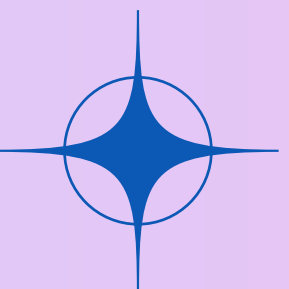# Adaptive Speech Emotion Recognition Via Reinforcement Learning

Authors: Kevin Lee[1] , Siew Mooi Lim[2] , Chen Zhun Lee[3]

1. The Future is Adaptive

Highlights:

- **New Paradigm:** Moving from static models to dynamic, real-time learning.
- **Adaptive AI:** Continuously learns and refines its understanding.
- **Future Vision:** Multi-modal, continuous, and live emotion AI.
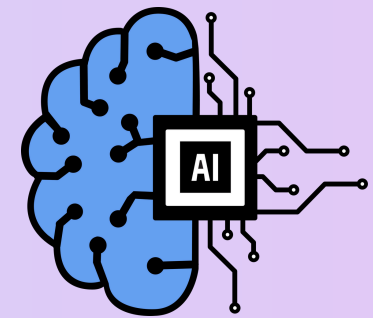
Static AI

Adaptive AI

2. High-Fidelity Audio Intelligence
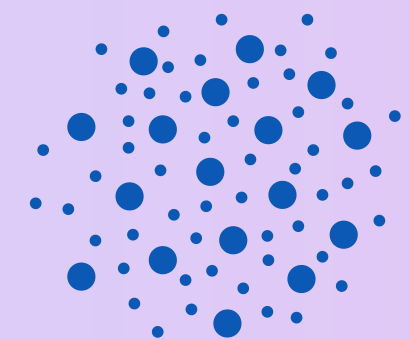
Highlights:

- **Raw Audio Input:** Processing speech directly via self-supervised AI (Wav2Vec2).

- **Rich Embeddings:** Generating deep, contextual features from sound waves.

- **Beyond Labels:** Unlocking nuanced emotion without manual data labelling.
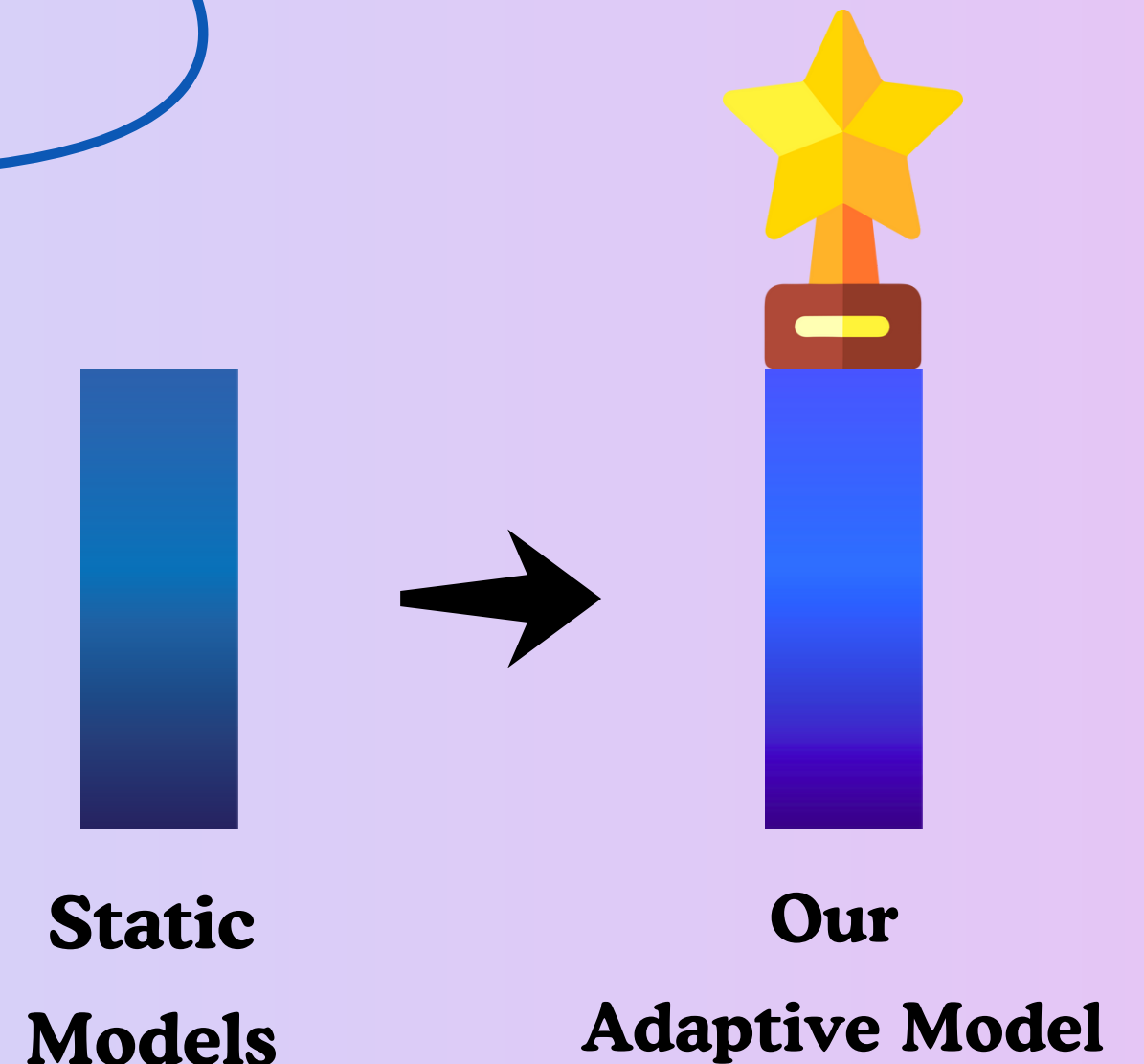
Raw Audio

