An Affective Marsupial Team For Robot-Assisted Medical Reachback

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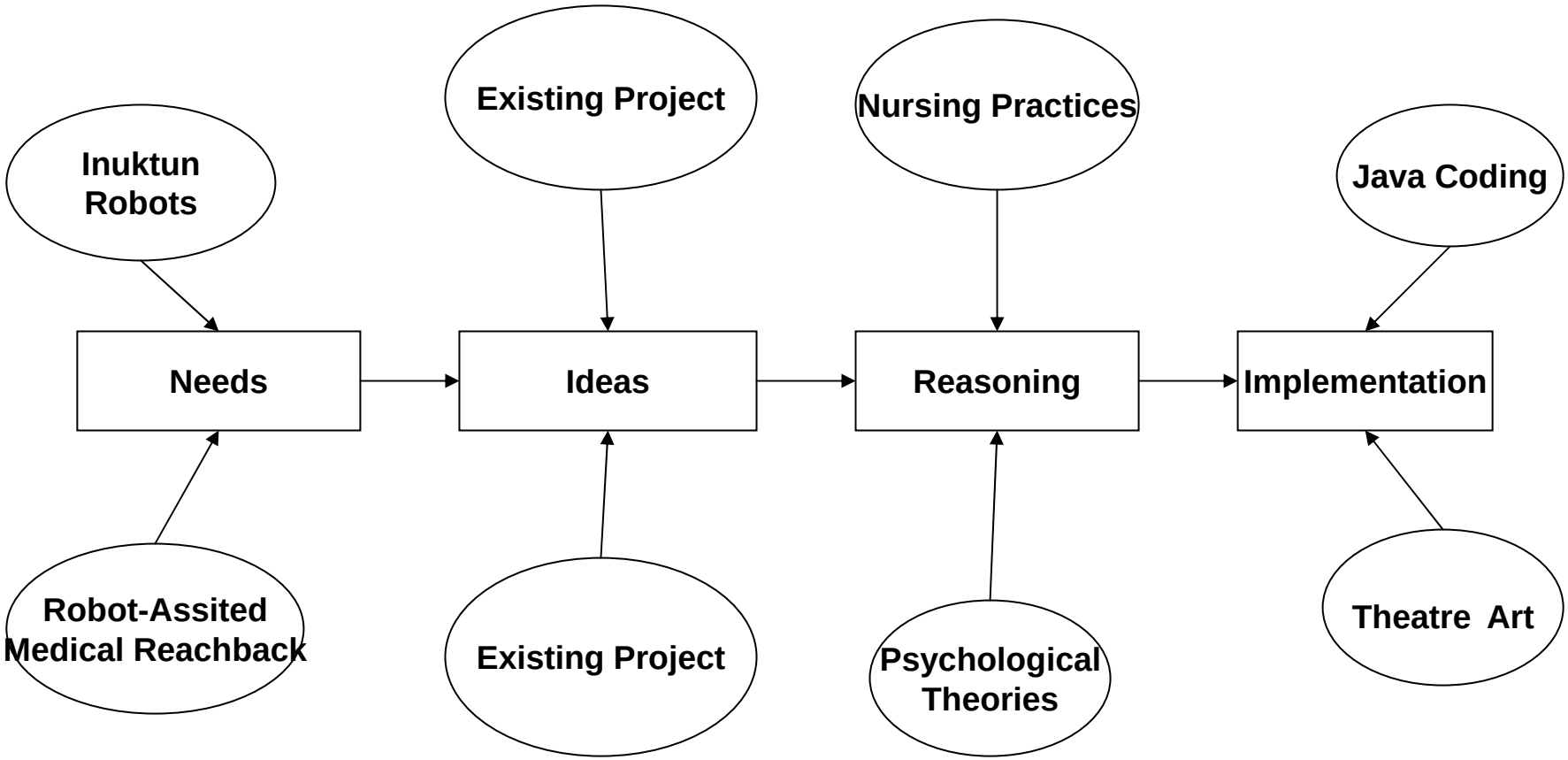
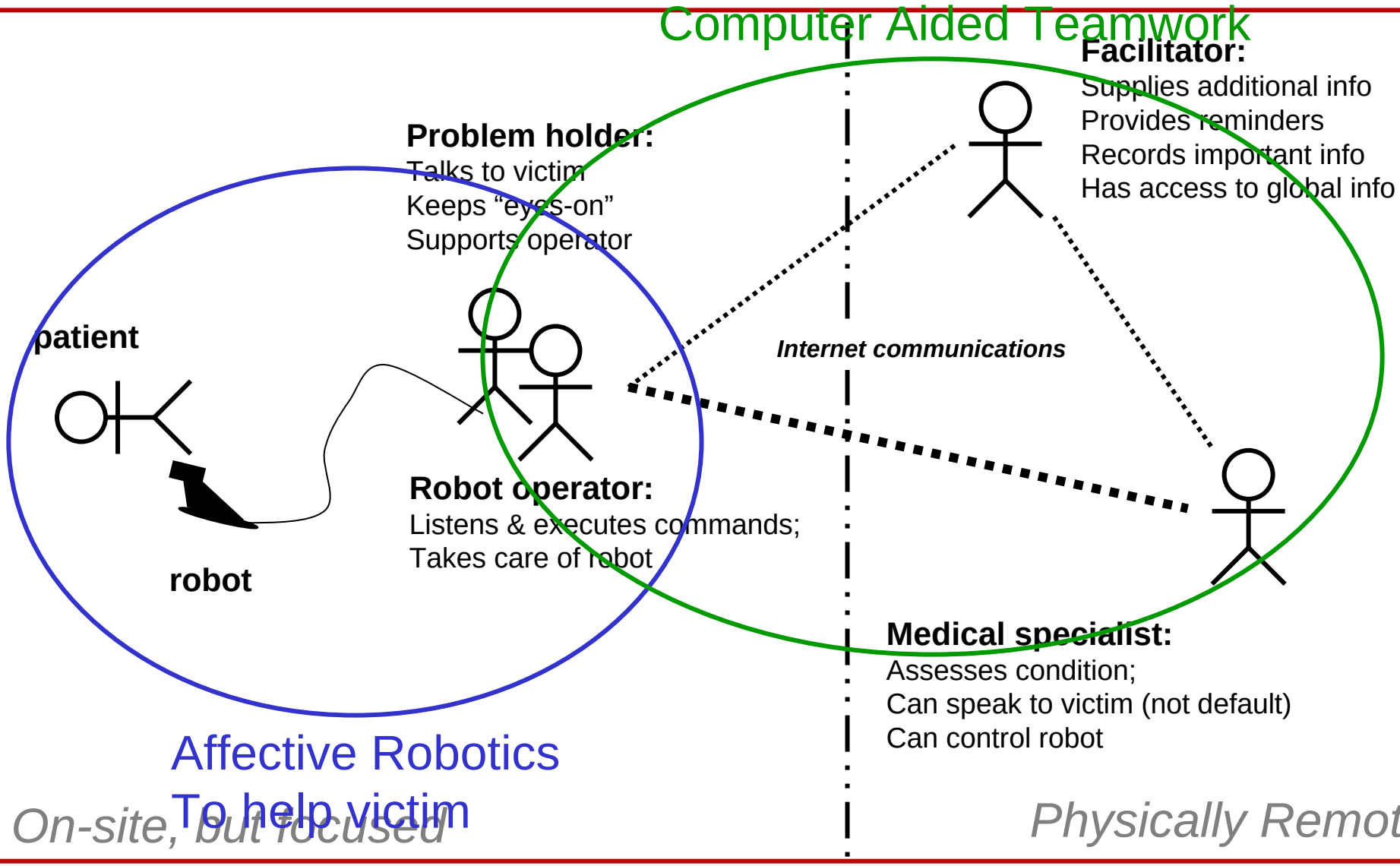
Project Overview



