

Sketch2Map: A Game Map Design Support System Allowing Quick Hand Sketch Prototyping

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Introduction

Background

- Modern open-world games require a vast extent of world map
 - Example: *The Legend of Zelda: Breath of the Wild*
 - The terrain must be diverse and attractive
 - Creating such terrain is challenging due to its size
- A hand-drawn sketch is a universal tool for prototyping
 - Applicable to world map design

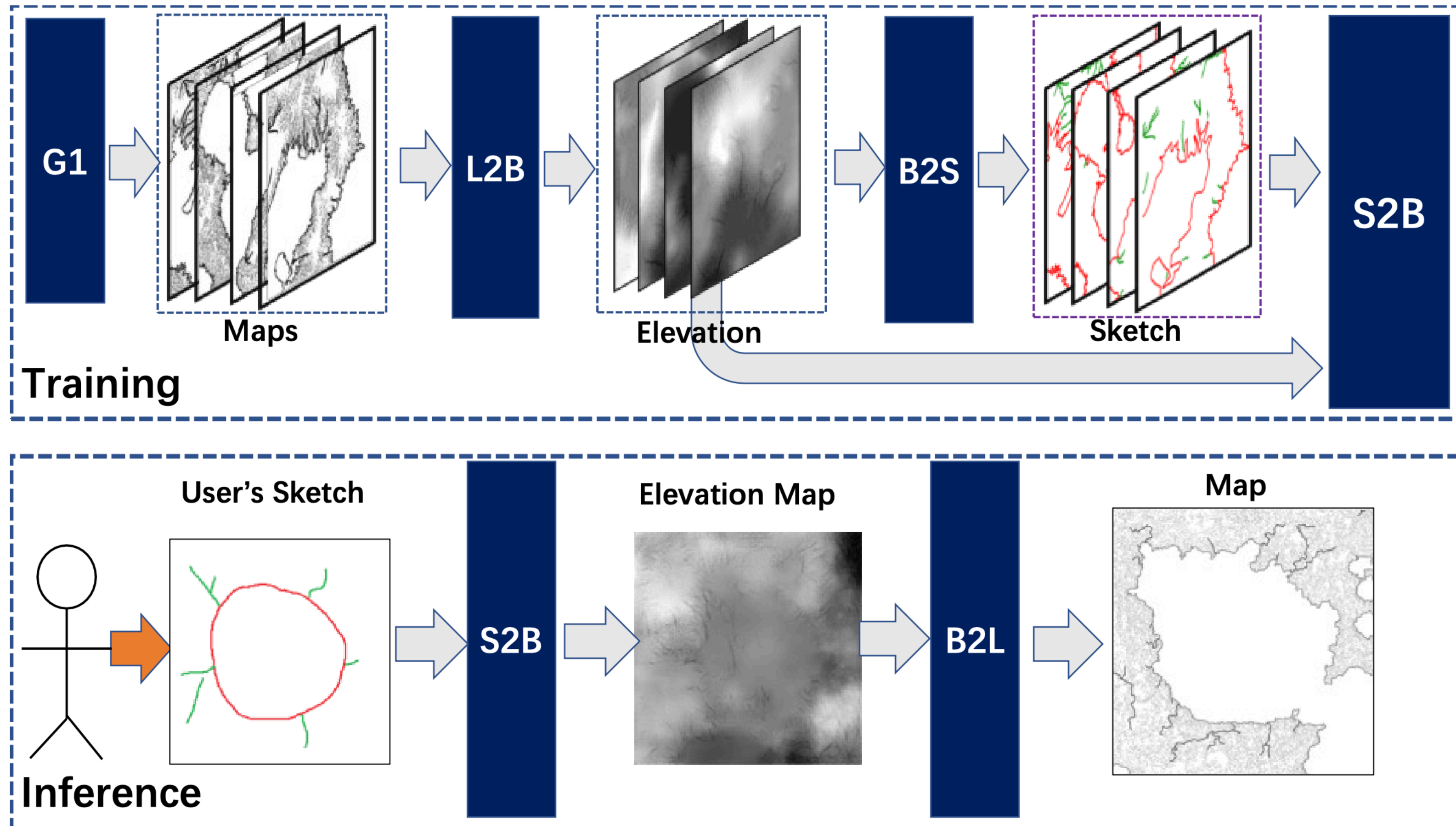
Introduction

Objective

- This paper introduces **Sketch2Map**
 - Aids terrain design prototyping
 - Generates diverse terrain from given sketch in real-time
 - Saves designer's time
 - Reflects designer's intention

