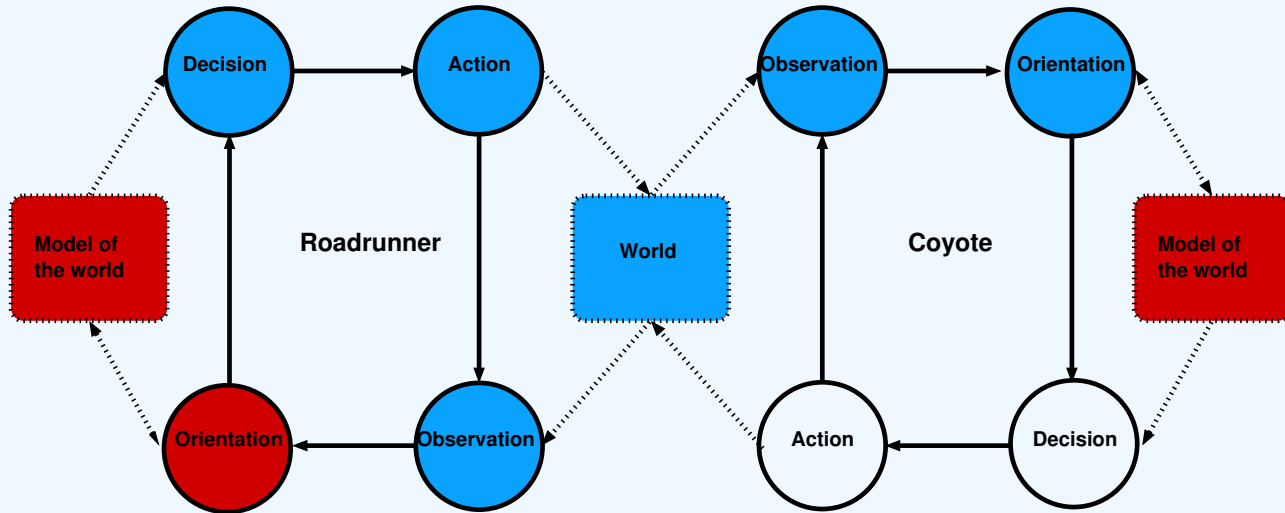
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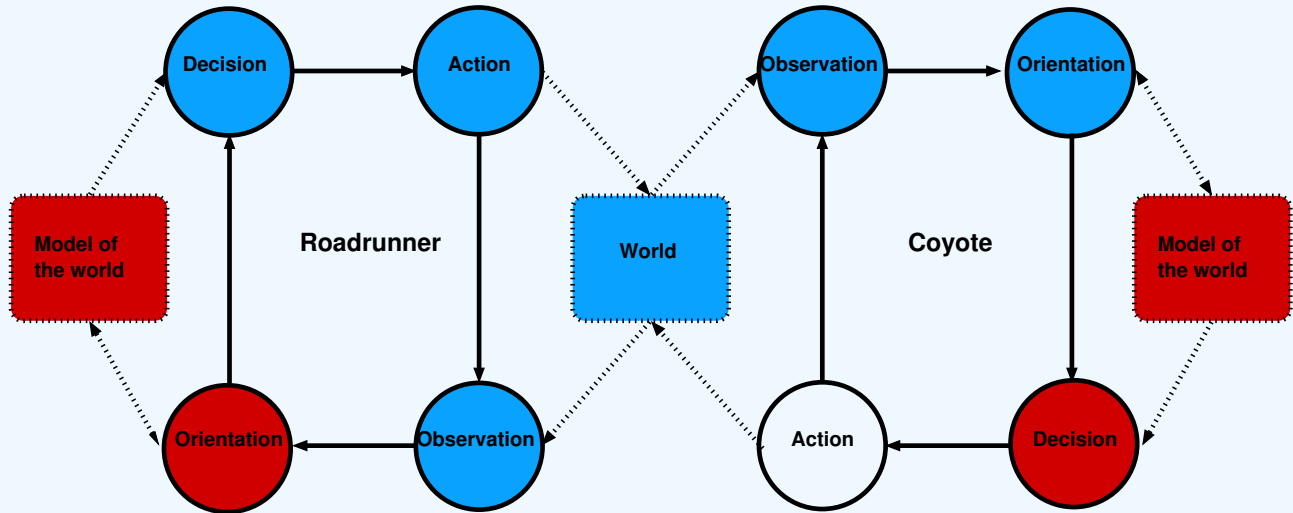
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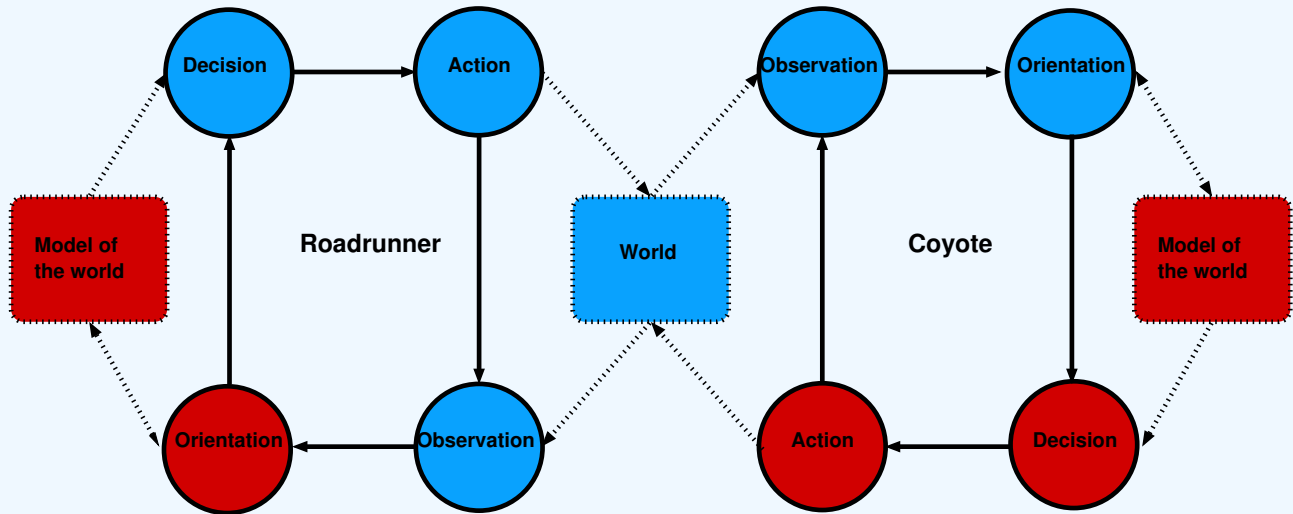
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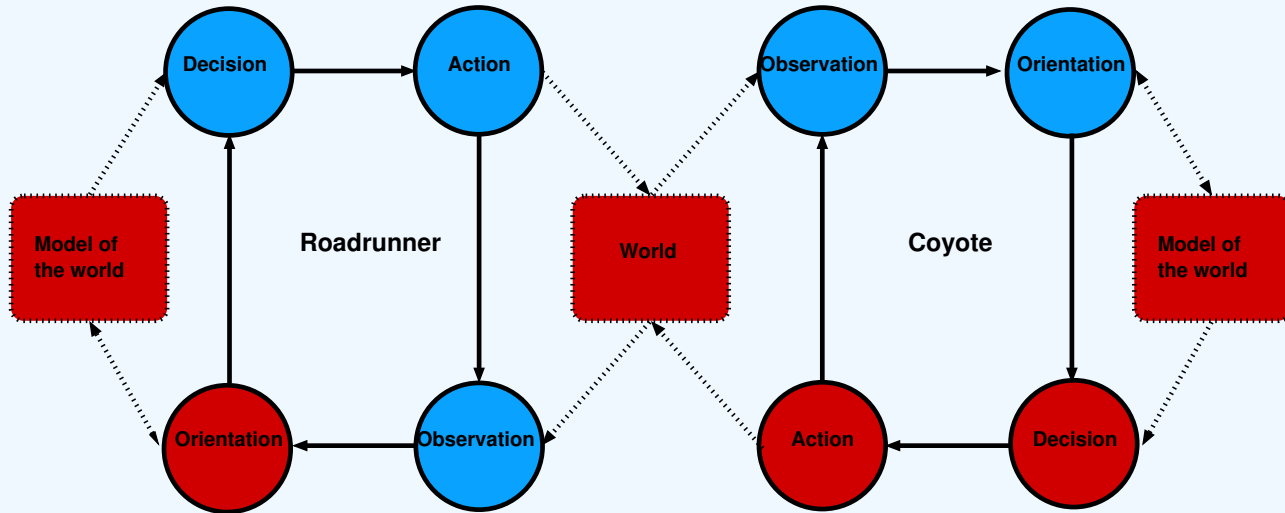
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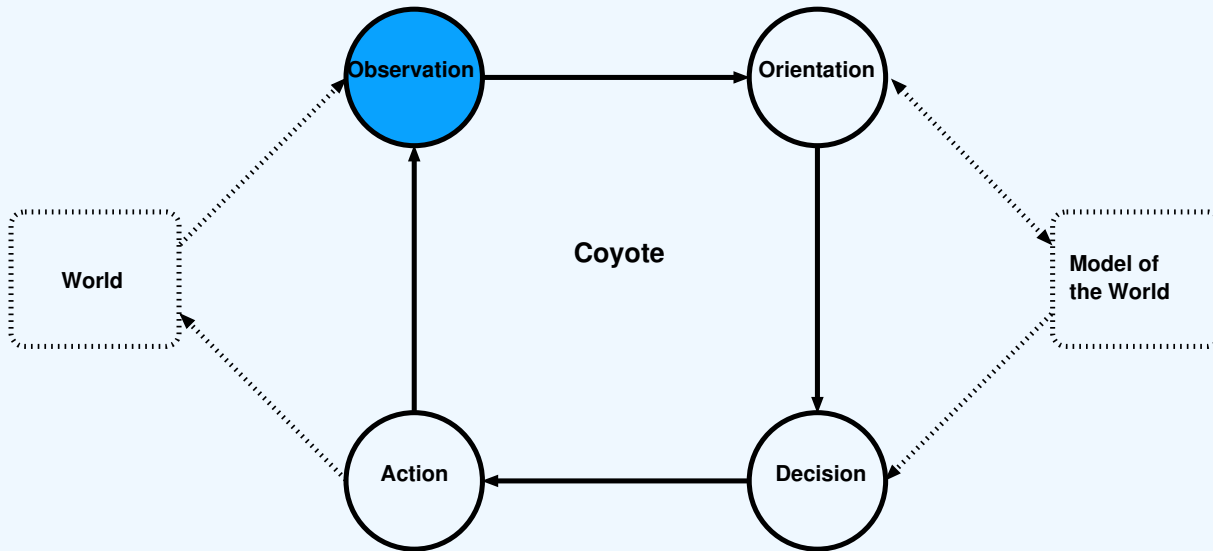
