Emergence of Object Segmentation in Perturbed Generative Models

Adam Bielski, Paolo Favaro
University of Bern

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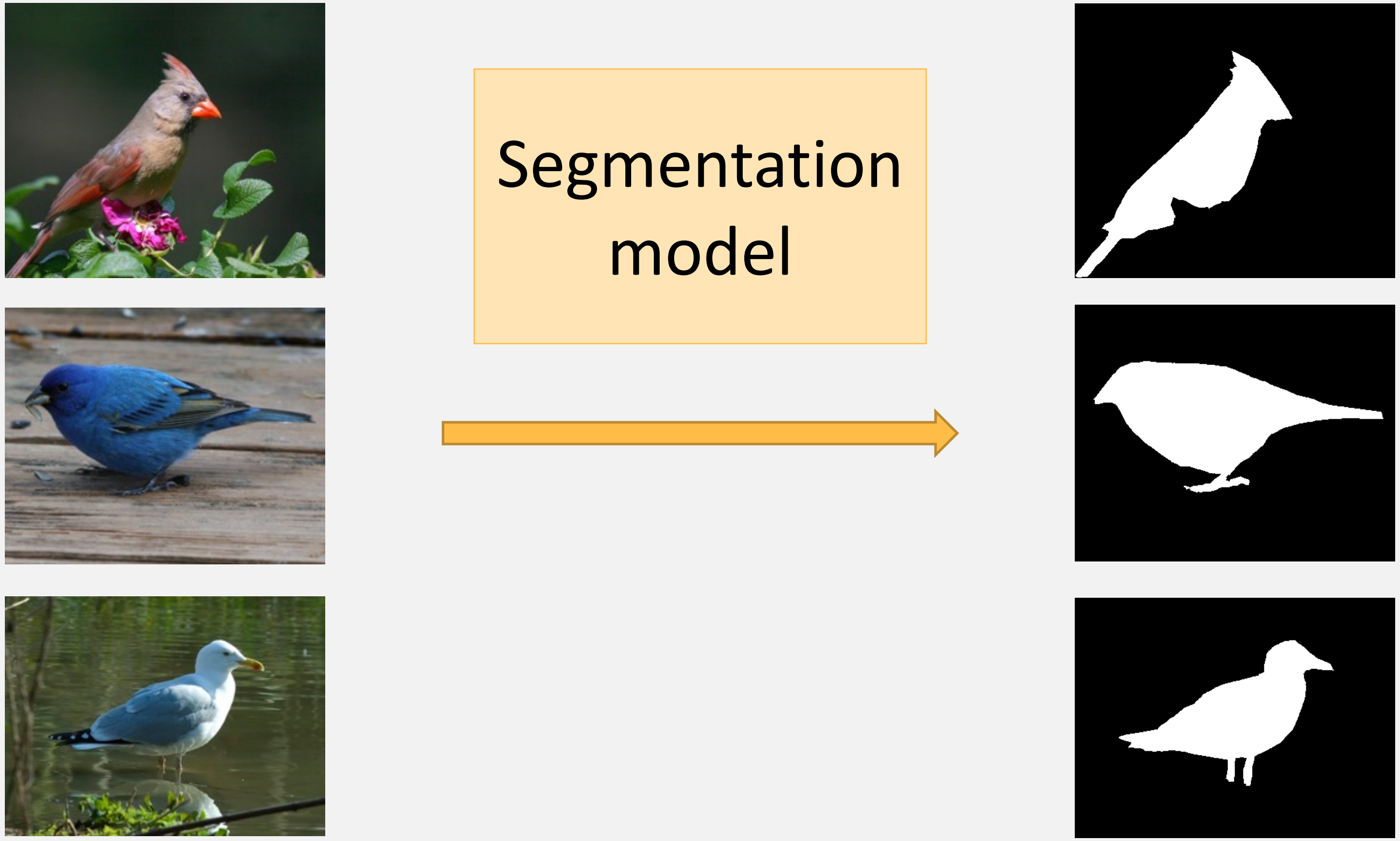
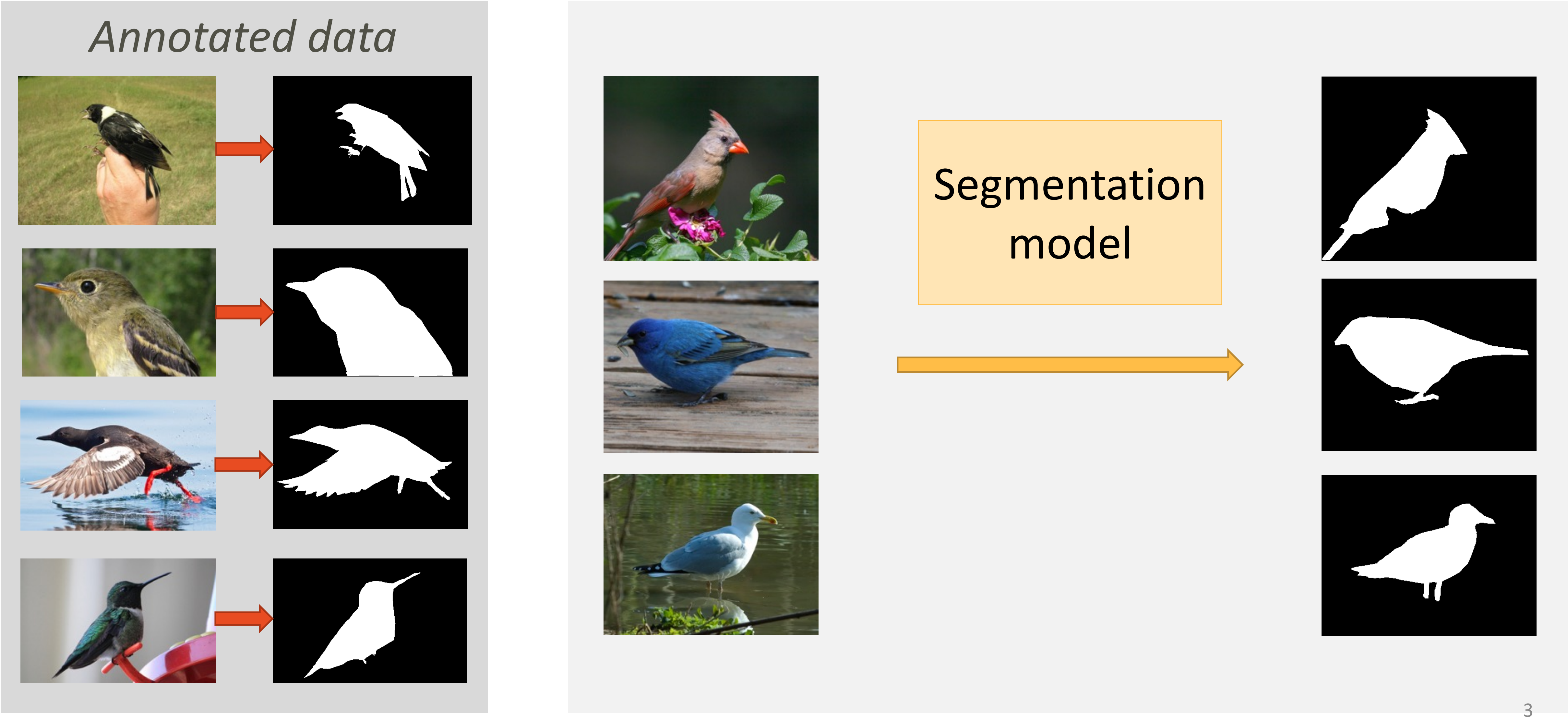
UNIVERSITÄT
BERN