Method

Pipeline of Sketch2Map

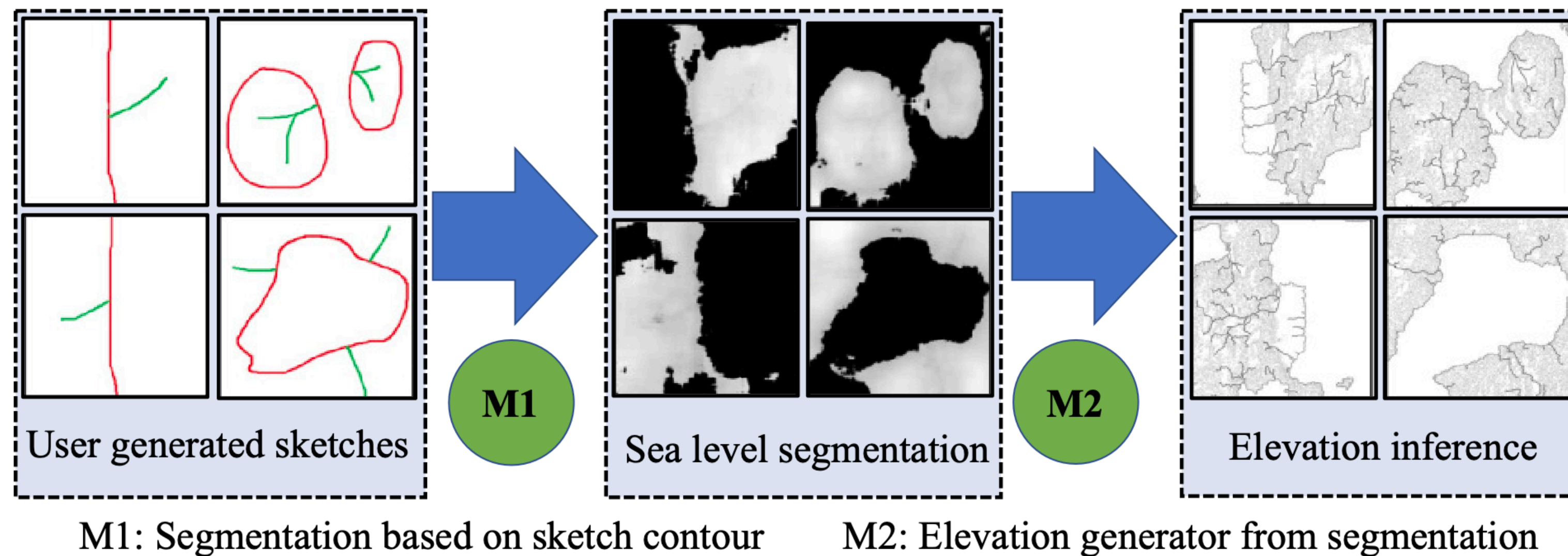


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Method

The two stage strategy

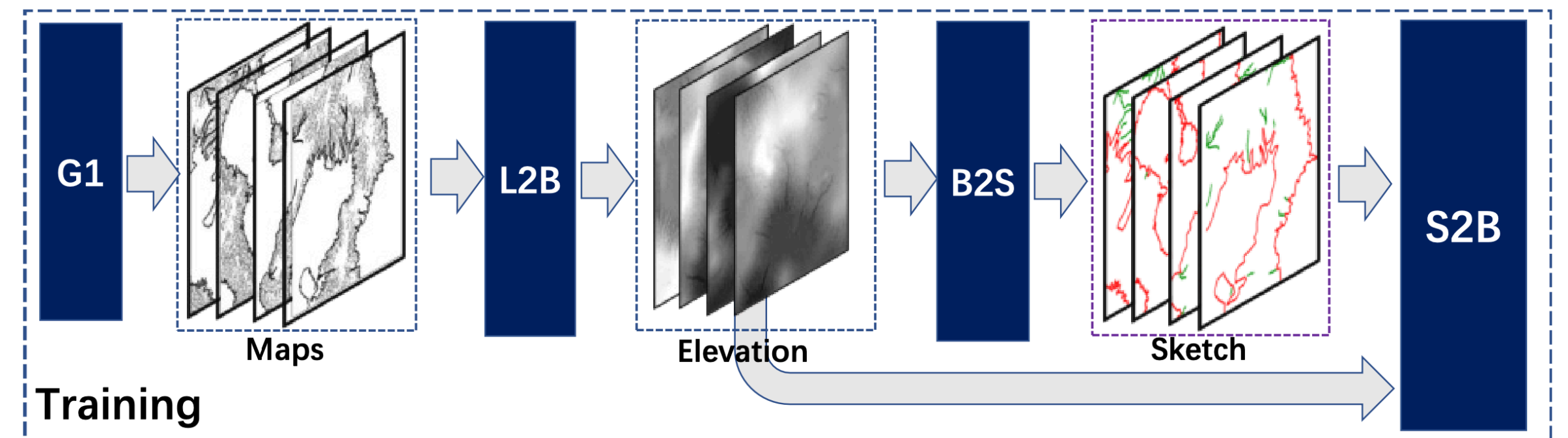
- In order to faithfully translate the designer's intention, they added a sea level segmentation stage in between
- Authors compared the results of two-stage and one-stage strategies