Emerging Concept



Affective Robotics Project

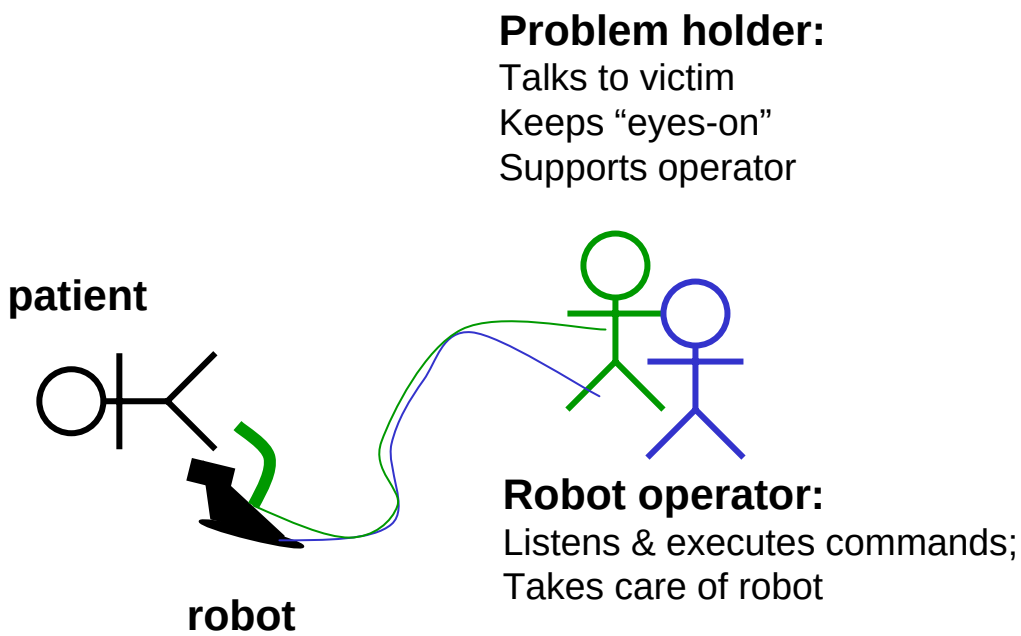
- Robots are teleoperated now but require too much concentration to make the robots move (and look) less creepy to the patients and be more comforting
  - Program guarded motions and expressive motions

- Option 1: use only the robot platform
  - Disadvantage, lose eye-contact, function overrides form

- Option 2: create a second device that rides on the robot that can be more expressive (marsupialism)

Buddy device

- Buddy device to ride on platform and be controlled by problem holder
  - Kerrebrock's mini-snake? Orbit webcam?



Control: More Animatronic than Autonomous

- Operator controls the buddy
  - Provides the “perception”
- Operator picks the desired affect
  - Tactical behaviors make sure the motions/pose/etc. fit the affect; take burden off the operator
- Later work
  - Coordinating marsupial team
  - Robot track victim

Literature Review

- Affective computing

  - Breazeal and Brooks (2004) presents the continuous dimensions (valence, arousal and stance) of the basis emotions which include fear, anger, surprise, tired, happy, unhappy, sorrow, disgust, accepting, stern, sorrow and calm.
- Picard suggested in the Affective Computing three categories of emotions:
  - Prospect
  - Confirmation
  - Fortunes-of-others

Literature Review (cont.)

- Categories of affective robots
  - Avatar
    - a computer screen displays face on robot, but no real motion or pose conveyed
  - Head or Face Only
    - No body or body does not express any affect
  - Body
    - Body also explicitly expresses affect
- Primarily interested in Body, since have a faceless snake

Relevant Projects

Name	With face?	Affective motions
Anemone	No	Rapidly reverse, reach towards, sway
Roco	No	Yes with head, yes with body, no with head, no with body, quizzical
Care-O-Bot	Yes	Attention, yes, no
Arnold	Yes	Yes , no
Wakamaru	Yes	Yes, no
Pearl	Yes	Yes, no
Kismet	Yes	Attention, turn away, withdrawal, startle, tracking
Flo	Yes	Yes, no, attention

Most Similar

Name	With face?	Affective motions
Anemone	No	Rapidly reverse, reach towards, sway
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Kismet	Yes	Attention, turn away, withdrawal / startle, tracking, calm
Flo	Yes	Yes, no, attention

What are the motions that are generated? Can We Do Them?