NEURAL INFORMATION PROCESSING SYSTEMS

Object segmentation



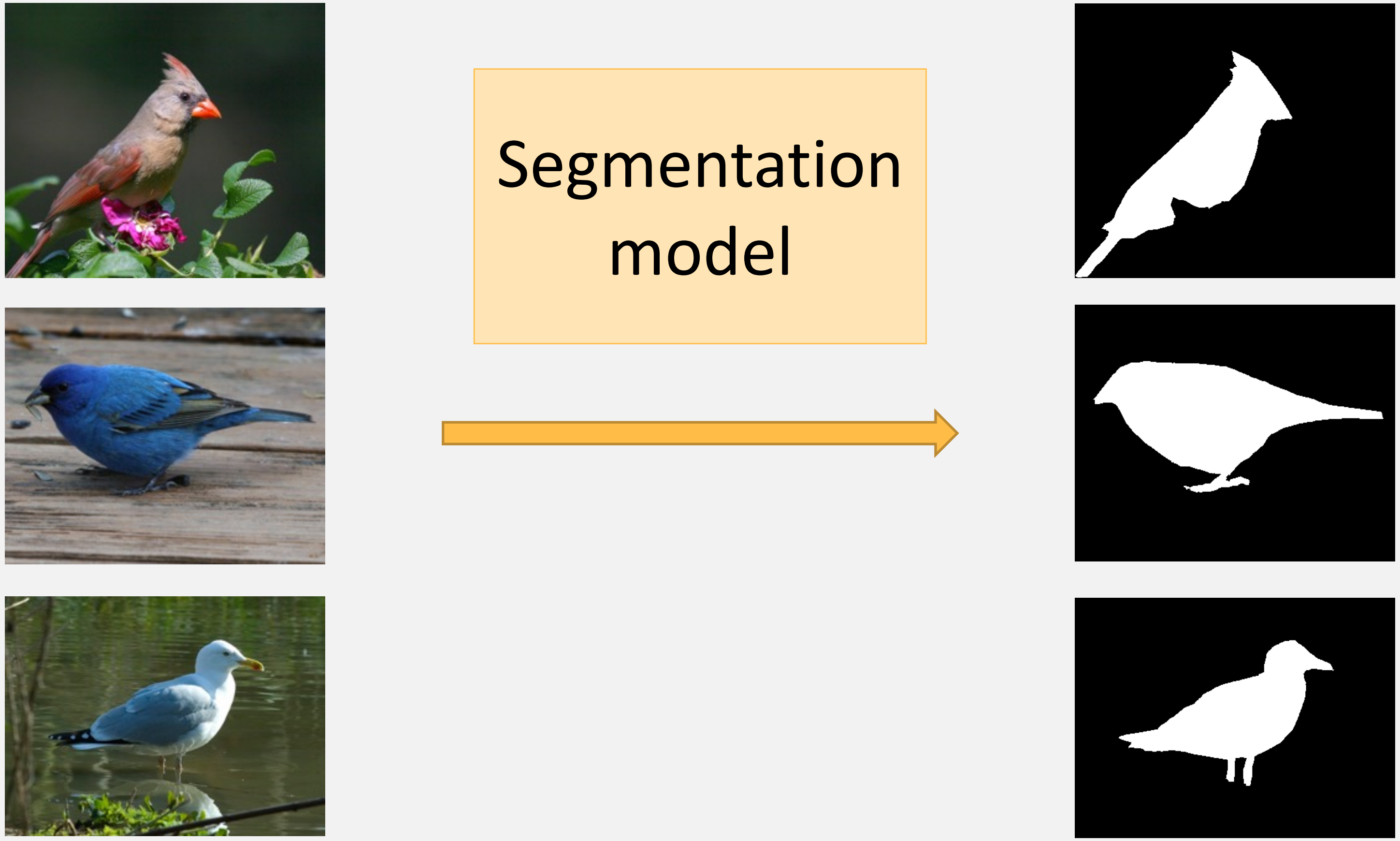
Object segmentation



Object segmentation

Annotated data

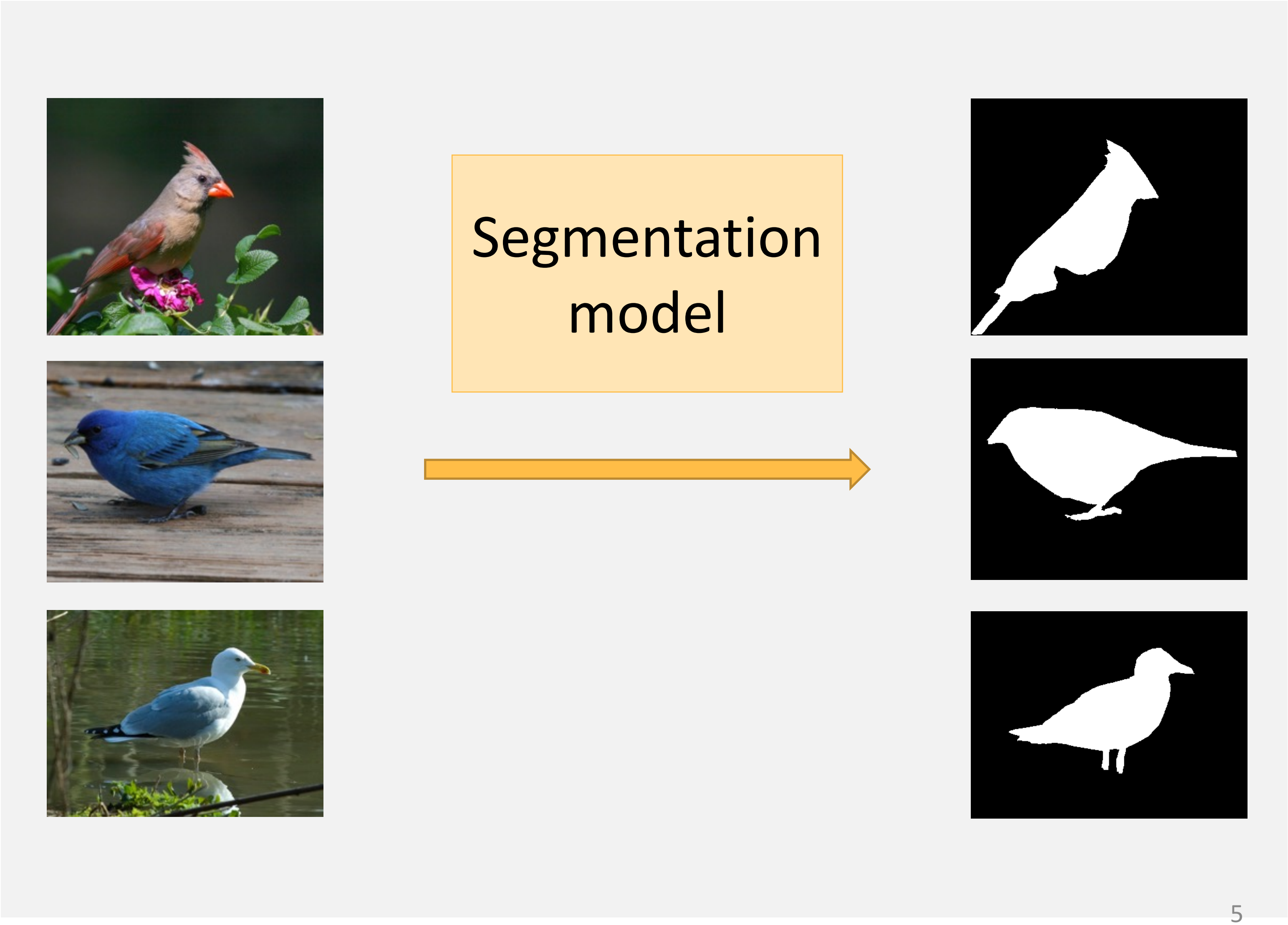
- *Human annotated*
- *Expensive*
- *Expertise knowledge*



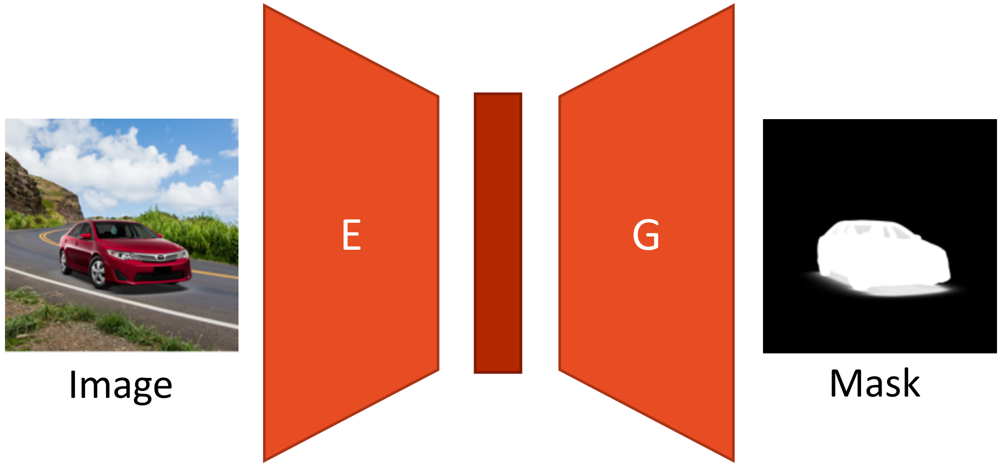
Unsupervised object segmentation

- Human annotated
- Expensive
- Expertise knowledge

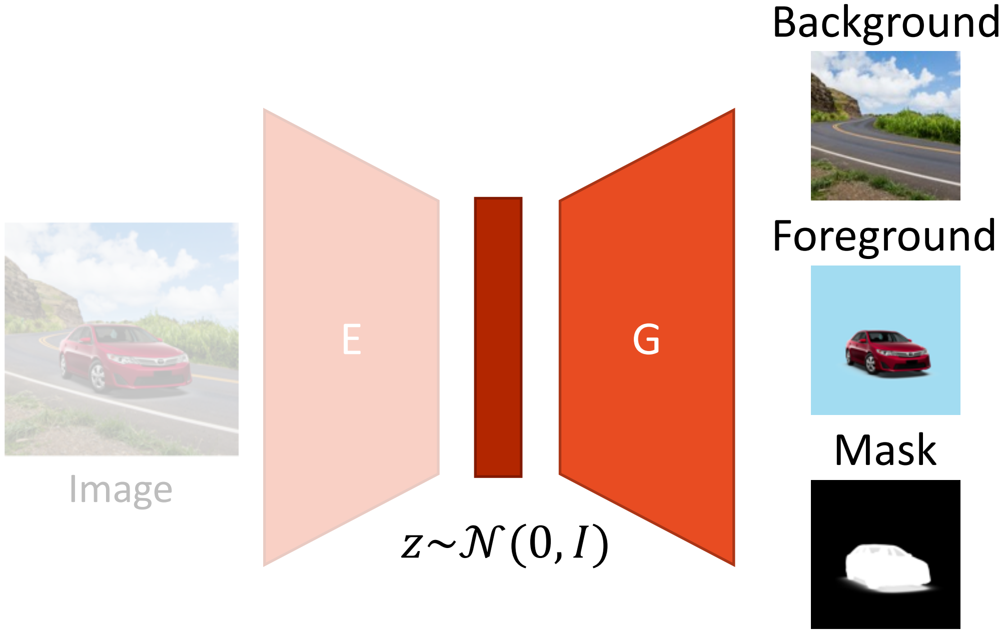
Can we do it without labels?



