

Peer Review

# Review of: "Towards End-to-End Neuromorphic Voxel-based 3D Object Reconstruction Without Physical Priors"

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## About content

It is not clear why the Optimal Binarization Threshold Selection Principle is presented as a contribution; please clarify.

Many claims are made throughout the document without providing the underlying reasons or citations to support them; please add citations.

I have some concerns regarding the level of detail in the method stages, which may affect reproducibility. Please provide all parameter values used to obtain the reported results.

In the Ablation Study, consider using curves to compare the variables and metrics across a fixed step sweep.

The comparison with a single baseline study using only one dataset makes it difficult to assess the significance of the work. A broader comparison with other state-of-the-art methods would be helpful.

## Some suggestions about writing

Structure: Section, original text in quotation marks, suggestion in parentheses, additional comment.

Abstract

"we introduced Optimal Binarization Threshold Selection Principle" (we introduce the Optimal).

Please review similar phrases throughout the text to ensure consistency.

I. Introduction

"serving as a 3D form of information present that" (remove present)

“They used Structure-from-Motion (SfM) to estimate sparse intrinsic, extrinsic point clouds, followed by Multi-View Stereo (MVS) techniques to complete dense reconstruction.” Please review writing for clarity.

### III. Method

“We propose an end-to-end method for dense voxel 3D reconstruction using monocular neuromorphic camera” (using a monocular). Please review similar phrases throughout the text to ensure consistency.

“ $E_i(x,y)$  represent the  $i$ -th event “ (represents)

“within time window” (the time)

“ $\pi_i$  denote the polarity of event“ (denotes)

“applied on initial event stream aiming to detect edge and structure in dynamic scenes” (aiming)

“which can be considered as non-frame-based preprocessing method for events.” (review writing for clarity)

“, and we name this method *Sobel Event Frame*.” (the Sobel). Please review similar phrases throughout the text to ensure consistency.

“applied on event stream of an airplane object” (the event)

“, which limits the performance of model.” (the model). Please review similar phrases throughout the text to ensure consistency.

“For decoder,” (the decoder)

“by Sigmoid function” (the Sigmoid)

For the equations of (a) Last Positive Event (Pos) and (b) Last Negative Event (Neg), include the word 'otherwise' when defining the condition  $F_t(x,y) = 0$ .

Please review equation 2.

### IV. Experiments

“dataset for 3D reconstruction with voxel label based on event data” (a voxel)

“The kernel size of Sobel” (kernel, the Sobel)

“Event Frame (Pos)and evaluated” (space)

“We use a fixed time window of  $5.0 \times 10^{-3}$ ” (time unit)

“(n,256,256)” . n means ...

“achieved mIoU of 0.358 and F-Score of 0.507” (an mIoU, an F-Score). Please review similar phrases throughout the text to ensure consistency.

“result in a mIoU decrease of” (an mIoU)

“Sobel Event Frameusing our method” (space)

“We recommend that future related tasks refer to our *Optimal Binarization Threshold Selection Principle*, flexibly adjusting the threshold to optimize results, which serves as a guideline for future work.” Please review writing and rephrase for clarity.

## V. Conclusion & Future Work

“we introduced a *Optimal Binarization Threshold Selection Principle*” (*the Optimal*)

“using the monocular neuromorphic camera” (using a)

“We believe that if both methods were compared under the same extremely rapid scanning conditions, traditional methods will suffer from motion blur, but our method will perform better, which we plan to test as a future work.” (Please review verb form).

## Declarations

**Potential competing interests:** No potential competing interests to declare.