AI Processing

Contextual Embedding

3. Validating the Breakthrough
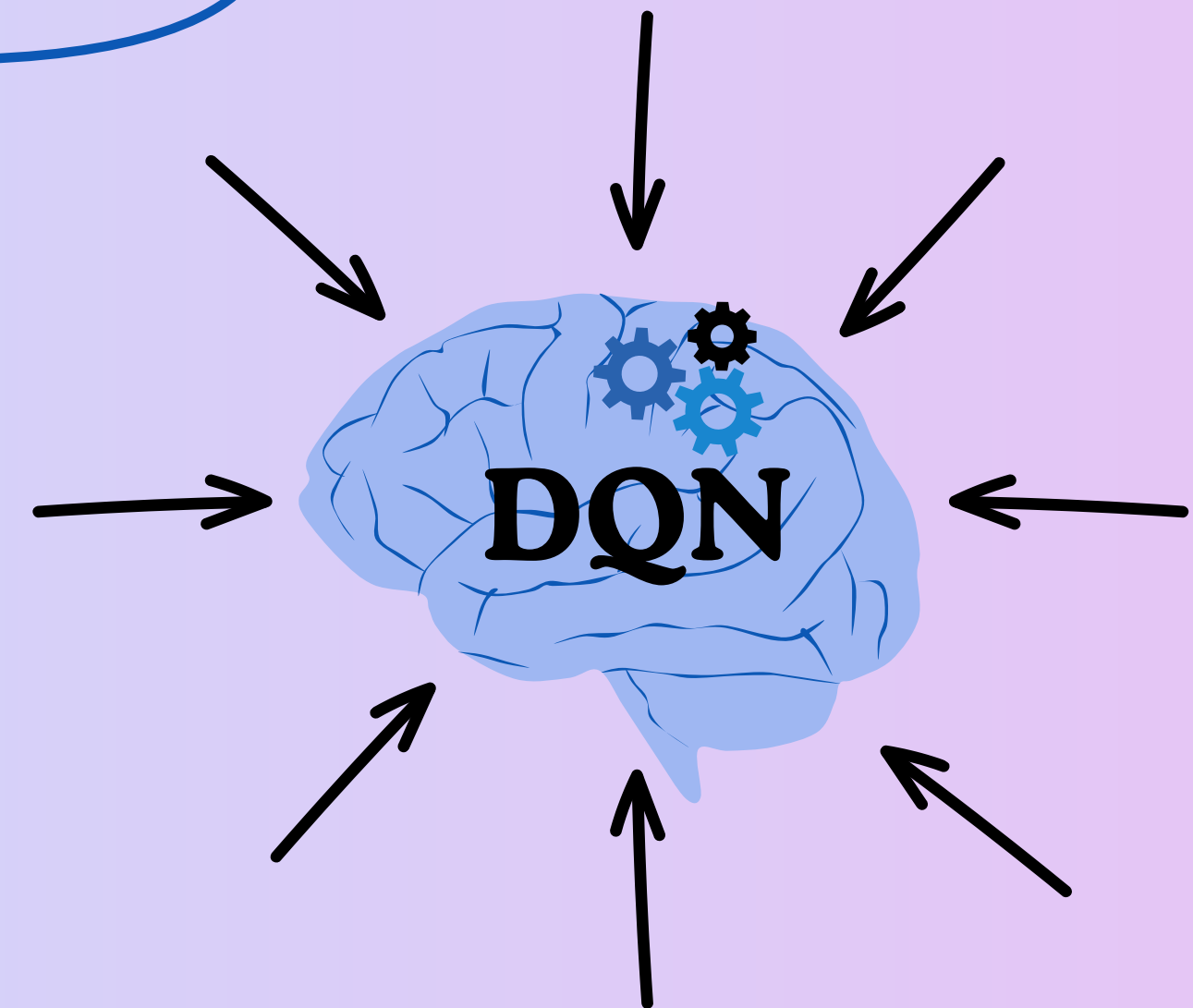
Highlights:

- **Proven Superiority:** Outperforming static benchmarks in all rigorous tests.