# Self-Deception (2)

Self-Deception used to hide information that will be harmful if perceived

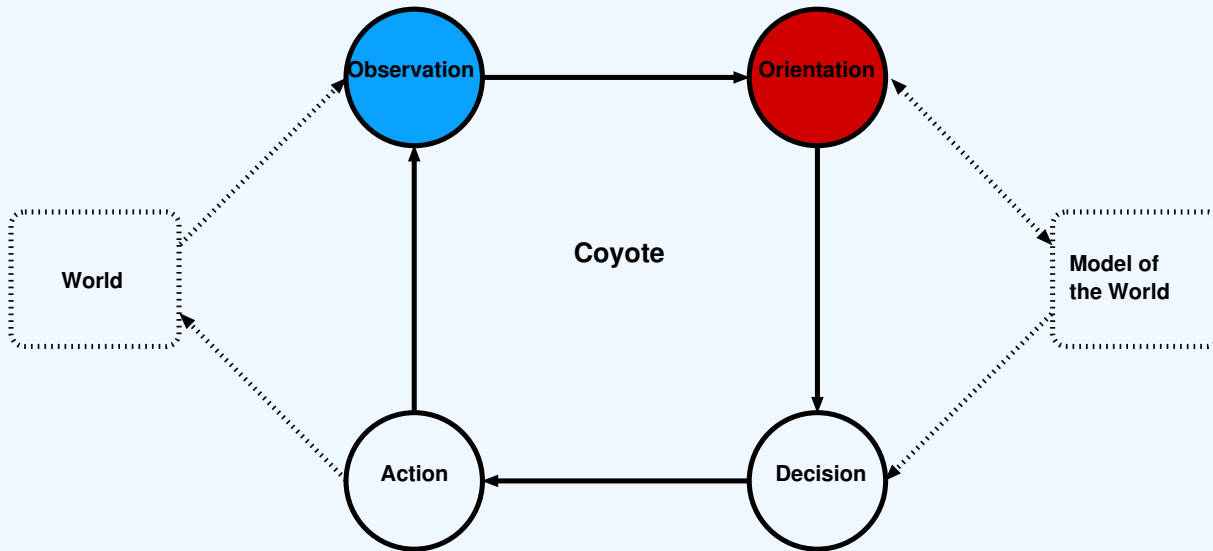
- The Self-Deceiver is unable to integrate or process this information, as it is incompatible with their perceived model of the world
- The Self-Deceiver is then forced to Corrupt the new information and their own