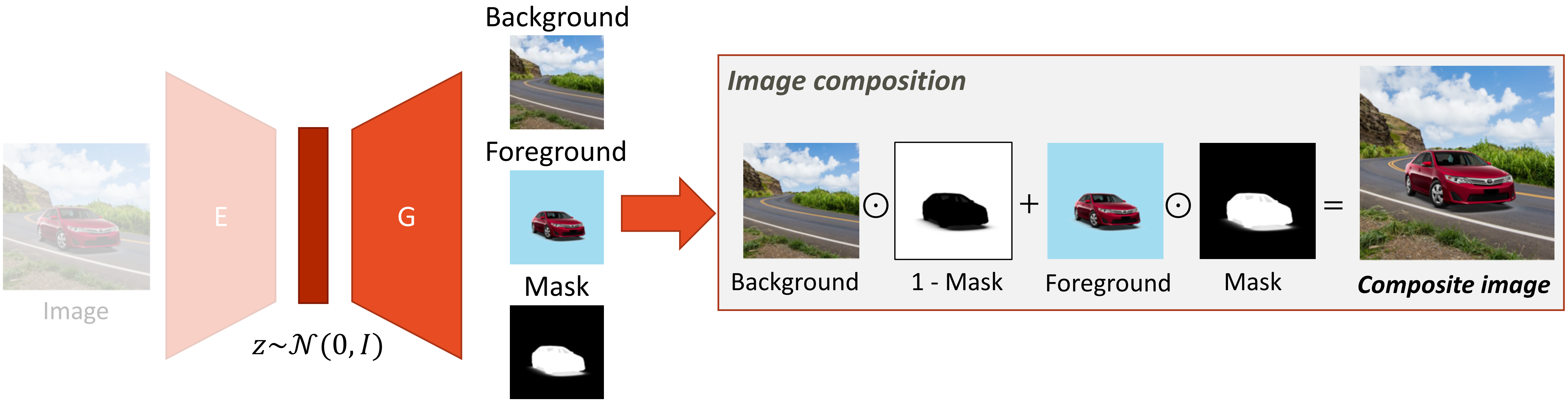
Unsupervised object segmentation



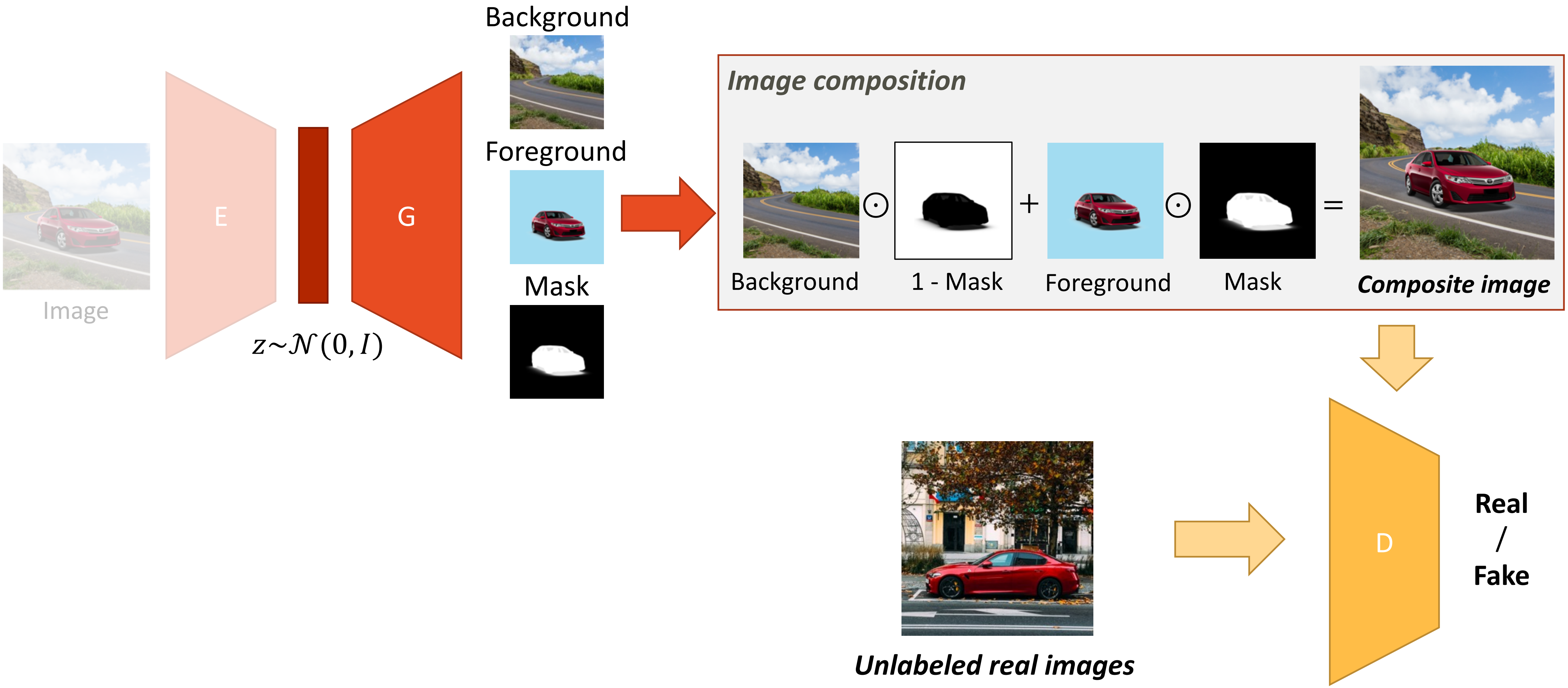
Learning to generate layered scenes with GAN



