Robot Authoring Platform (RAP)

The RAP is a toolset designed to create consistent, reliable interaction and behavior performances for practical robotic and digital personalities. Using the RAP, an interaction designer can create 'blocks' of interaction, each of which can be performed in one (or more) MODES.

RAP allows simple to complex behavior design via the following graphic UI elements:

- Timelines
- Input triggers
- Macro (and motor level) icons
- Parameter entries
- Dialogue entry (TTS)
- Emotion icons (TTS)

Designable reactions (output) include:

1. SPOKEN DIALOG – Using TTS (with emotion control), expansive dialog can be designed via interaction trees. Conversations can be navigated via scripted, autonomous, puppeteer or 'game logic' modes.
2. FACIAL EXPRESSION – Facial motor reactions can be triggered via scripted, autonomous, puppeteer or 'game logic' modes.
3. EXTREMITY CONTROL – Extremity motor reactions can be triggered via scripted, autonomous, puppeteer or 'game logic' modes.
4. REACTION TOGGLES – Basic autonomous movements (like blinks and eye-line following) - as well as any unique reactions that may be specific to robotic personality - can be toggled on/off for any 'block' of interaction, by the interaction designer.

The RAP designer can make use of the following input types when designing a 'block' of interaction:

- Spoken (pre-scripted) Keywords – STT Audio capture
- Spoken (pre-scripted) Phrases – STT Audio capture
- Spoken chatbot (unscripted) queries
- Non-verbal sound recognition – *high frequency input? Recognizable sounds like sneeze, etc?*
- Head tracking
- Facial recognition
- Emotion tracking/recognition
- Other object tracking/recognition - *Hand and finger. Displayed shape/symbol?*
- Triggers from Local or Cloud Networks

MODES

Based on the type of input that controls how 'blocks' of interaction are being navigated, a robotic personality can be said to be in an 'Interaction MODE.' Its convenient to classify at least four different MODES of interaction:

- Scripted – A robot is in scripted mode if it is running a linear sequence of interactions OR navigating interaction blocks via pre-scripted speech input.
- Autonomous – A robot is in autonomous mode if it is performing interactions based on non-proactive input (Non-verbal sound, head tracking, face capture,..) or unscripted speech queries.
- Puppeteer – A robot is in puppeteer mode when KEY interactions are prompted by explicit operator triggers (local/cloud network signal, high freq sound,…)
- Game Logic – A robot can be controlled by custom coded game logic. This mode can create a more complex interaction utilizing any input type.

Simulator

The RAP incorporates a robot *simulator* into the authoring process, so that interaction design can continue in parallel with the development of practical robotics. *At each significant iteration of the motor systems, the simulator is updated to match all motor output and (potentially) additional control elements added to the RAP.*

Most significantly, the simulator provides the designer with the ability to:

1. View accurate output of any 'block' of interaction run in the RAP.
2. Create and perfect motor Macros (single facial expressions or an unbroken range of expressions) that can then be exported into the RAP as unique Macro icons.