model of the world until the two are compatible. Then the new information can be successfully integrated
- The danger of using this behaviour is that the Self-Deceiver's model of the world becomes more inaccurate, increasing the chance of future Misperception



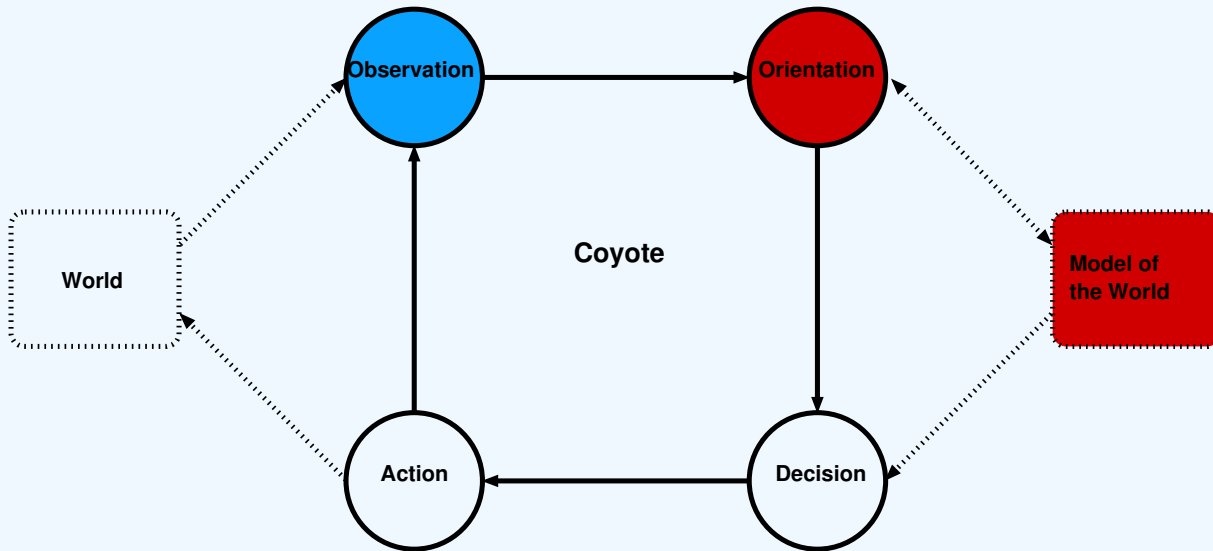
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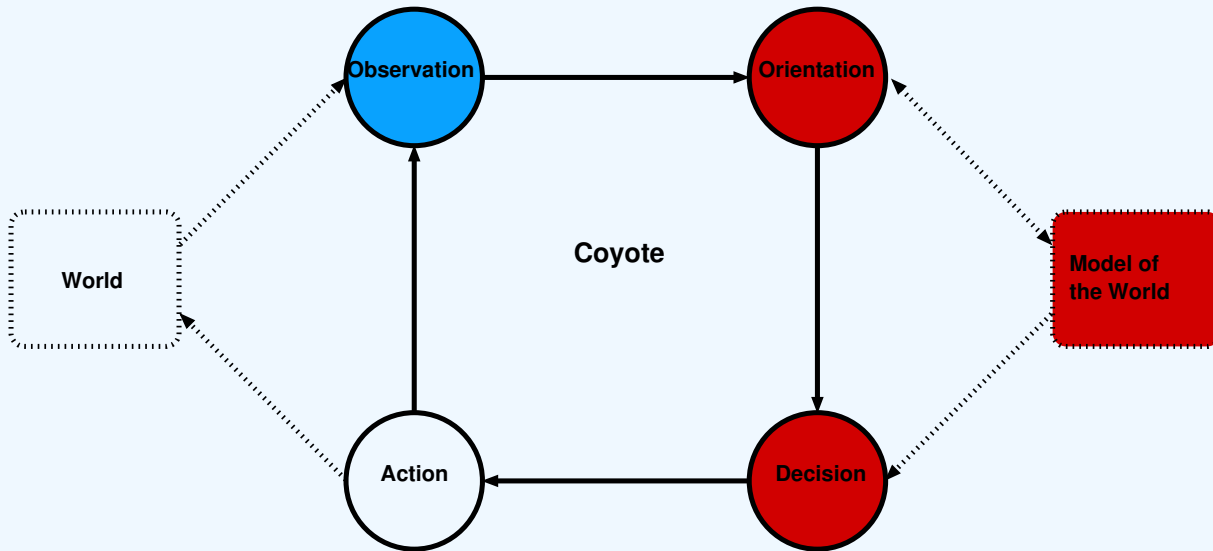