Learning to generate layered scenes with GAN



Learning to generate layered scenes with GAN



Degenerate solutions

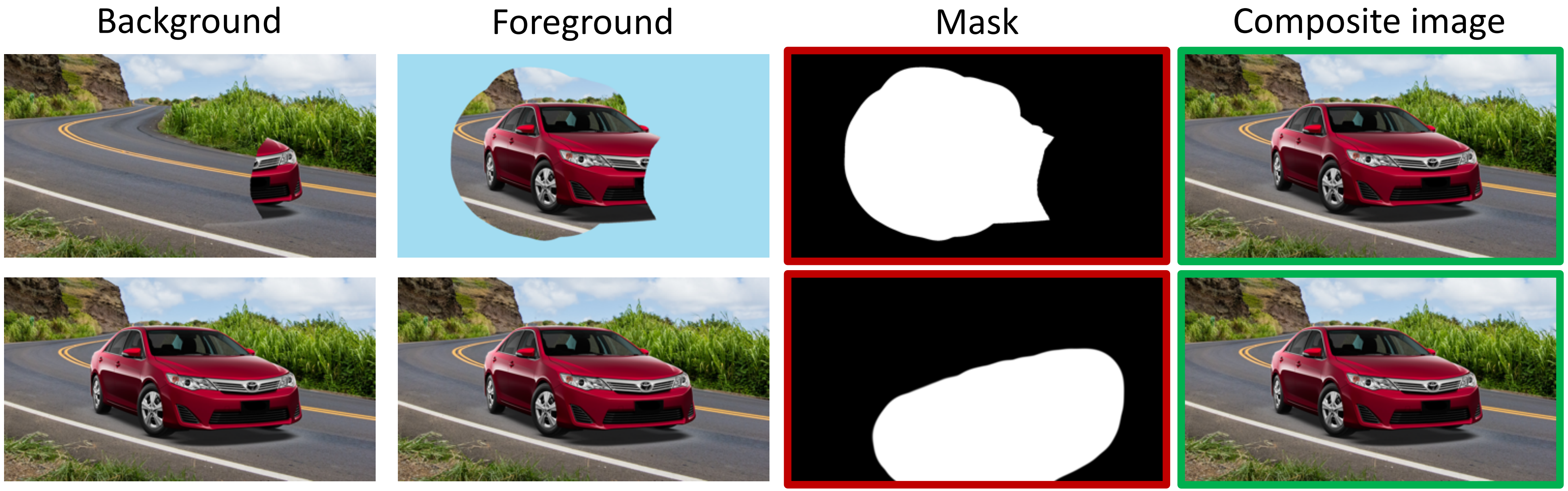
Background

Foreground

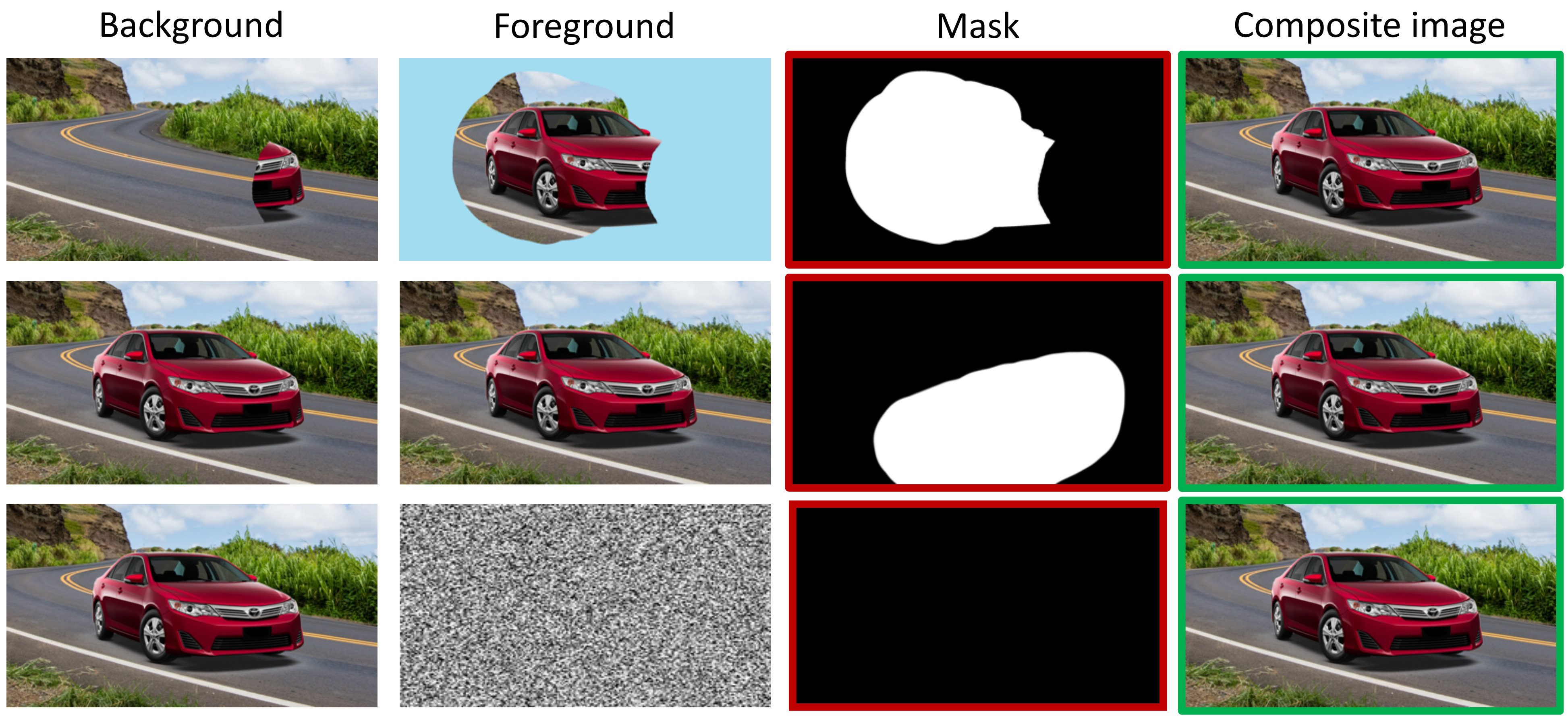
Mask

Composite image

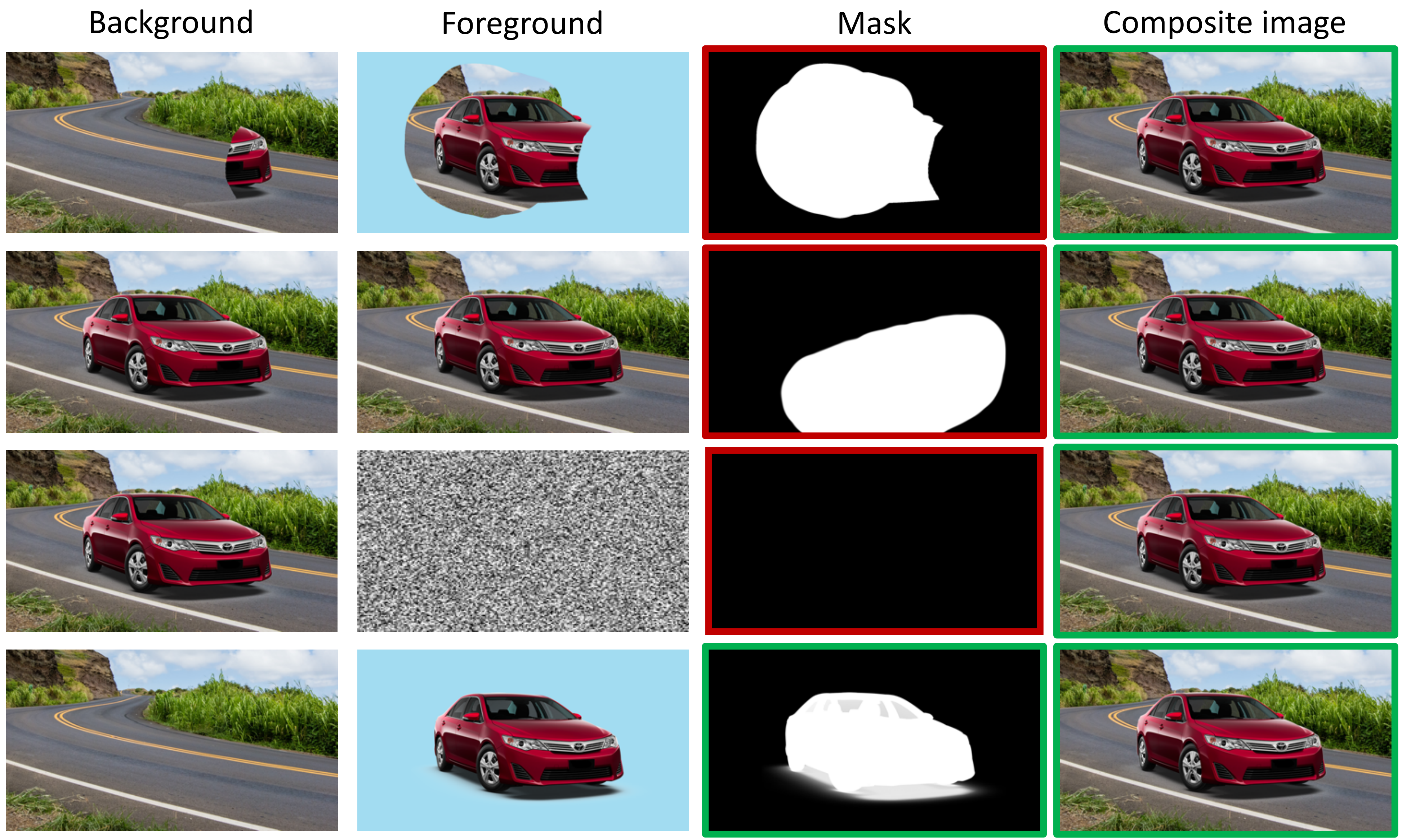
Degenerate solutions



Degenerate solutions



Degenerate solutions



What is a correct partition?

What is a correct partition?

Random shifts


Random shifts

Random shifts

Random shifts

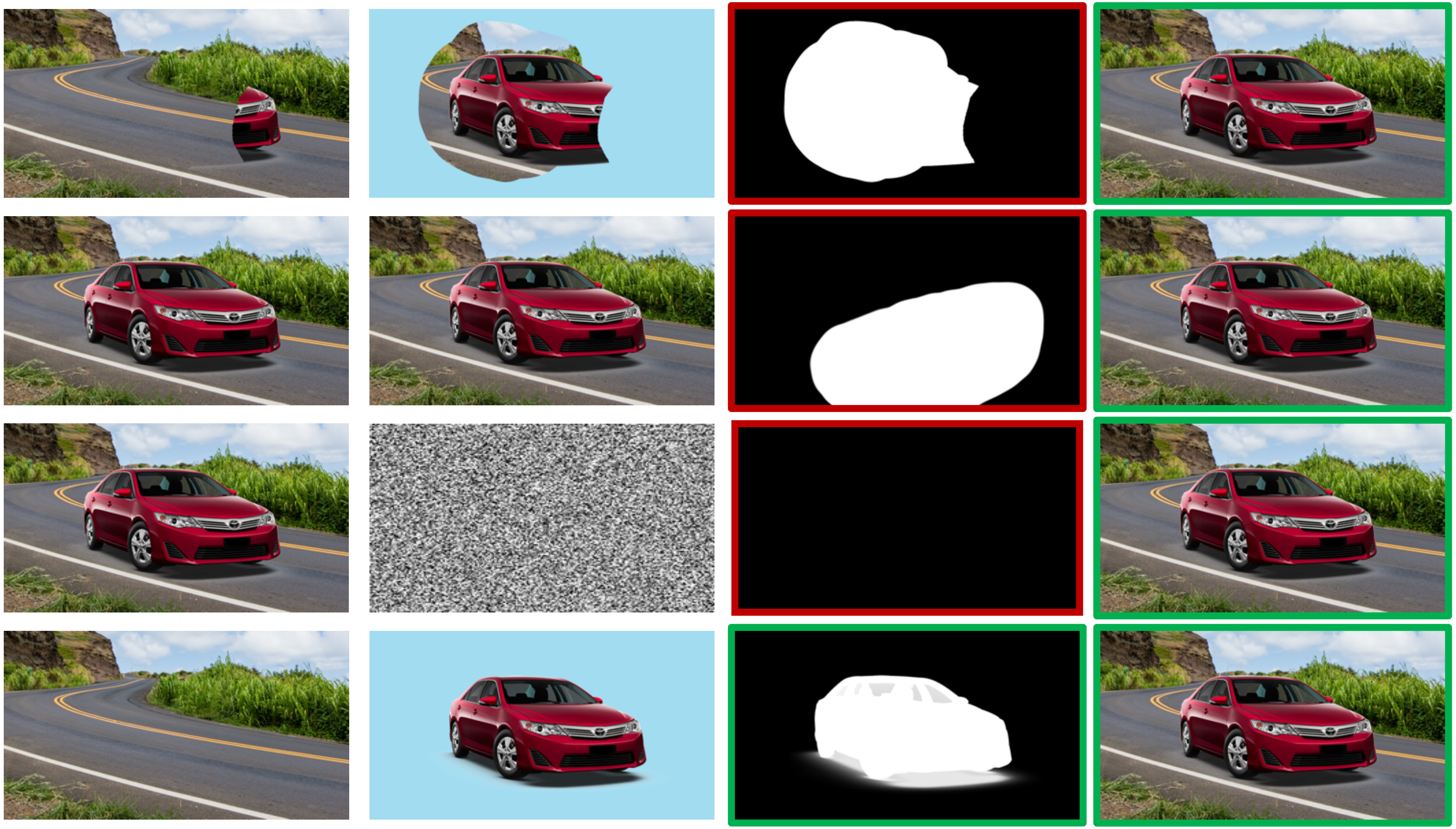
Invalid partition $\Longrightarrow$ invalid scene after a small shift

