Functionalist Emotion Model In NARS

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NARS Overview

NARS (Non-axiomatic reasoning system) is an AGI system built in the framework of a reasoning system and founded on the belief that "Intelligent" can be defined as the ability for a system to adapt to its environment and to work with insufficient knowledge and resources

NARS Overview
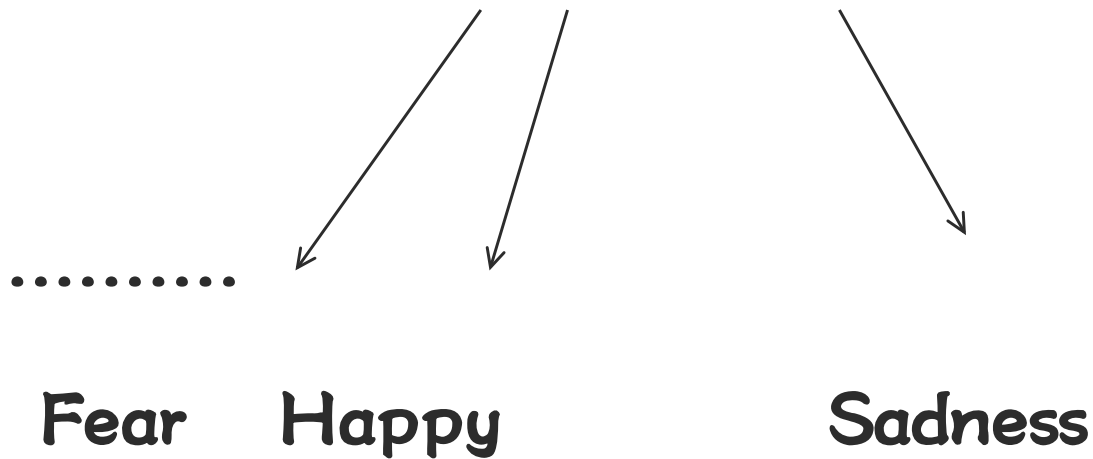

https://cis.temple.edu/~wangp/papers.html
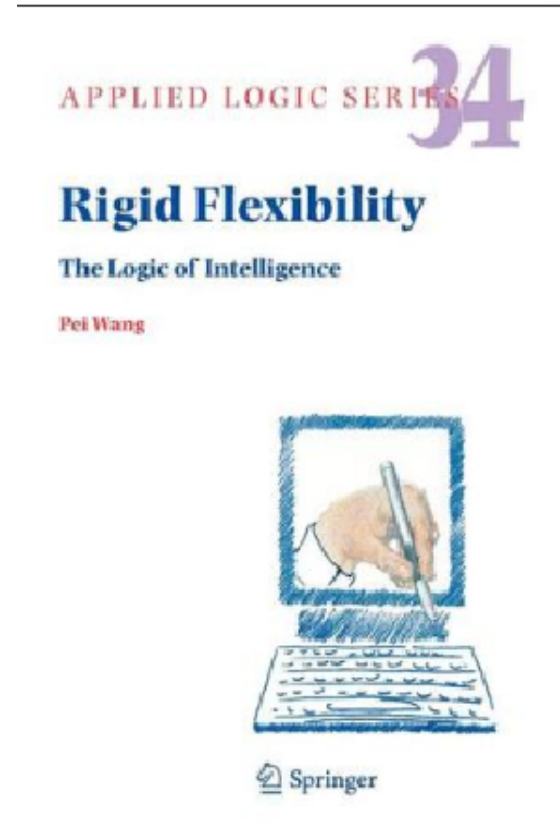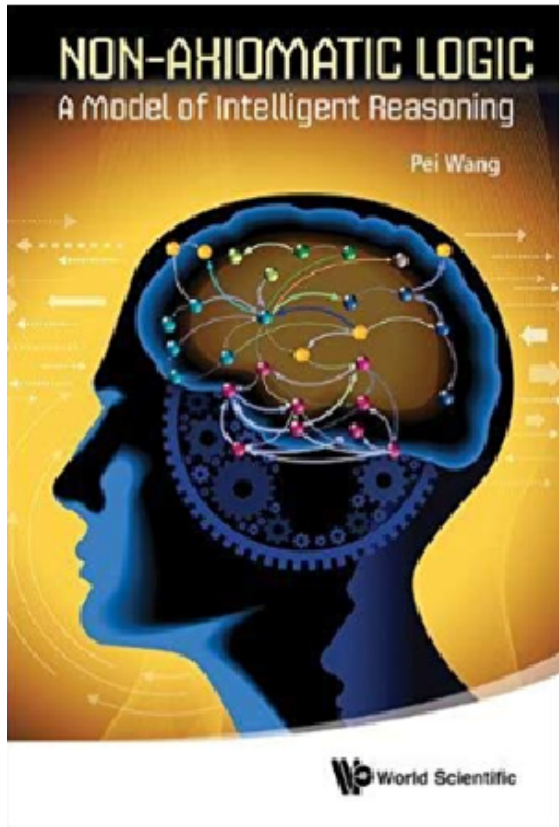
Introduction