- **Robust & Adaptable:** Thrives in complex, real-world emotional scenarios.

- **Efficient Learning:** Demonstrates faster and more effective agent dynamics.

Static Models

Our Adaptive Model

4. Engineering the Intelligent Agent
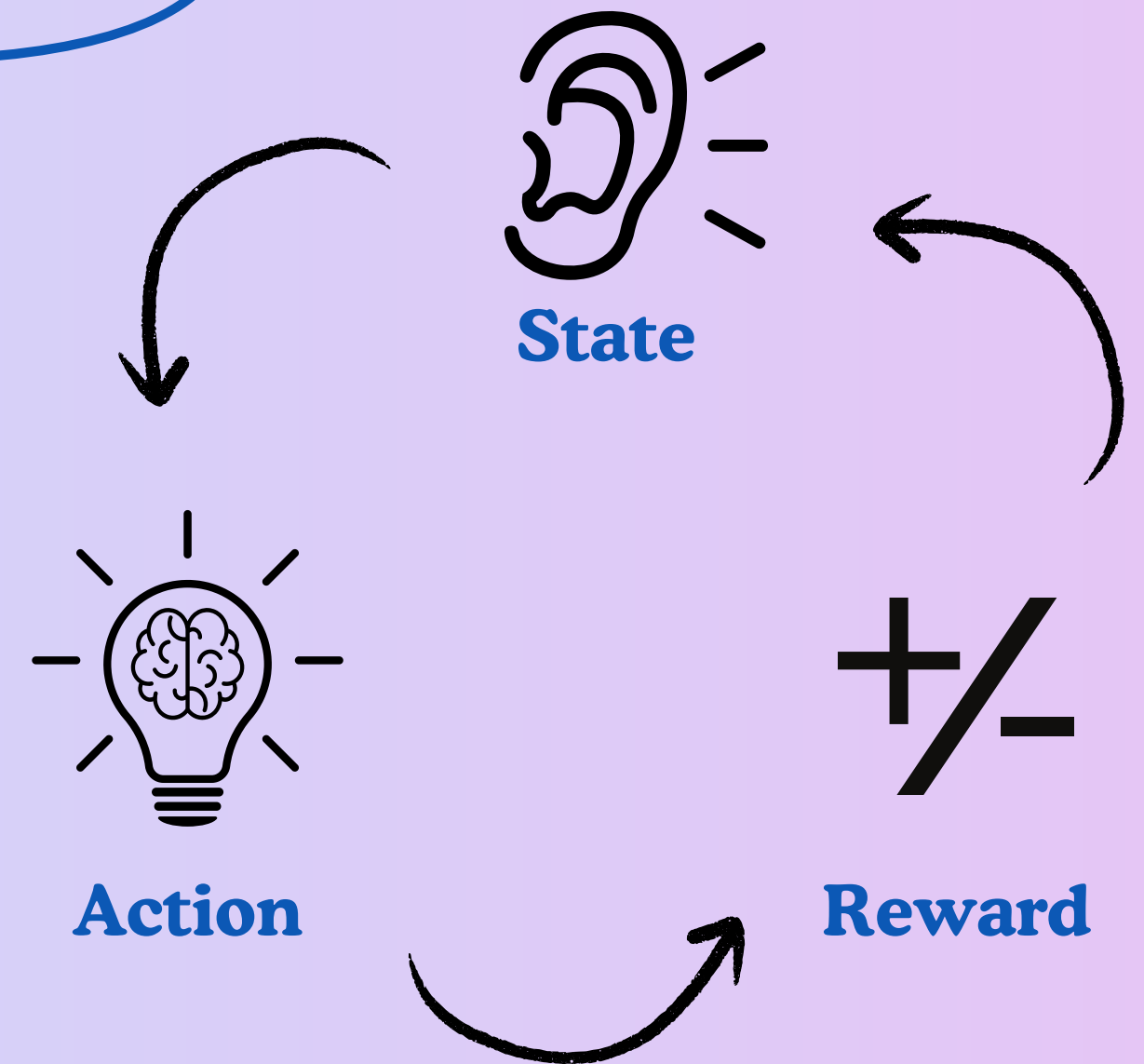
Highlights:

- **Reinforcement Learning Core:** Engineering the agent's decision-making brain.
- **Optimised Policy:** Selecting the best algorithms (DQN, QRDQN) for peak performance.
- **Maximum Efficiency:** Achieving rapid and highly accurate emotion mapping.