	Expression	Motion/Pose	Snake could
1	Fear	Reverse direction fast	same
2	Interest	Move towards	same
3	Normal/happy	sway	same
4	yes	Body bend	same
5	yes	“top” bend	?
6	no	Body sway	same
7	no	“top” sway	?
8	quizzical	Sideways, diagonal	?

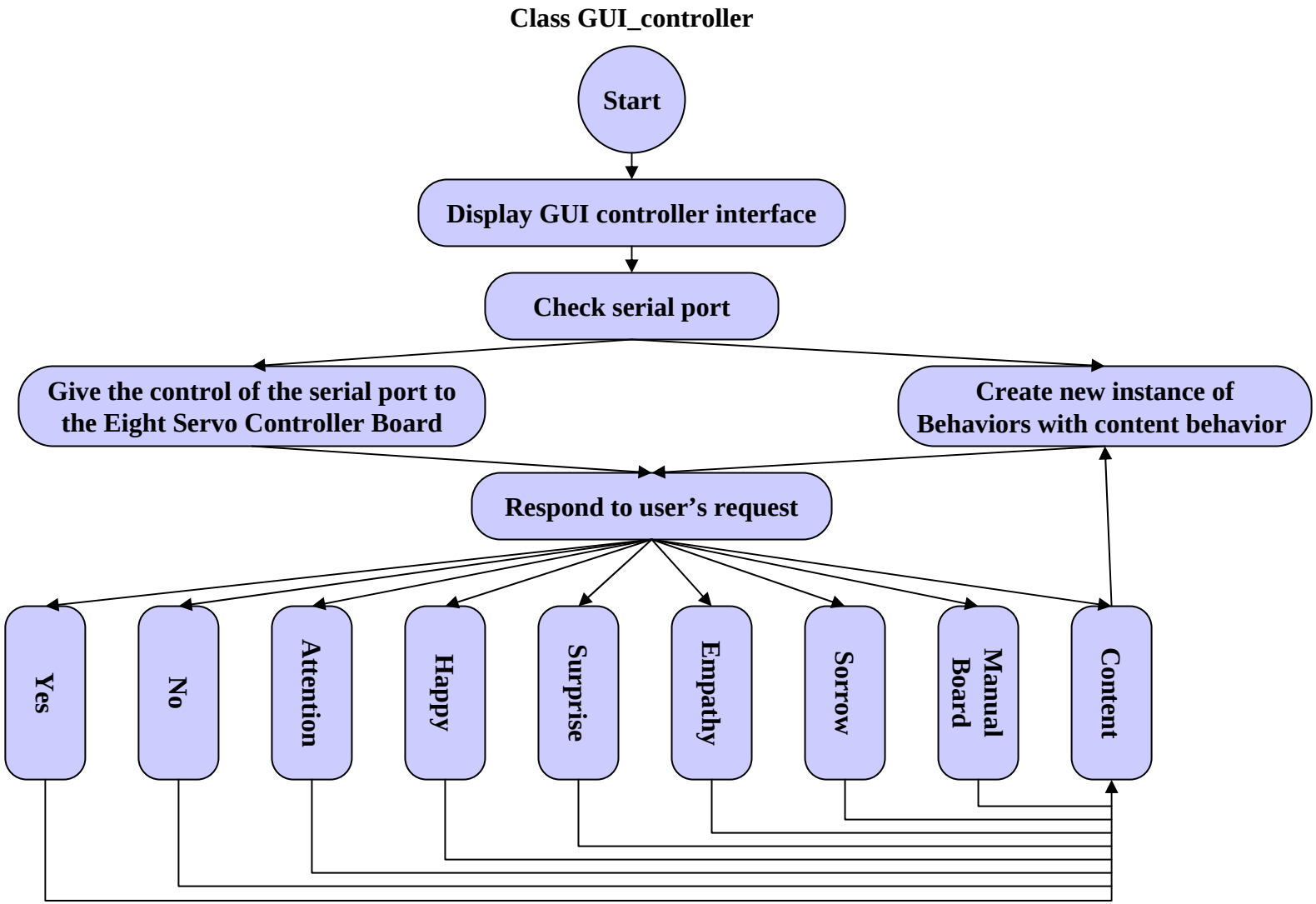
Selected emotions

- Agree: rotate from left and right and reverse
- Disagree: bend down and then up
- Attention: like Yes, but slower
- Happy: rotate around while bend down and up with rhythm