Extending the existing Emotion mechanism in NARS

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Satisfied/Unsatisfied

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Fear   Happy   Sadness

Introduction

Not attempt to simulate or copy human emotions with NARS!

Previous works

Satisfaction – evaluation mechanism

(Event level)

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(Event level)

E1(Desire value, Truth value)

E2(Desire value, Truth value)

...

En(Desire value, Truth value)

Previous works

Satisfaction – evaluation mechanism

(Event level)

Satisfaction [0 , 1]

=

Closeness of Desire value and Truth Value

0: Completely Unsatisfied

1: Completely Satisfied

Previous works

Satisfaction – evaluation mechanism

(System Level)

Accumulation of recent event–level satisfaction

New Appraisal Model in NARS

1. If one event is related to any goals, if not, no emotion will be triggered.

2. Congruence of the event with the agent's current goal

Desire	Want	Want	Want	Not want
State	Have	Not have	Not have	Have
Belief of certainty	Yes	Never	Can reinstate	Likely
Emotion	Happiness	Sadness	Anger	Fear

Desire value	Truth value	Satisfaction
Want	Have	Positive
Want	Not have	Negative
Not want	Have	Negative
Not want	Not have	Positive

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Not want	Have	Negative
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New Appraisal Model in NARS

- **Fear:** An undesired event is anticipated to happen
- **Happiness:** An desired event is believed as already happened (high satisfaction)
- **Sadness:** An undesired event is believed as already happened (low satisfaction)

New Appraisal Model in NARS

Emotion helps the system summarize its experience at a more abstract level

New Appraisal Model in NARS

Emotion helps the system summarize its experience at a more abstract level.

Emotions can also decrease the time needed to respond to certain events.

Examples

// If the system desired some event to be happen and the system believes this event is already
// happened, the system feels happy

Input: <(&&, (^want, {SELF}, #1, TRUE), (^believe, {SELF}, #1,TRUE)) =|> (^feel, {SELF}, happy)>.

// SELF has a goal which is not being hurt, ``−−" is the negation
// of the statement

Input: (−−,<{SELF} −−> hurt>)!

// SELF is not getting hurt, :|: represents the tense ``present"
// means SELF is not getting hurt right now

Input: (−−,<{SELF} −−> hurt>). :|:

//What do you feel?

Input: (^feel,{SELF},?what)?

Examples

//SELF feels Happy, the reason why it feels happy is because
//SELF doesn't want to get hurt (generated by goal), and SELF
//is not getting hurt (generated by belief).

Answer: (^feel,{SELF}, happy).

Examples

//If something is wanted by SELF, and SELF anticipates the
//opposite to happen, SELF feels fear

Input:<(&&, (^want, {SELF}, #1, FALSE), (^anticipate, {SELF}, #1)) =|> (^feel, {SELF}, fear)>.

//At the same time when SELF feels fear, it generate an
//motivation which to run away, run is also an operator in NARS

Input: <(^feel,{SELF}, fear) =|> <(*, {SELF}, <(*, {SELF}) --> ^run>) --> ^want>>.

//SELF doesn't want to be hurt

Input: (--,<{SELF} --> hurt>)!

//If wolf is getting close to SELF, SELF will get hurt

Input: <(&/,<(*, {SELF}, wolf) --> close_to>,+42) =/> <{SELF} --> [hurt]>>.

Examples

//If something is wanted by SELF, and SELF anticipates the
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Input: <(&/,<(*, {SELF}, wolf) --> close_to>,+42) =/> <{SELF} --> [hurt]>>.

Examples

//Wolf is getting close to self

Input: <(*, {SELF}, wolf) --> close_to>. :|:

//Result: SELF takes the action run, based on the knowledge
//where SELF runs when it feels fear, SELF also feels the emotion
//fear

EXECUTE (^run,{SELF})

Future works

1. Building a richer experience for NARS, new emotional states.

2. Making emotions also affect internal state of NARS

3. Communication(Secondary)

Thank you

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