DQN

5. The Core Innovation: MDP Framework

Highlights:

- **Foundational Leap:** Framing emotion recognition as a Markov Decision Process (MDP).

- **Sequential Decisions:** Empowering the agent to act intelligently over time.

- **Learning Cycle:** A continuous loop of **State → Action → Reward.**
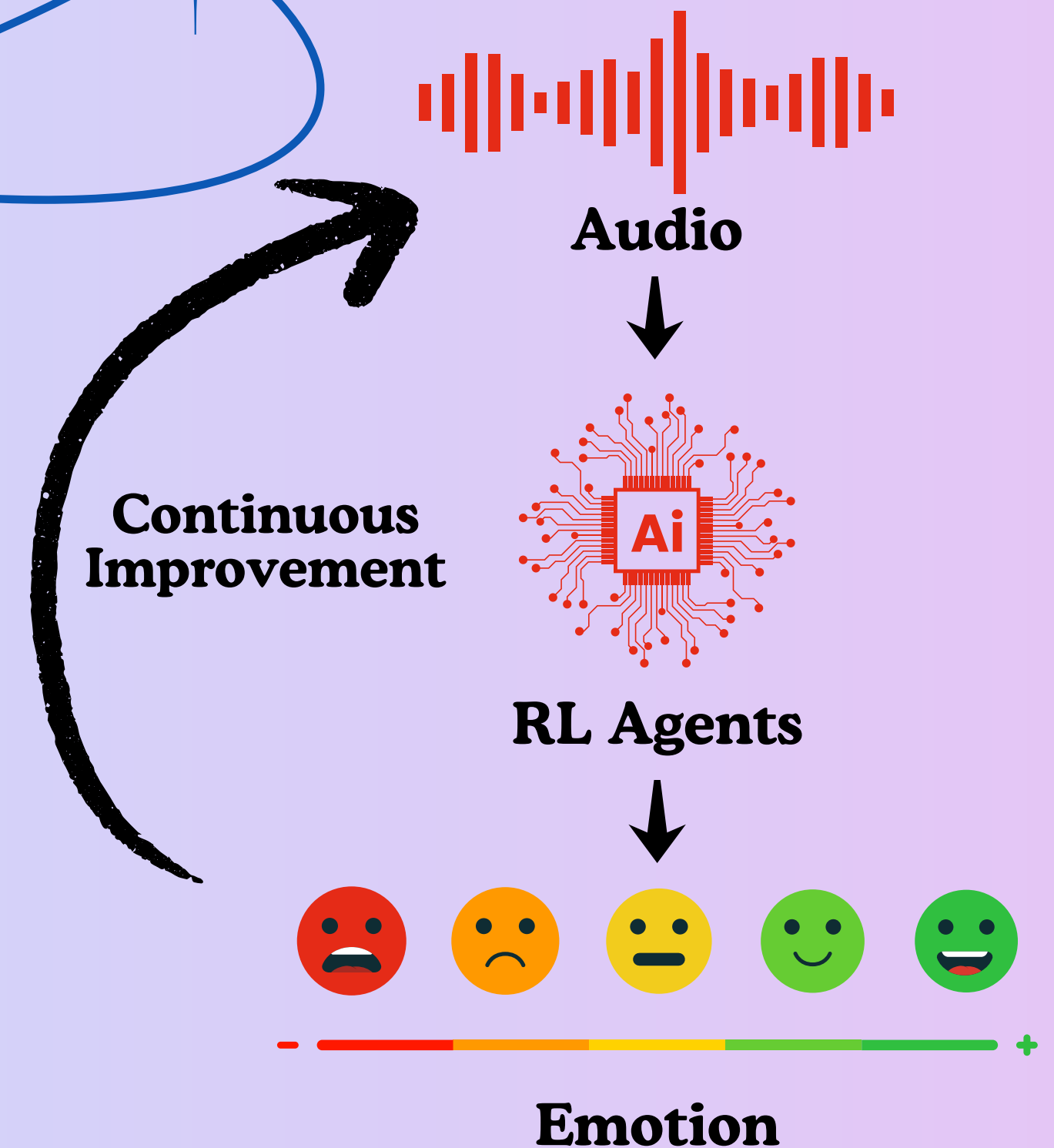
State

Action

Reward

6. The End-to-End Learning Architecture

Highlights:

- **Seamless System:** A fully integrated, self-improving architecture.

- **Continuous Improvement:** The agent learns and self-corrects from every interaction.

- **Cognitive Evolution:** A system designed to grow smarter over time.

Continuous Improvement

Audio

RL Agents

Emotion

Thank You