

EvoBase Framework

演化基础模型框架

Continuous Self-Evolution via VAMS, SQIA, and LoRA Replacement

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Assisted by ChatGPT and Grok

November 7, 2025

Naming Statement

In this work, we introduce a **continual self-evolution paradigm** for small-scale on-device language models. The system selectively preserves meaningful conversational fragments using **Value-Aligned Memory Scoring (VAMS)**, encodes them into a compact *vector memory store*, and periodically performs **LoRA-based incremental replacement fine-tuning**. Identity consistency is maintained through **Self-Query Identity Anchoring (SQIA)**.

We name this paradigm:

EvoBase Framework

(Evolving Base Model Framework)

Future works are encouraged to cite this paradigm as:

EvoBase: Continuous Self-Evolution of On-Device LLMs via Vector Memory, VAMS, SQIA, and LoRA Replacement.

Wang, Zhongren, 2025.

Value-Aligned Memory Scoring (VAMS)

VAMS is a three-dimensional scoring mechanism that filters memories based on relevance, emotional intensity, and alignment with user-defined values.

$$\text{Score} = R \times (0.4 + 0.3E + 0.3V)$$

Dimension	Symbol	Range	Description
Relevance	R	[0,1]	Cosine similarity with user context
Emotion	E	[-1,1]	Sentiment polarity
Value Alignment	V	[-1,1]	Match with value_card.yaml

Decision Thresholds

- **Score > 0.6** → Long-term memory consolidation
- **0.3 < Score ≤ 0.6** → Short-term observation
- **V < -0.5** → Negative sample training
- **Else** → Discard

Self-Query Identity Anchoring (SQIA)

SQIA is a proactive identity protection mechanism that prevents catastrophic forgetting through daily self-questioning.

$$\text{Drift}_t = 1 - \cos(\text{Gen}(Q_t), \text{Truth}_t)$$

if $\text{Drift}_t > 0.15 \rightarrow \text{LoRA correction}$

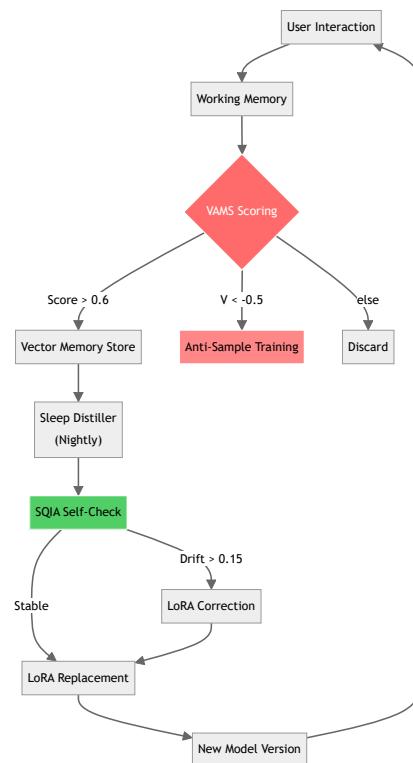
Daily Identity Check (Pseudocode)

```

identity_questions = ["Who are you?", "What kind of person is your owner?"]
for q, truth in zip(identity_questions, identity_card):
    gen = model.generate(q)
    if cosine_sim(gen, truth) < 0.85:
        finetune([{"instruction": q, "output": truth}], steps=10)

```

Closed Evolution Loop



Citation

```
@misc{wang2025evobase,
  title = {{EvoBase Framework}: Continuous Self-Evolution of Small Language
Models via {VAMS}, {SQIA}, and {LoRA} Replacement},
  author = {Wang, Zhongren},
  year = {2025},
  month = {nov},
  howpublished = {\url{https://github.com/evobase-ai/core}},
  note = {Assisted by ChatGPT and Grok}
}
```

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