- Surprise: rapidly bend up
- Empathy: like Attention but slower
- Sorrow: slightly rotate from left to right and reverse
- Content: unchanged in neither rotate or bend

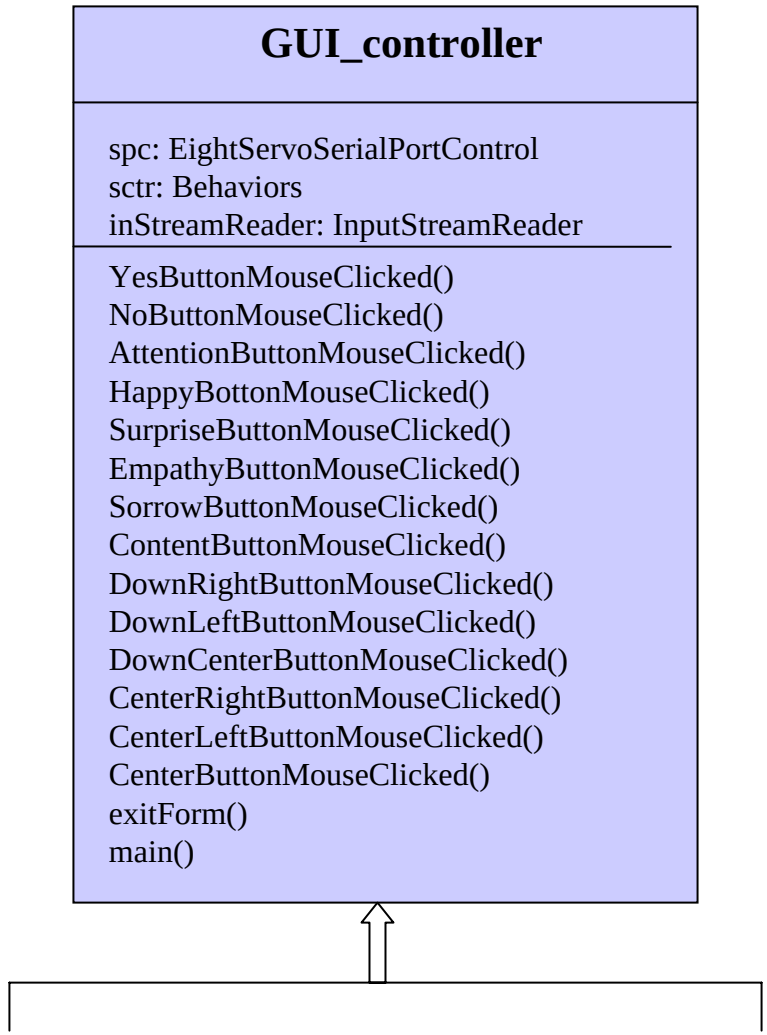
The Implementation

- The serial control technique uses Java Communication API (very much similar to that of the Inuktun's).
- GUI is carried out using GUI Building features in NetBeans IDE 3.6
- The robot's behaviors were built with feedbacks from puppetry experts.

