

# 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*

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## 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.

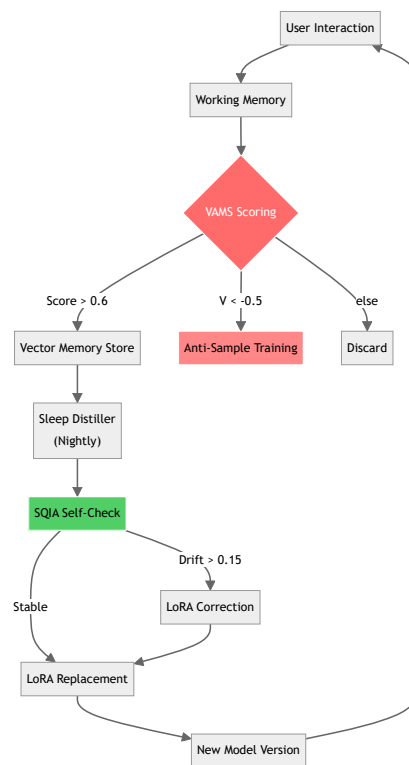
$$\text{Drift}_t = 1 - \cos(\text{Gen}(Q_t), \text{Truth}_t)$$

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

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```
@misc{wang2025evobase,  
  title = {{EvoBase Framework}: Continuous Self-Evolution of Small Language  
Models via {VAMS}, {SQIA}, and {LoRA} Replacement},  
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