

Adaptive Speech Emotion Recognition Via Reinforcement Learning

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Conclusion & Future Research Trajectories Our work redefines speech emotion recognition as a dynamic learning problem, achieving a new standard of adaptability in human-centered Al.

Beyond Static: The Future of **Emotion Recognition is** Adaptive

Way: rigid Old Static, models that break.

Our Way: Dynamic, adaptive learning that listens.

Future Trajectories:

• Multi-Modal Integration: Fusing voice with facial and text data.

• Continuous Emotion Mapping: Moving beyond discrete labels to valence-arousal space.

• Real-Time Deployment: Developing lowlatency models for live applications.

Plot

empirical our validation: Analyse: Hyperparameter

control

data. Use the central

selector to dive into

Take

Explore Our Results

Sensitivity **Benchmark:** Classification **Performance**

• Track: Agent **Learning Dynamics**

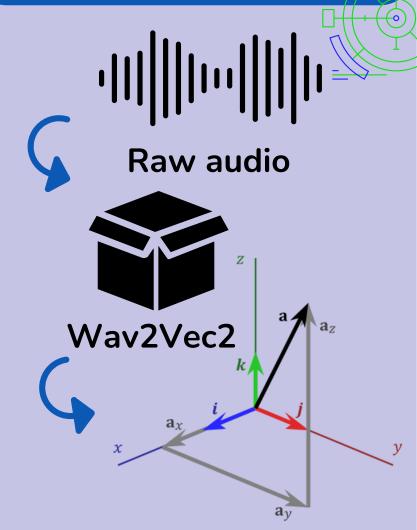
Classification Metrics by Mode F1-Score Speech_Emotion-and-Smart IrriGO/ DQN **QRDQN**

Model Mean Reward Comparison of Agents (Bar Chart) PPO **QRDQN** Ensemble DQN Agent Wav2Vec2 **Feature Extraction**

Advanced Policy Optimization Crafting the Optimal Policy Paradigms Policy-Value-**Gradient Based Algorithms PPO &** DQN & A₂C **QRDQN**

Performance **Audio Input Evaluation Action** ِي_َ ۗ **RL Agent Custom Action Environment** Classification (EmotionEnv) **Accuracy** Scalar 4 Reward Signal

2 Unlocking High-Fidelity Sound with Self-Supervised Al



Contextualized Embedding

- Formulating SER as a **Markov Decision Process** (MDP)
- **State** (S): The sequence of acoustic embeddings derived the from current speech segment.
- (A): The agent's Action selection of a discrete emotion label from predefined the emotion set.
- (R): Reward correct prediction gives a +1.0 base reward, with an additional +0.2 confidence bonus. An incorrect prediction results in a -0.5 penalty.