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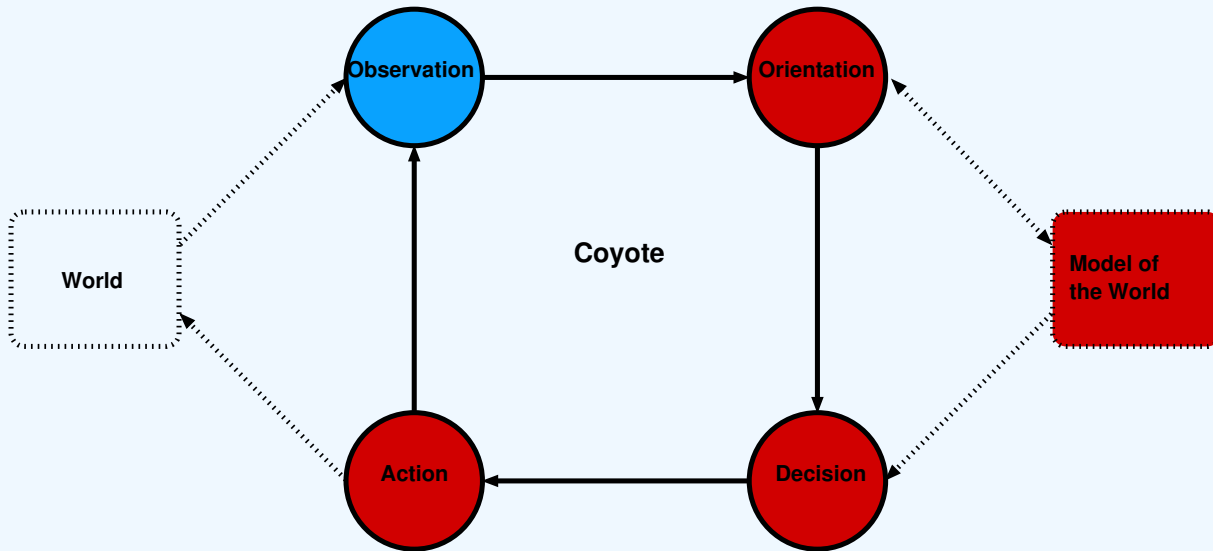
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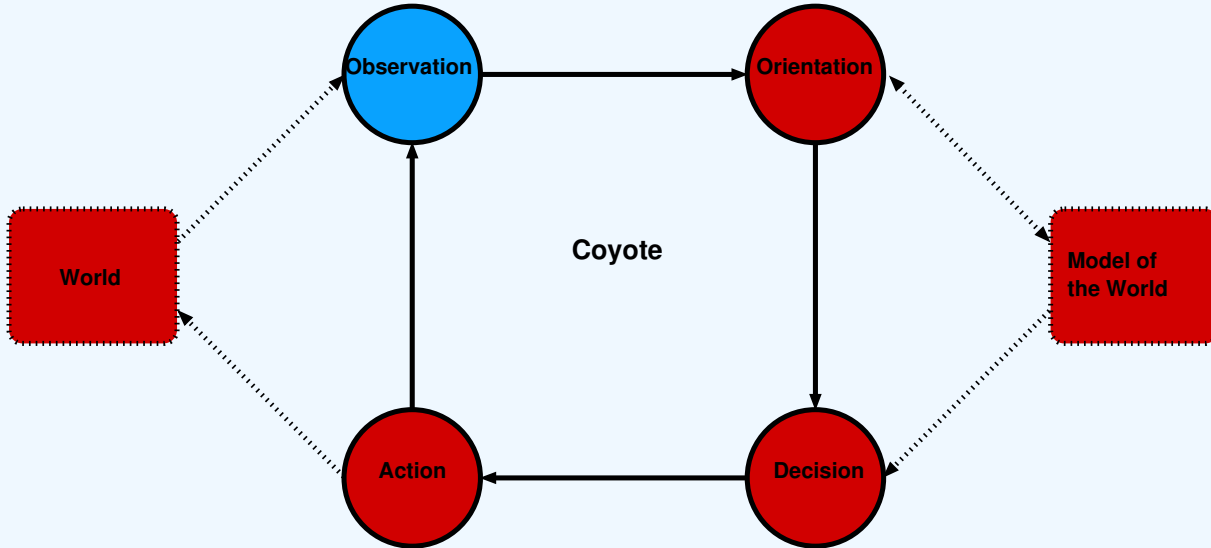
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# Summary

- Demonstrated how Misperception, Deception and Self-Deception can be modelled in terms of the OODA loop
- Misperception, Deception and Self-Deception each may be caused by the use of an Information Warfare attack
- Cyclic Decision - Action models with feedback demonstrate how information used in previous decision iterations can affect present and future decisions
- Information Warfare strategies allow individuals to affect their own perceived world state and that of their opponents





Questions?