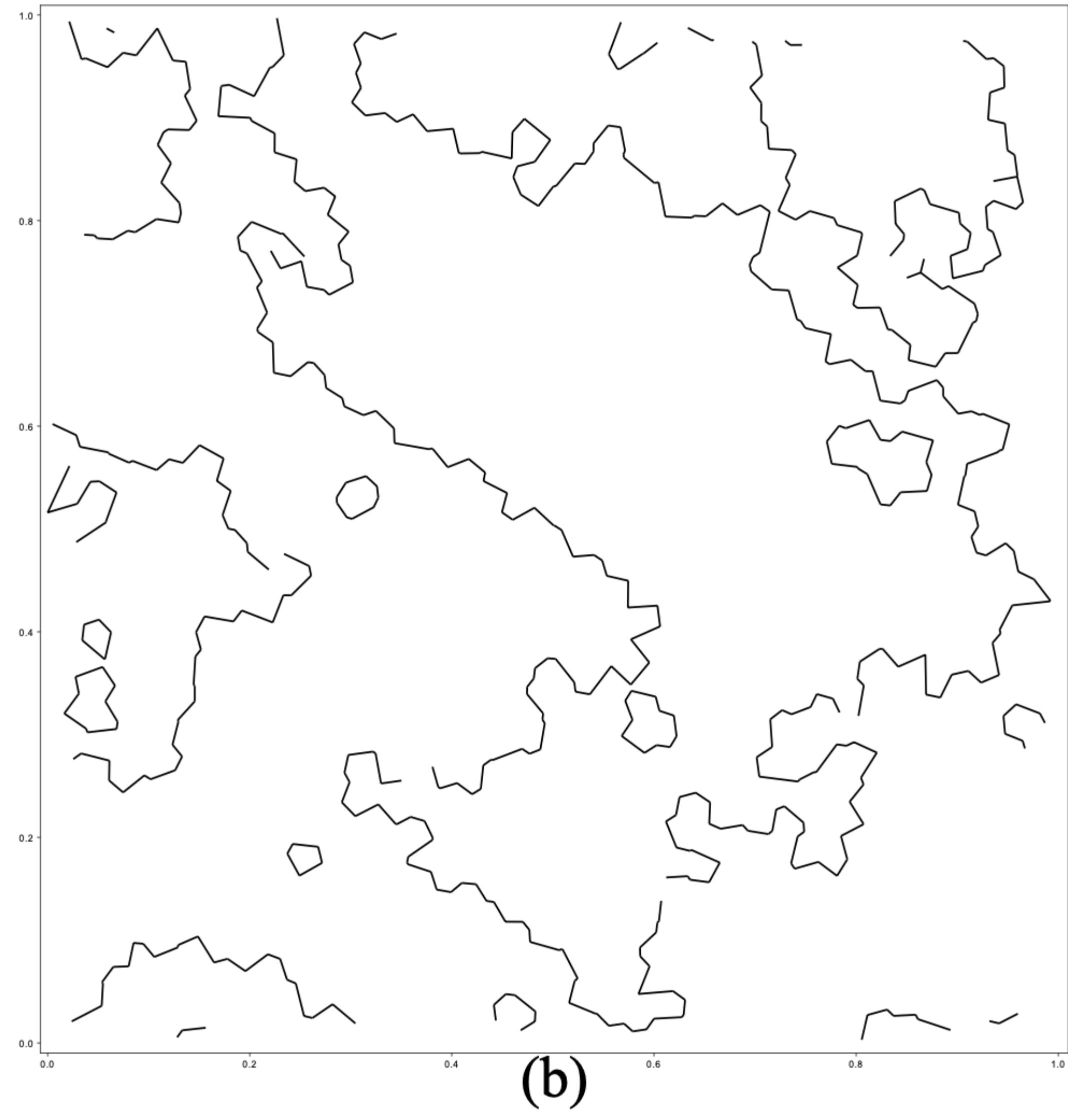
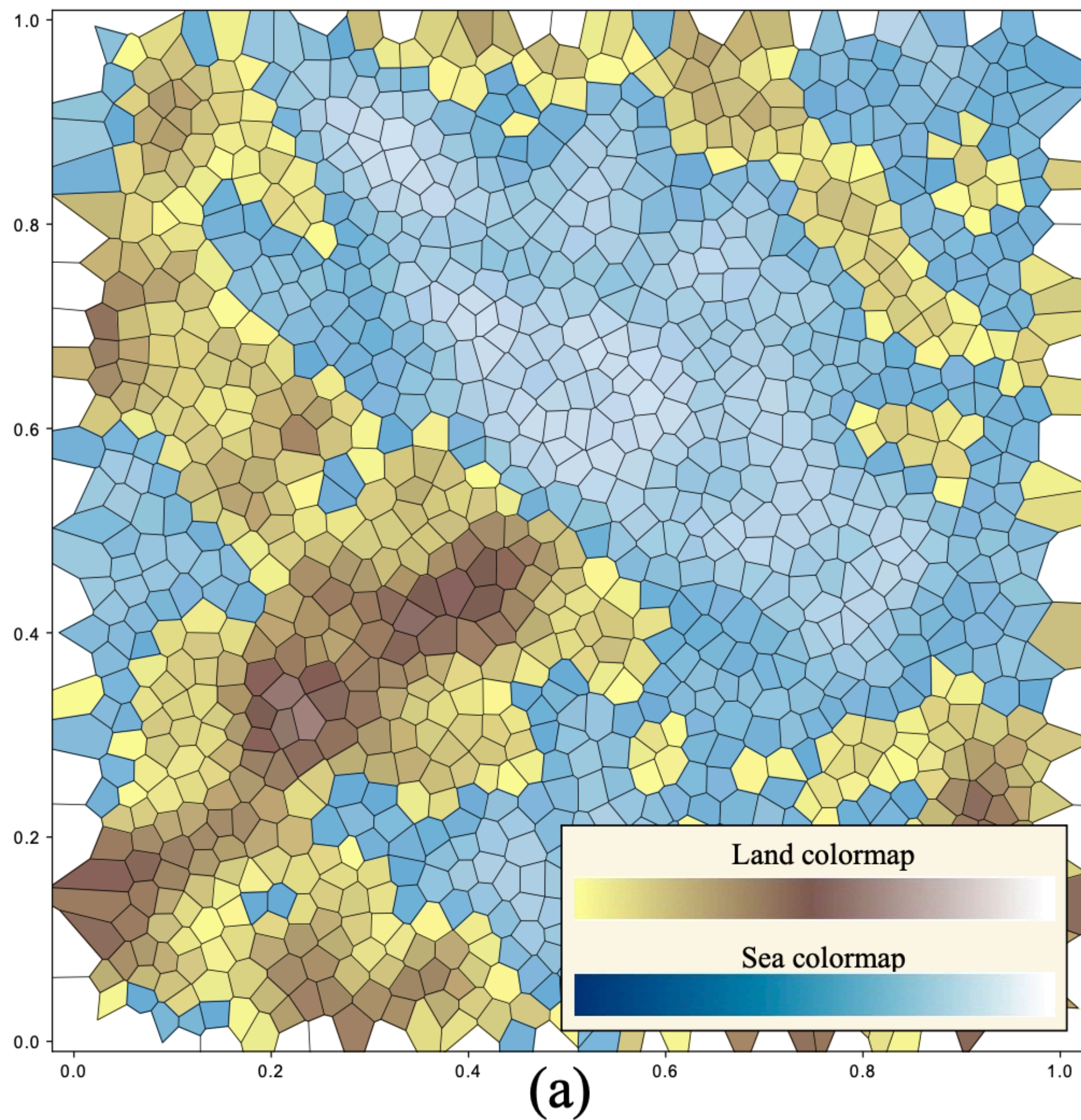