Valid partition $\Longrightarrow$ valid scene after a small shift

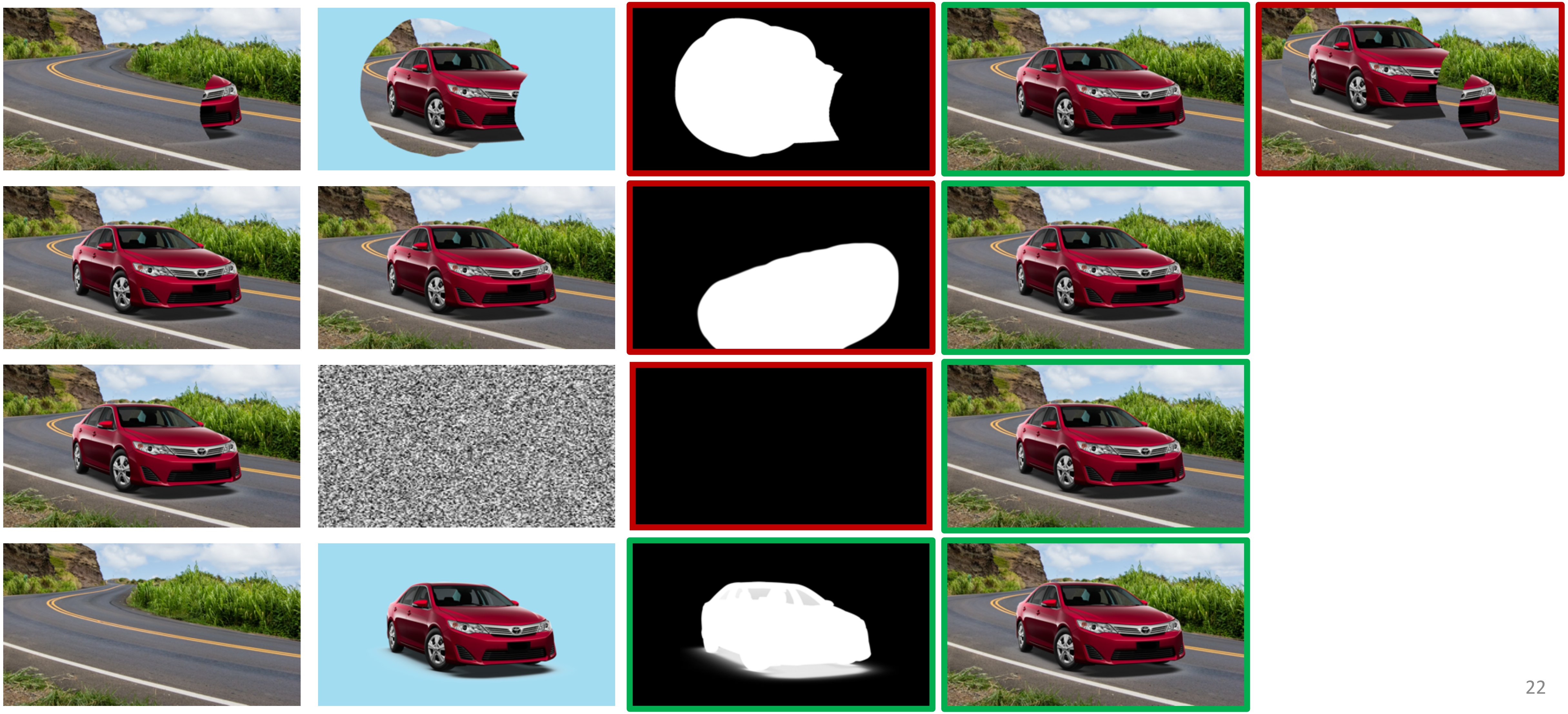
Random shifts

Avoiding degenerate solutions

Background | Foreground | Mask | Composite image | Composite image w/shift

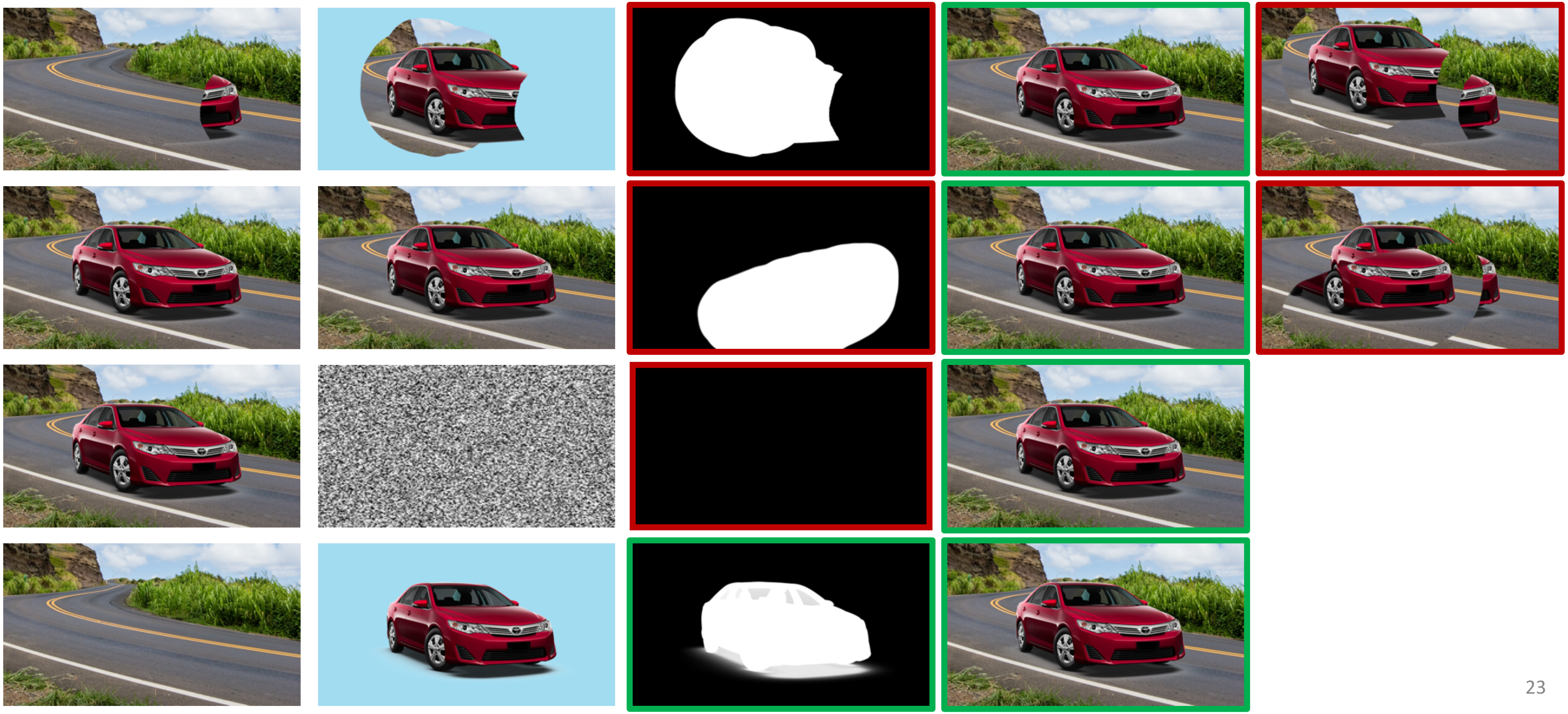


Avoiding degenerate solutions

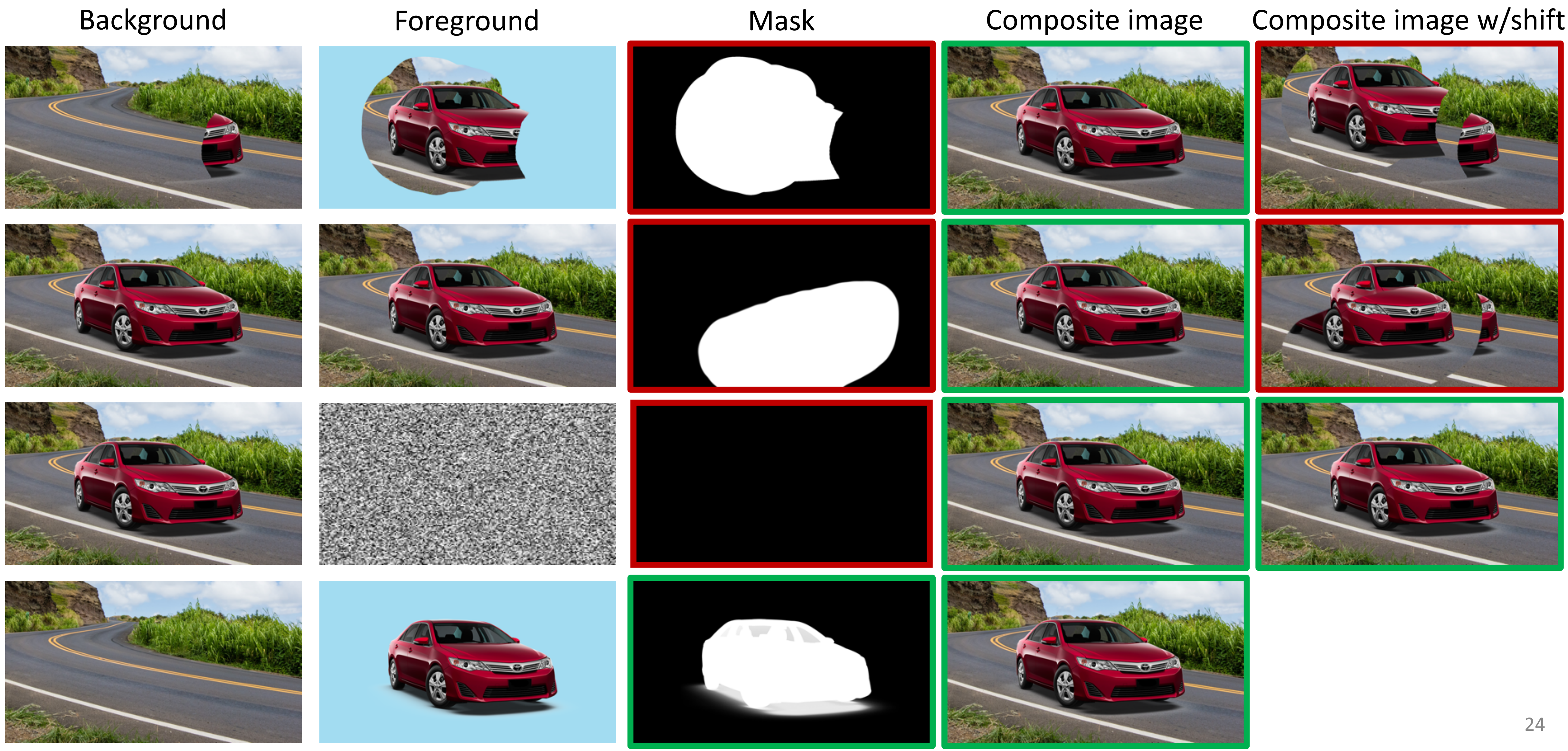


Avoiding degenerate solutions

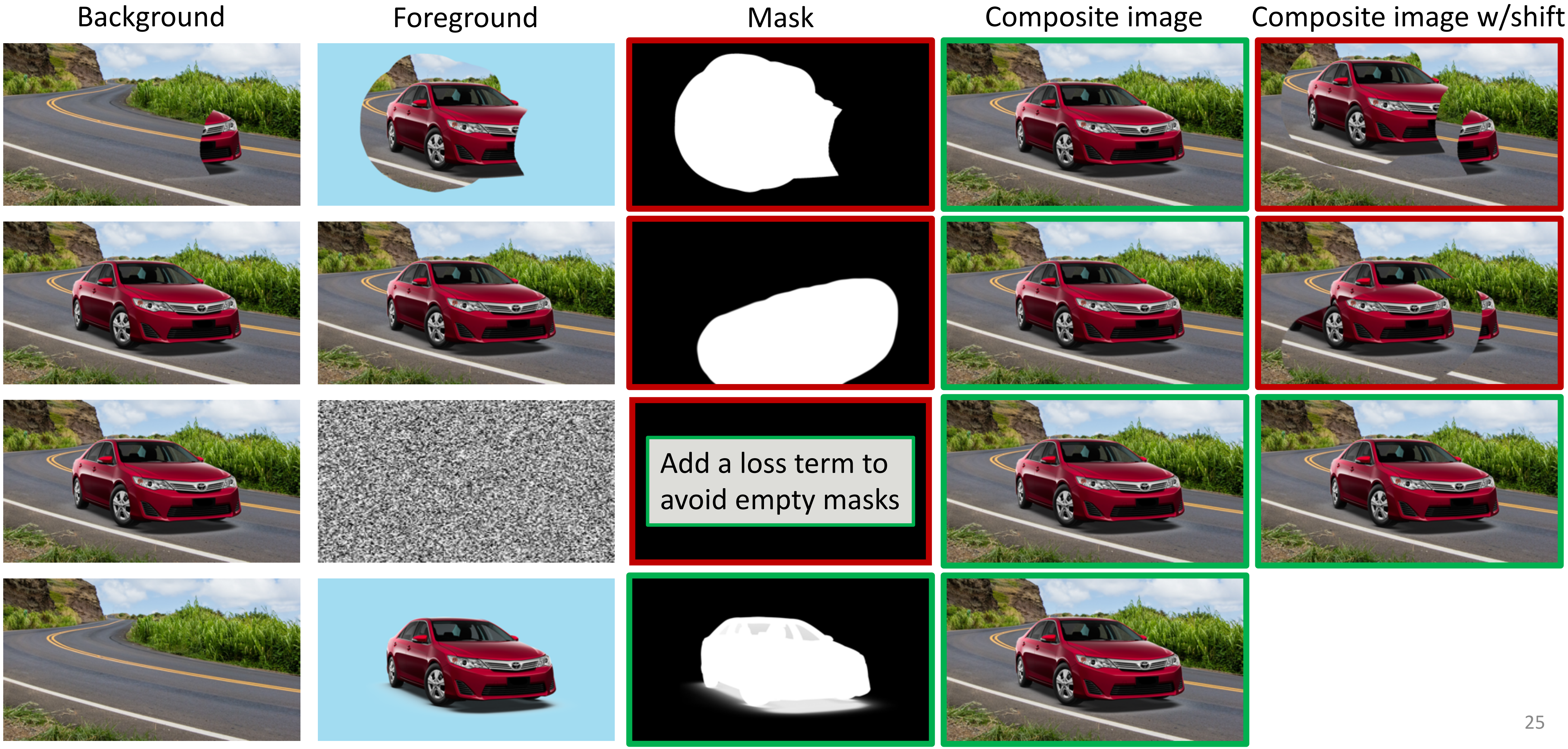
Background | Foreground | Mask | Composite image | Composite image w/shift