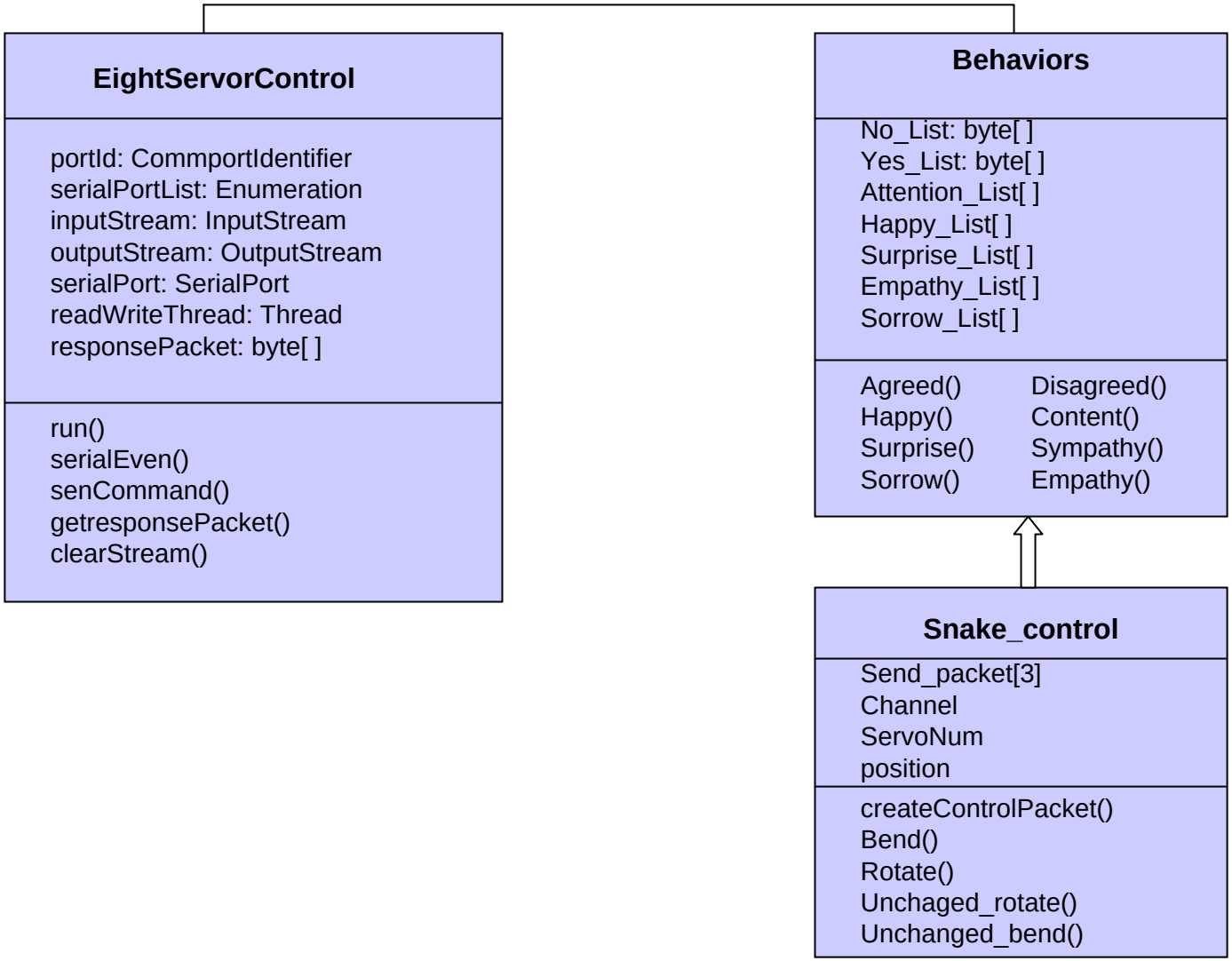
URL Dynamic Model



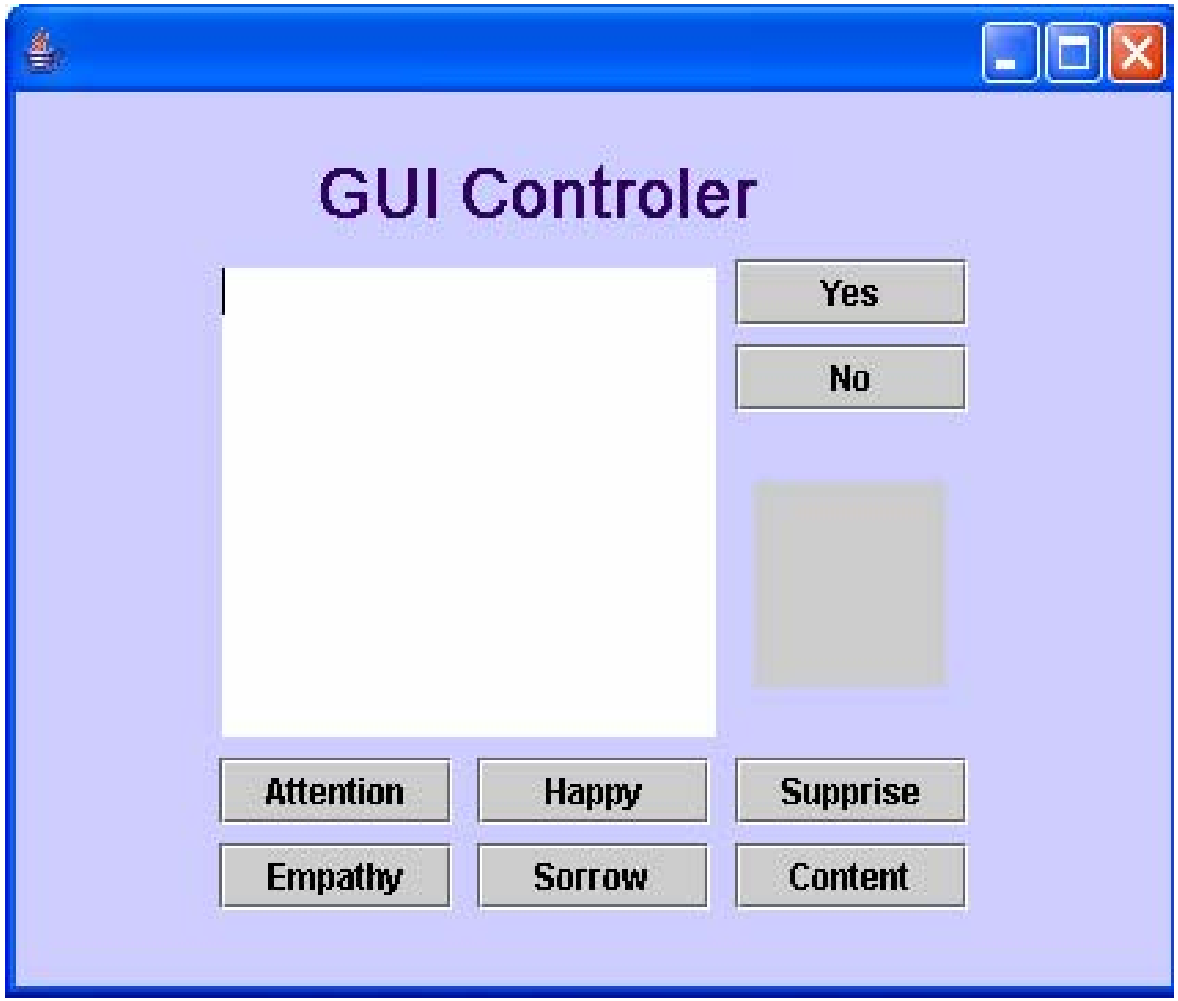
URL Class Diagram



URL Class Diagram (cont.)



Graphical User Interface



Final Product