Method

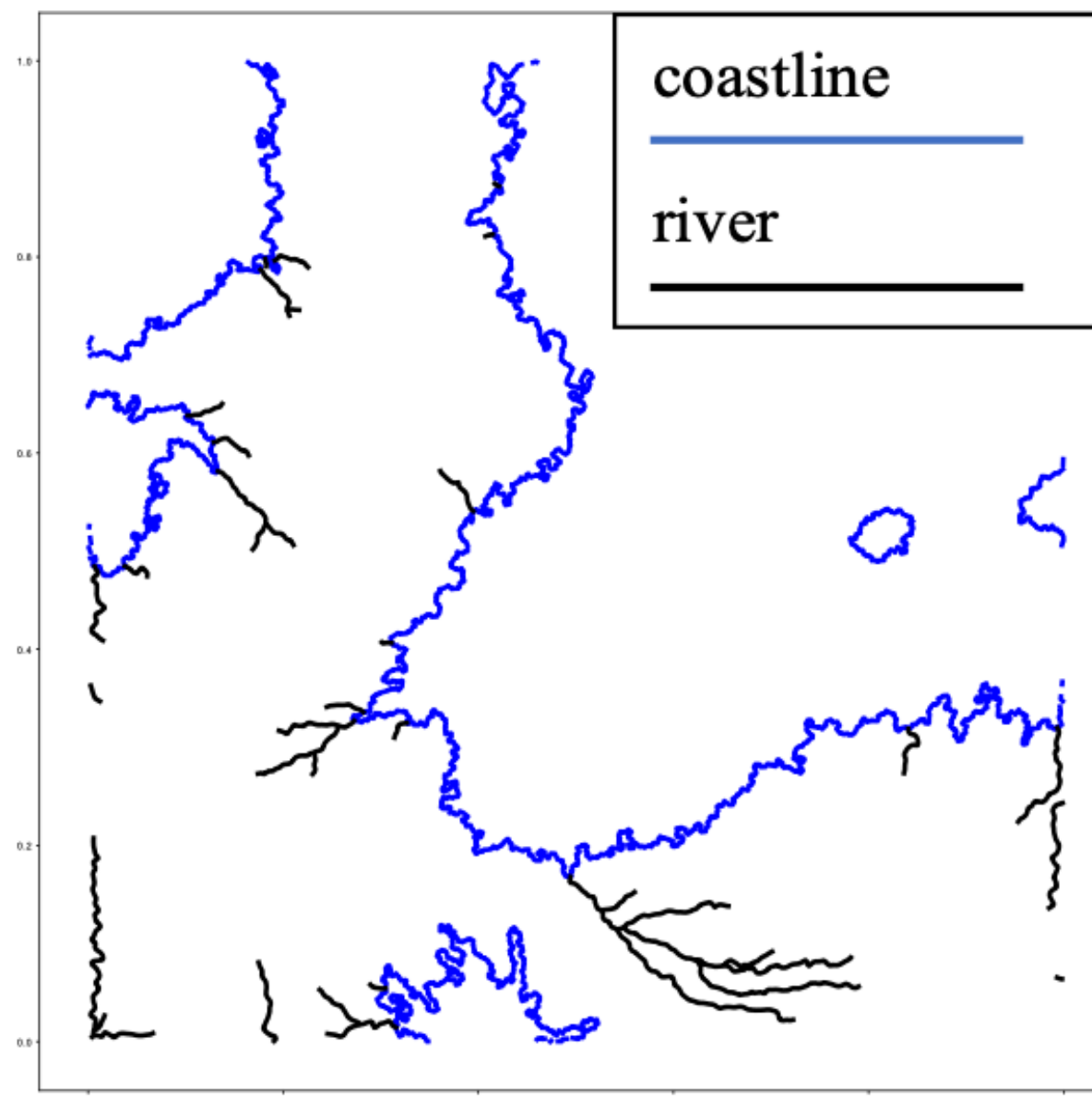
Pipeline of Sketch2Map

- G1: Generator of training data
 - Real world elevation data
 - Random world map generator
- L2B (Level2Bitmap): Convert levels to 2D bitmap representing elevation
- B2S (Bitmaps2Sketch): Generate corresponding sketch for 2D bitmap
- S2B (Sketch2Bitmaps)