Avoiding degenerate solutions

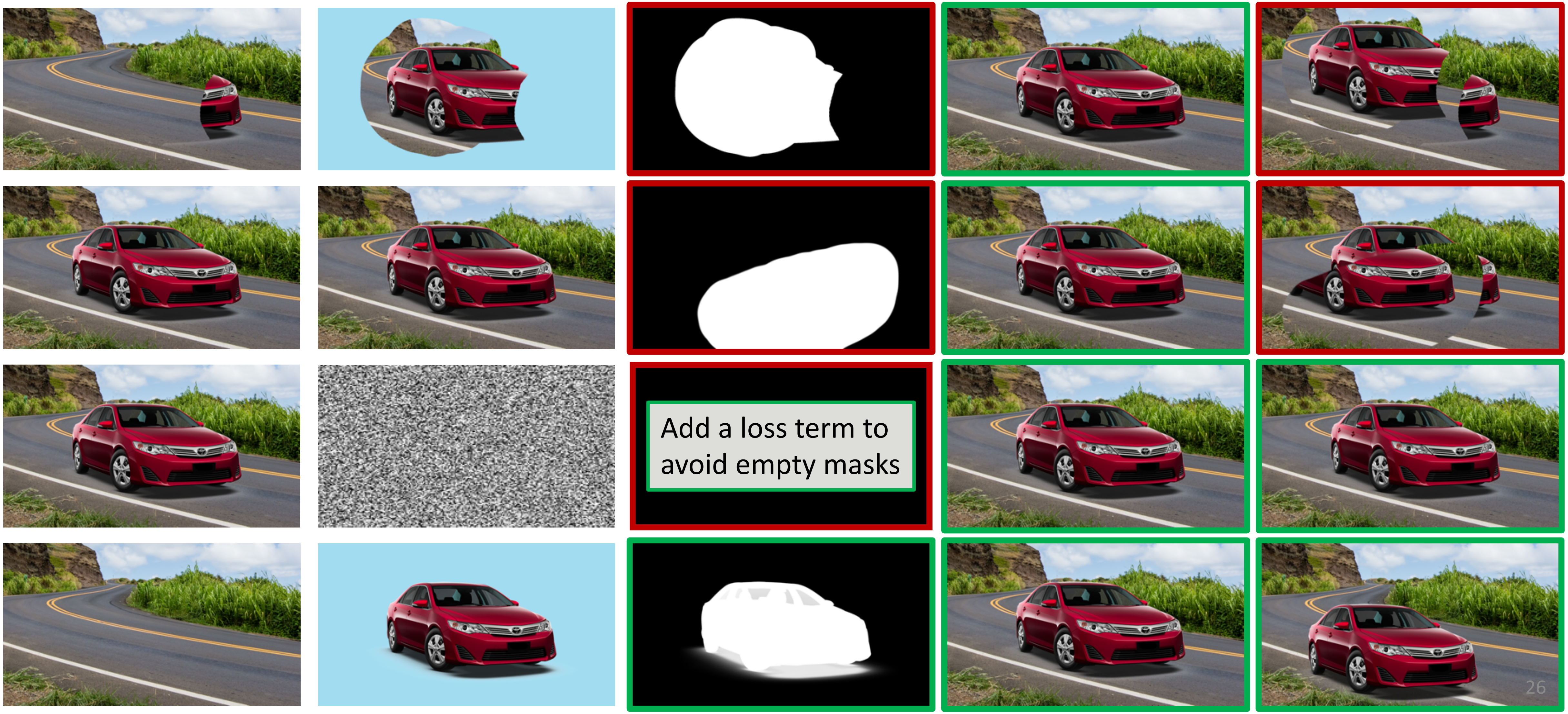


Avoiding degenerate solutions

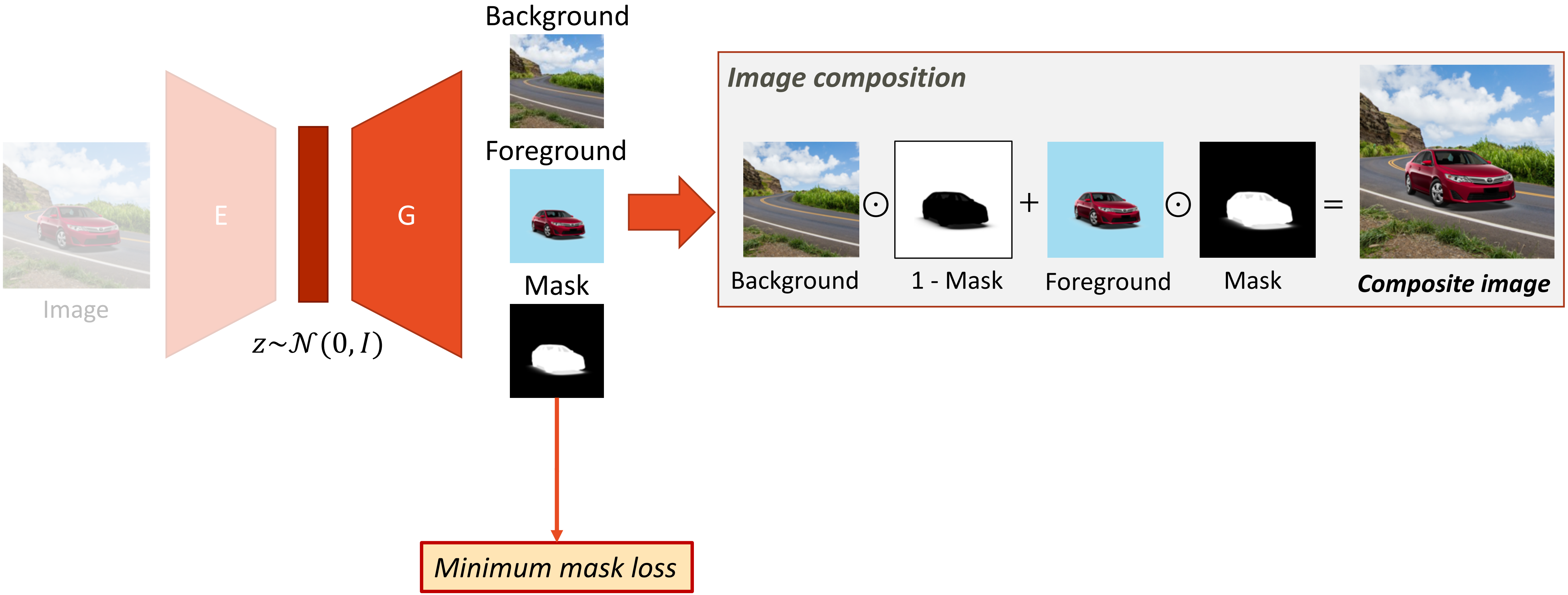


Avoiding degenerate solutions

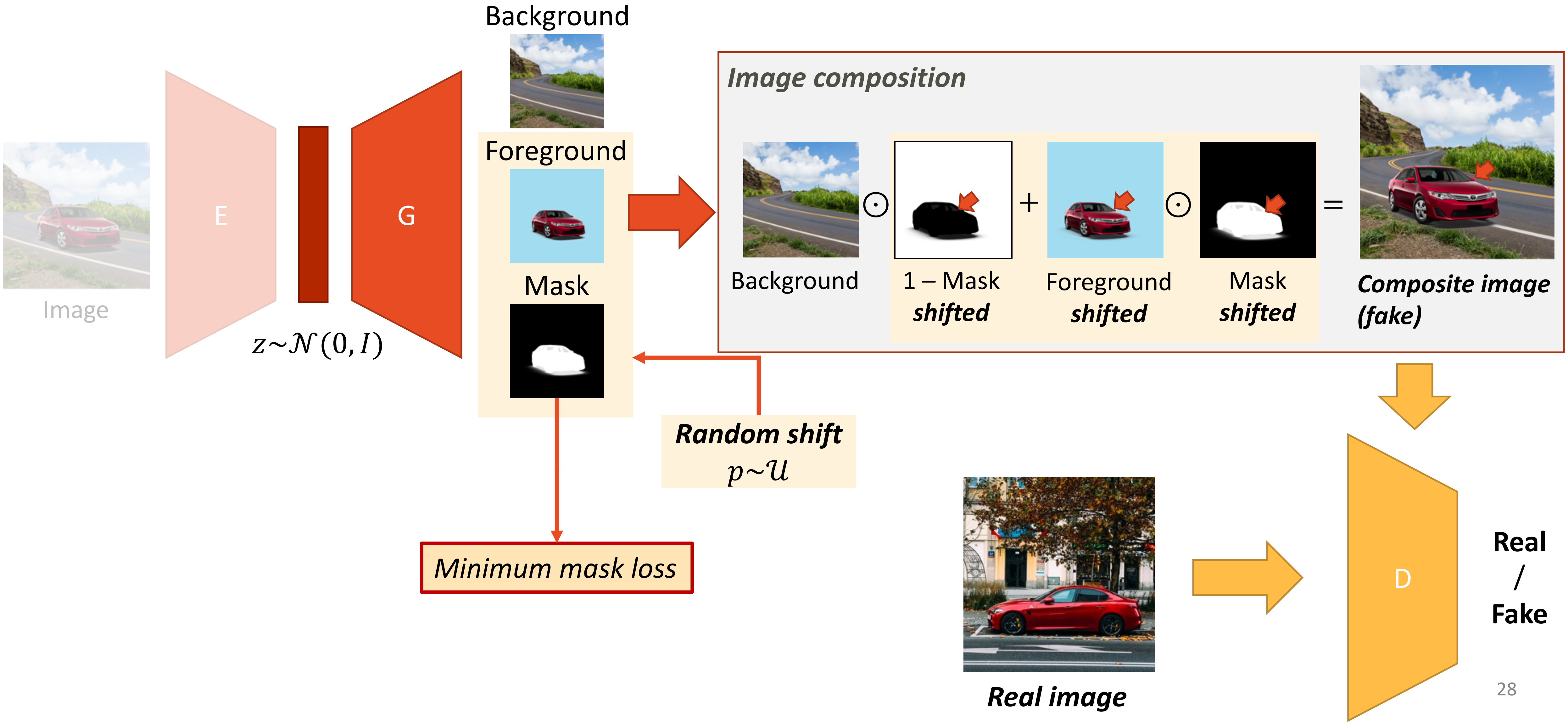
Background | Foreground | Mask | Composite image | Composite image w/shift



