

## عنوان مقاله:

LTC-SE: Liquid Time-Constant Neural Networks Special Edition for Scalable AI and Embedded Systems

## محل انتشار:

هفتمین کنفرانس بین المللی پژوهش های کاربردی در علوم و مهندسی (سال: 1402)

تعداد صفحات اصل مقاله: 11

## نویسندگان:

Michael Bidollahkhani - *Institute of Graduate Studies, Karabuk University of Turkey*

Ferhat Atasoy - *Department of Computer Engineering, Karabuk University of Turkey*

Hamdan Abdellatif - *Department of Electrical and computer engineering, Lebanese American University, Byblos, Lebanon*

## خلاصه مقاله:

In this paper, we introduce LTC-SE, a specialized version of the Liquid Time-Constant (LTC) neural network algorithm, initially presented by Hasani et al. in ۲۰۲۱ [1]. The original algorithm unifies the Leaky-Integrate-and-Fire (LIF) spiking neural network model with Continuous-Time Recurrent Neural Networks (CTRNNs), Neural Ordinary Differential Equations (NODEs), and custom Gated Recurrent Units (GRUs). LTC-SE is designed to address the unique requirements of embedded systems and scalable AI, featuring enhancements that focus on flexibility, compatibility, and code organization. By providing a consolidated class library compatible with TensorFlow ۲.x, LTC-SE offers comprehensive configuration options for LTCCell, CTRNN, NODE, and CTGRU classes. We compare the performance of LTC-SE against its predecessor, demonstrating the benefits of our optimizations in terms of user experience, Keras function compatibility, and code readability. The proposed improvements extend the applicability of liquid neural networks to a wide range of machine learning tasks, including robotics, causality analysis, and time-series prediction, while building upon the seminal work of Hasani et al

## کلمات کلیدی:

Scalable AI, Neural Networks, Embedded Systems, Optimization, Liquid Time-Constant Networks, Leaky-Integrate-and-Fire, Continuous-Time Recurrent Neural Networks, Neural Ordinary Differential Equations, Gated Recurrent Units

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1682058>