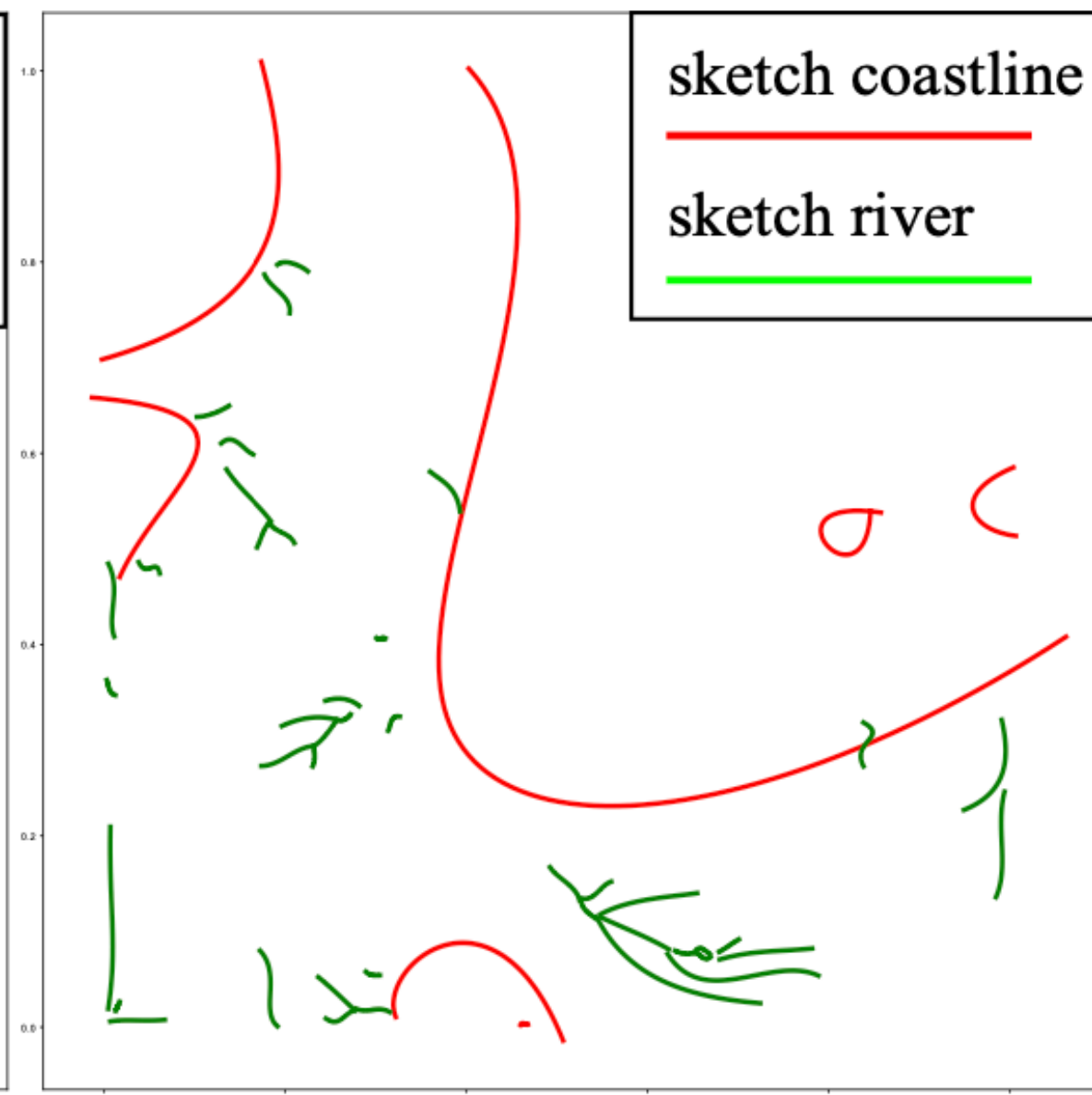




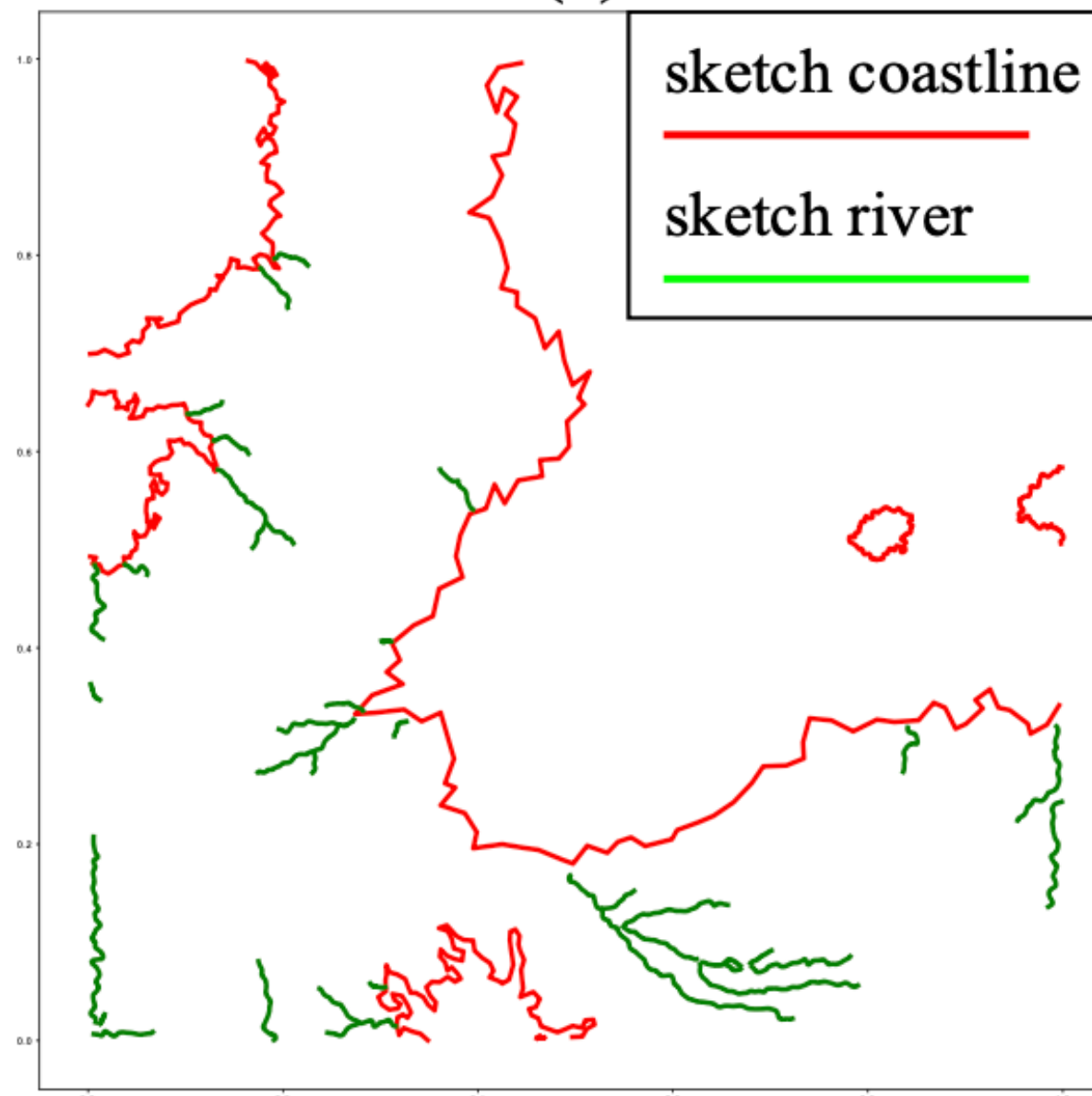
Example of map generator



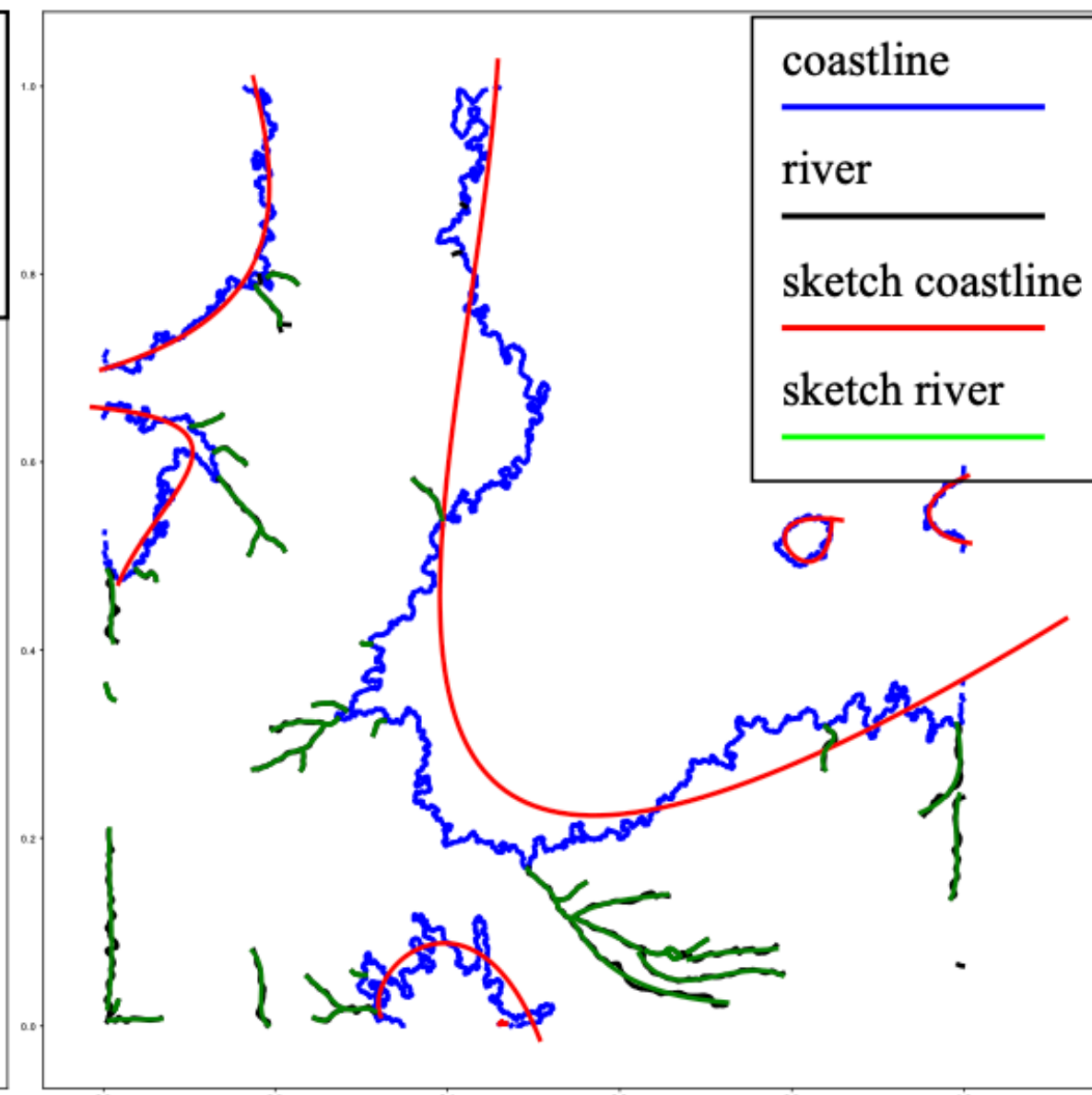
(a)