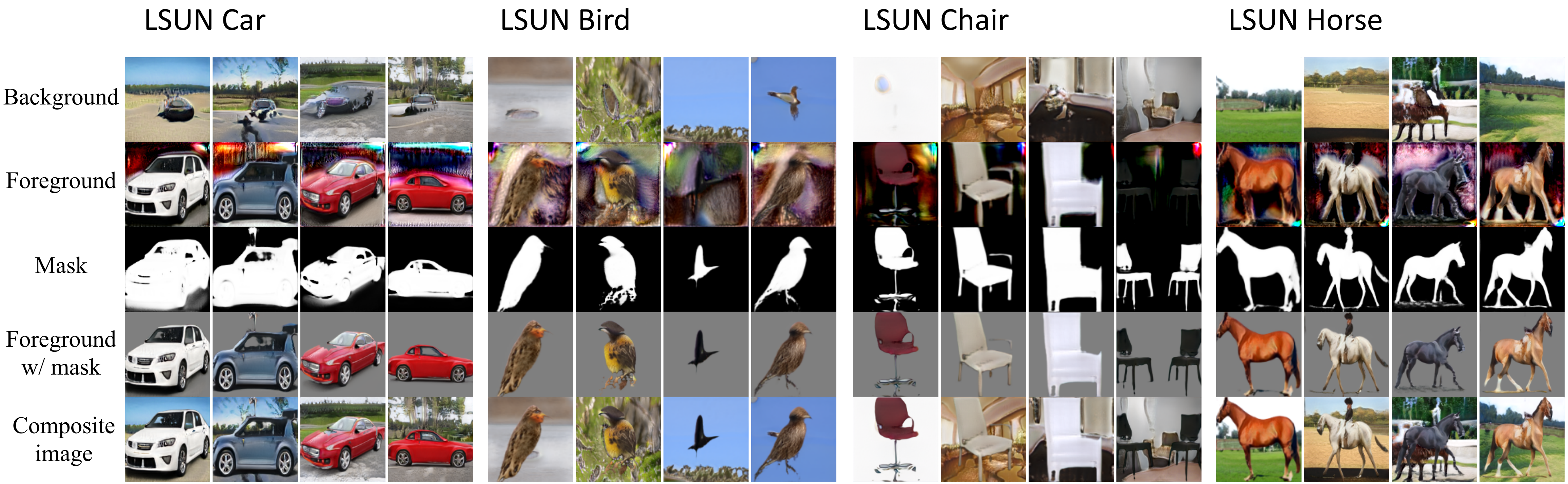
Learning with perturbations



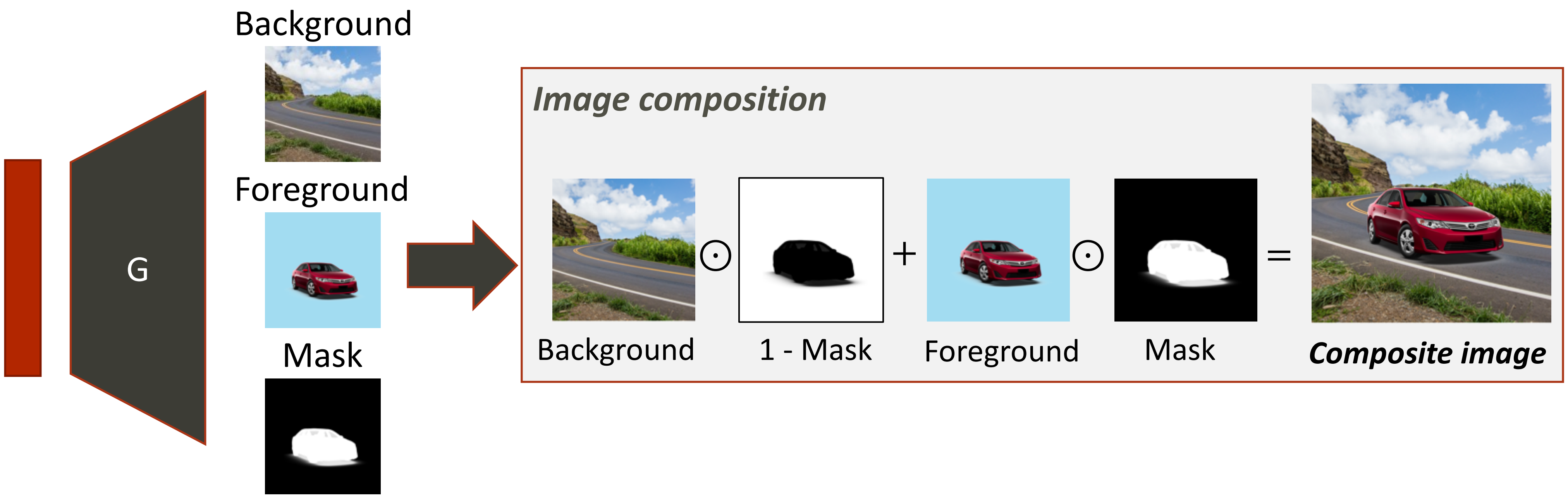
Learning with perturbations



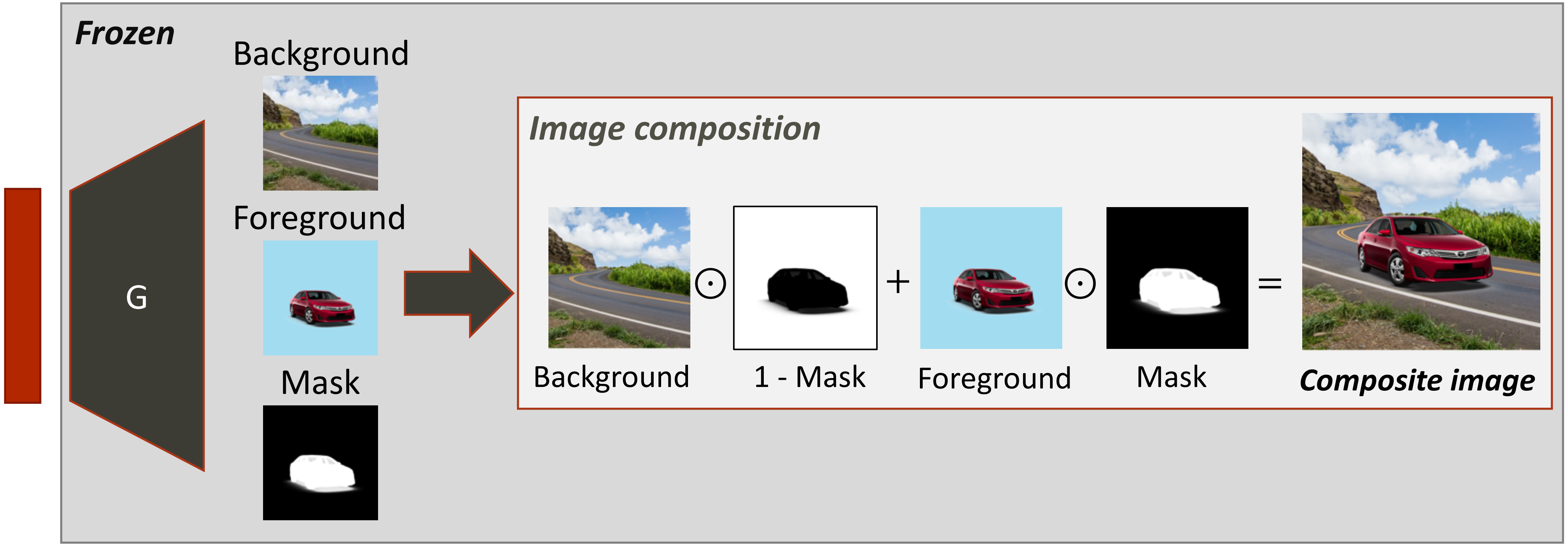
Generation results



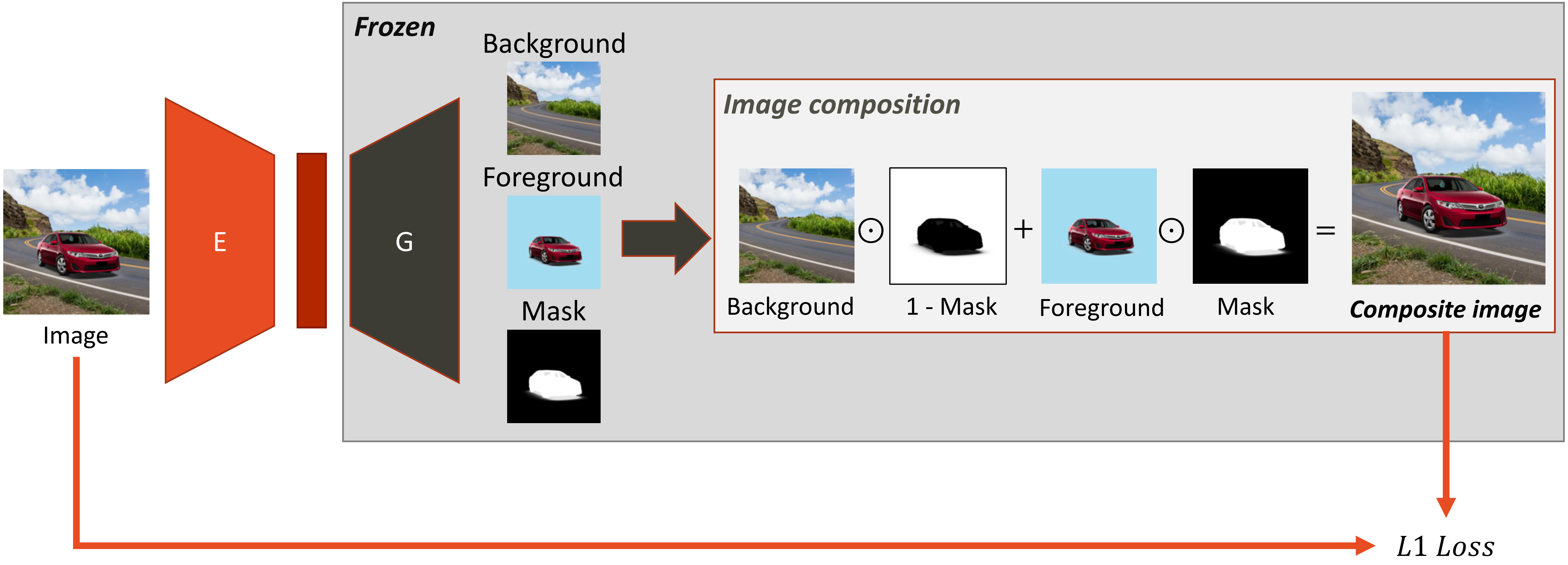