(b)



(c)



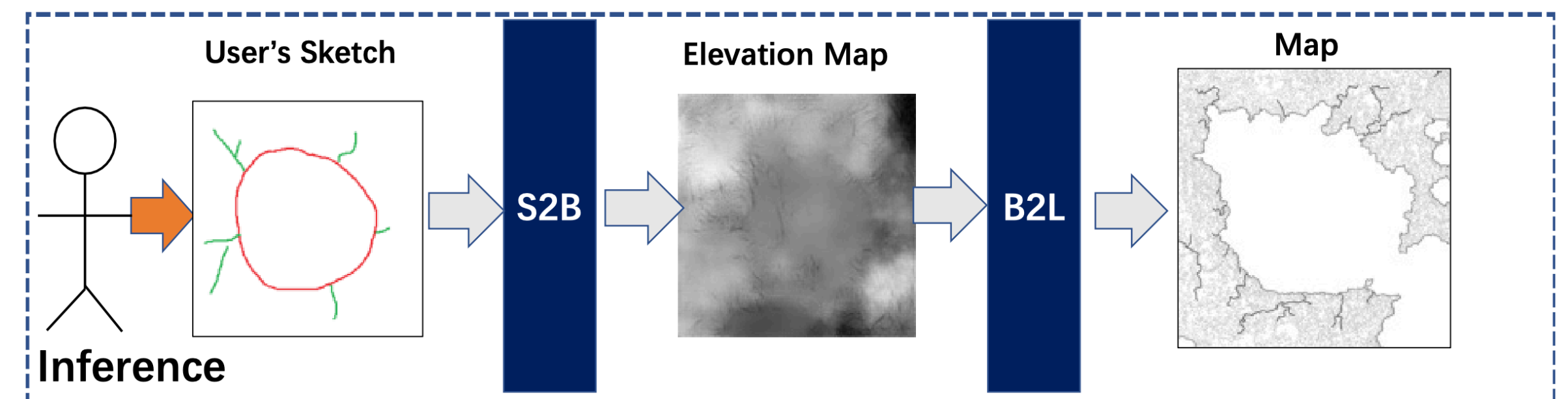
(d)

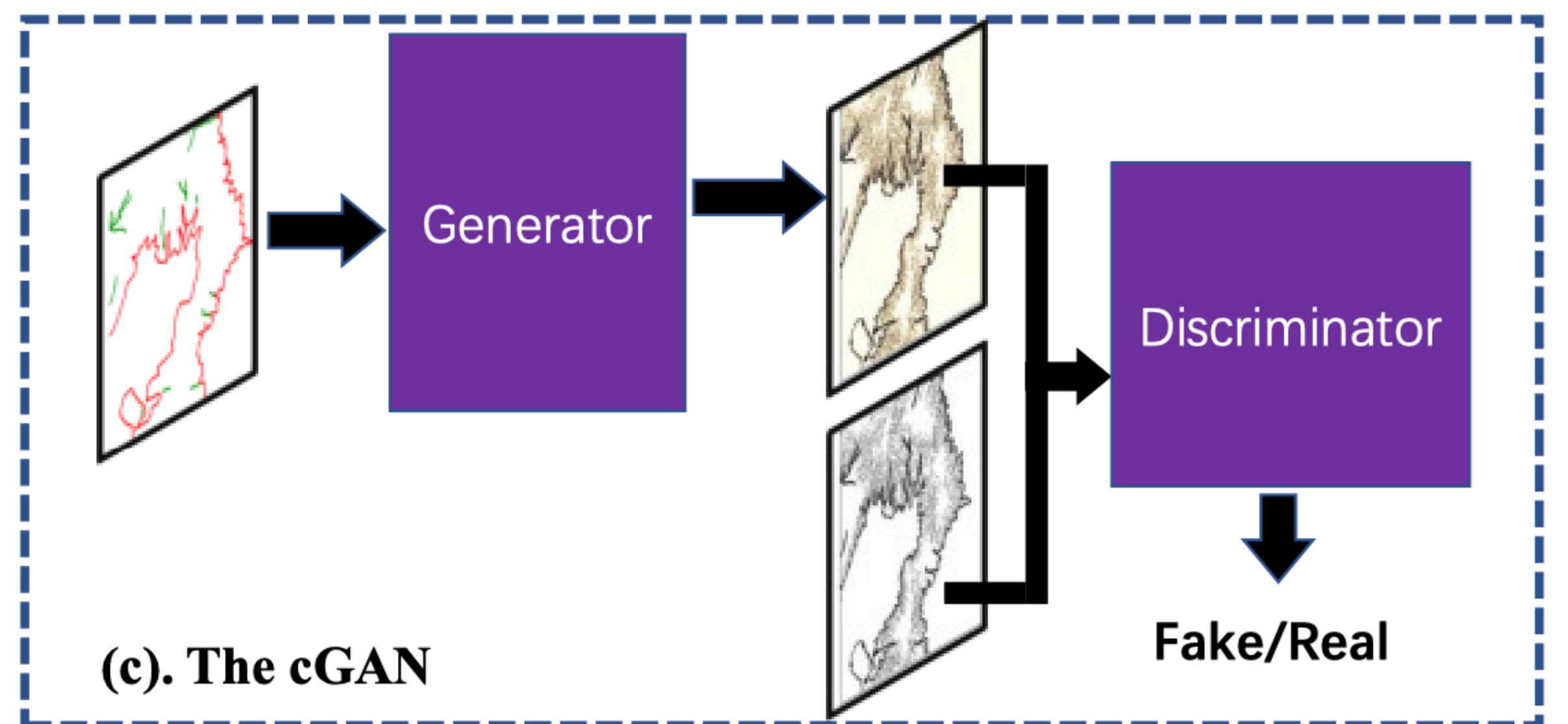
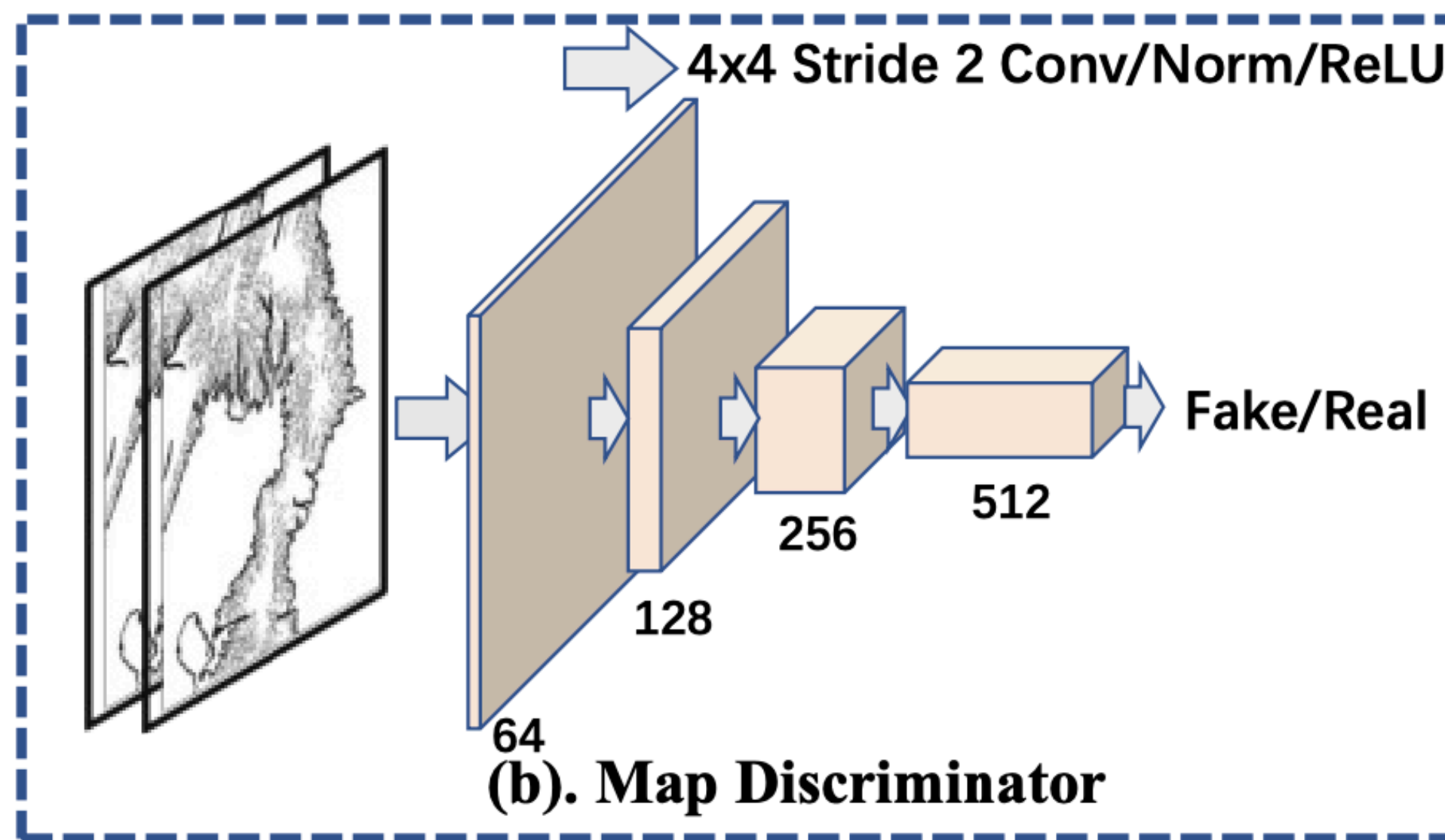
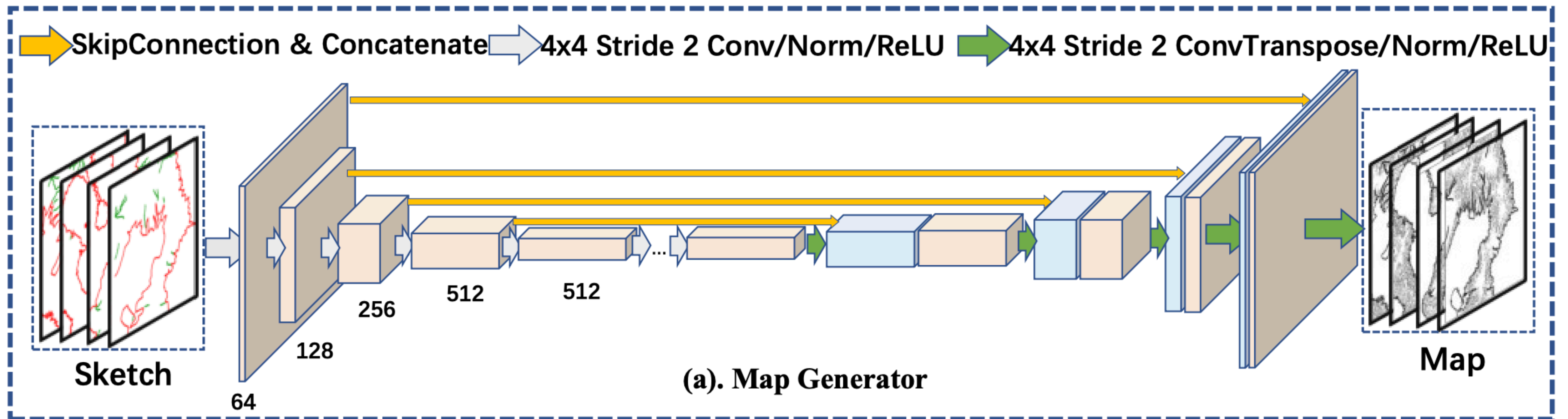
Sketch data generated from elevation map

Method

Pipeline of Sketch2Map

- S2B (Sketch2Bitmaps): A cGAN model which maps sketches to bitmaps
 - Uses a customized pix2pix framework
 - Phillip Isola, Jun-Yan Zhu, et al. “Image-to-Image Translation with Conditional Adversarial Networks”
- B2L (Bitmaps2Level):
 - Obtains actual level asset from elevation map





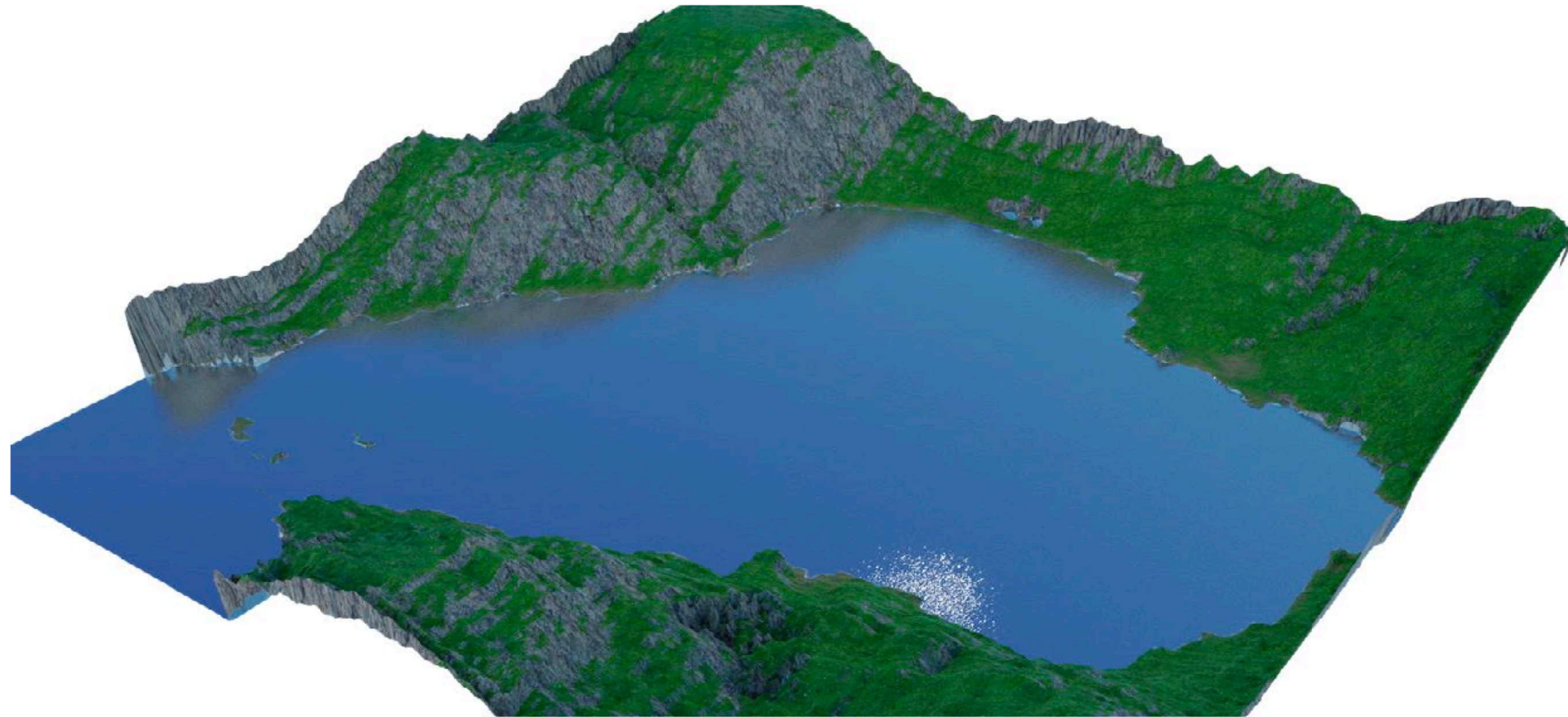
Architecture of the cGAN map generator (S2B)



(a). User generated sketch

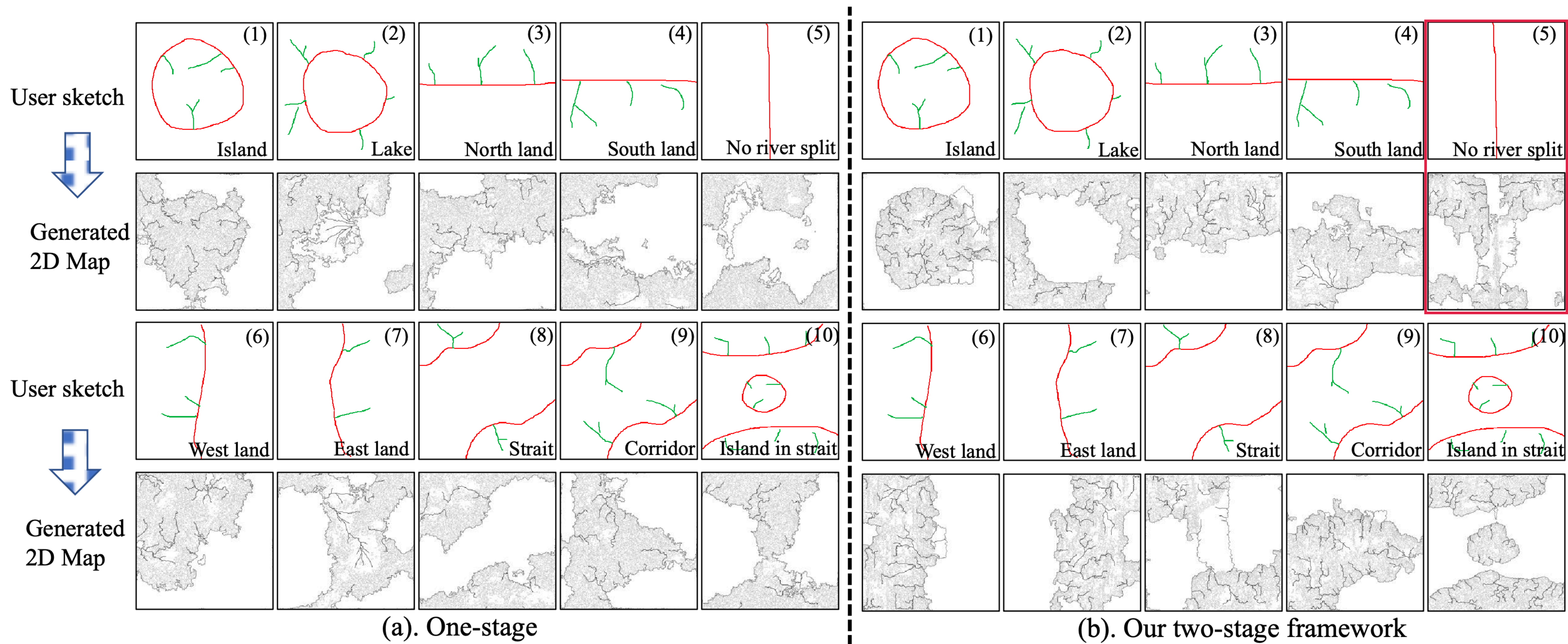
(b). 2D map generated
with Sketch2Map

(c). 3D rendering result



(d). Perspective view of the generated map

Example of generated terrain



Comparison of one-stage results and two-stage results

Conclusions

Results and limitations

- Sketch2Map can faithfully translate sketch into a world map
 - Highly customizable and adaptable
- The two-stage strategy is more faithful to the given sketch than the simple one-stage strategy
- Limitations
 - Designers have to draw the sketch in a certain style
 - Lacks support of lakes
 - “No river split” case

Thank you for your attention