Learning to segment



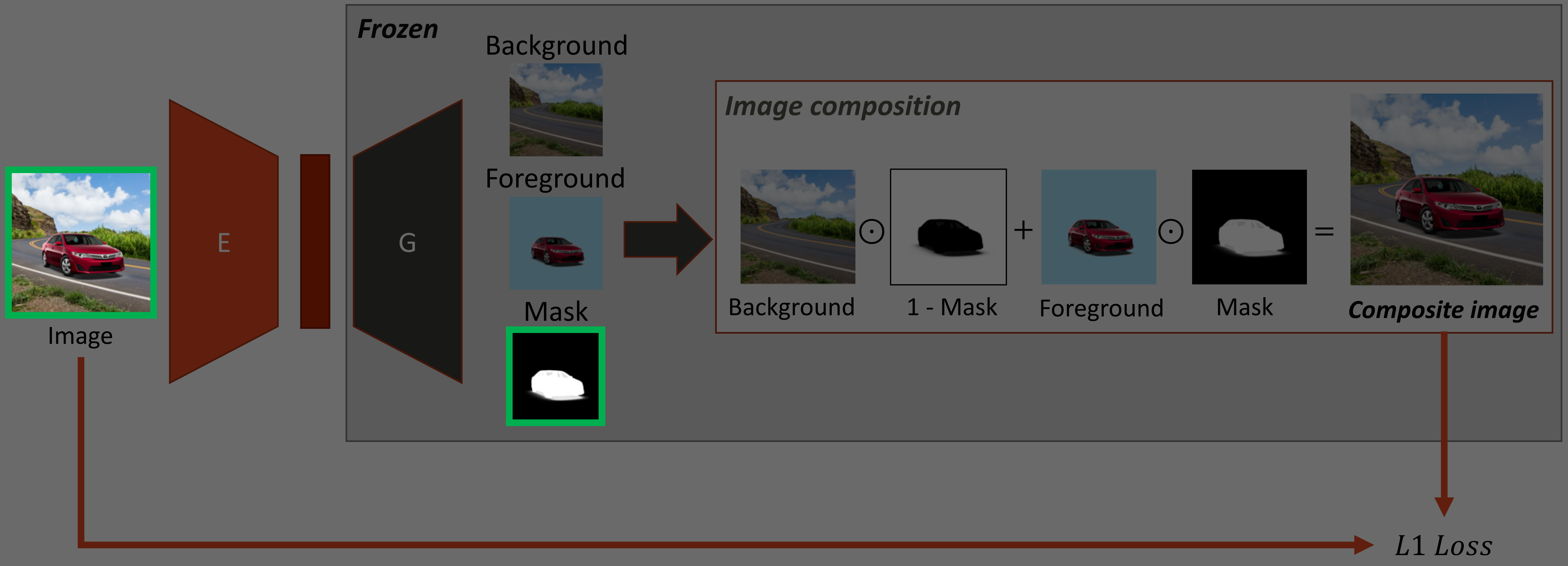
Learning to segment



Learning to segment



Learning to segment



Segmentation results

Real image

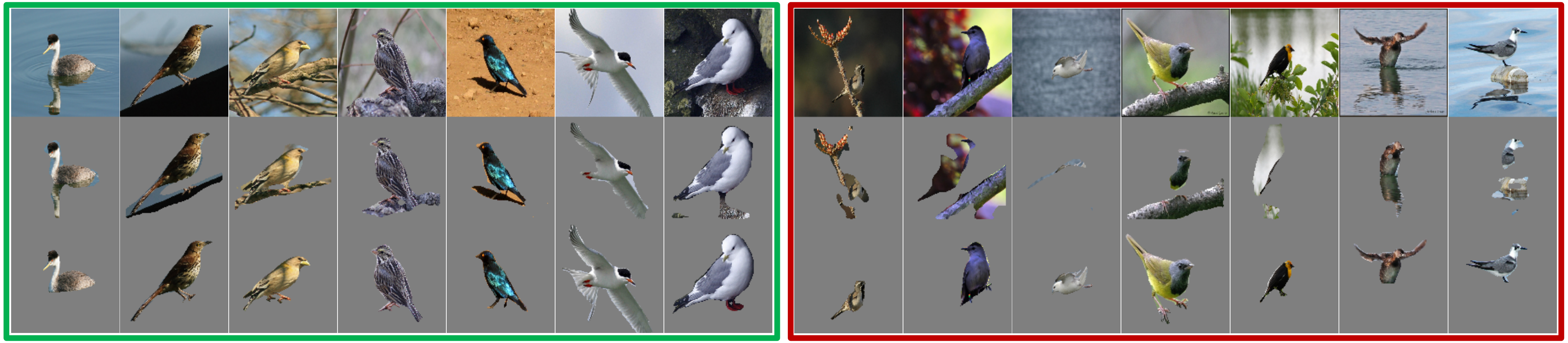
Our results

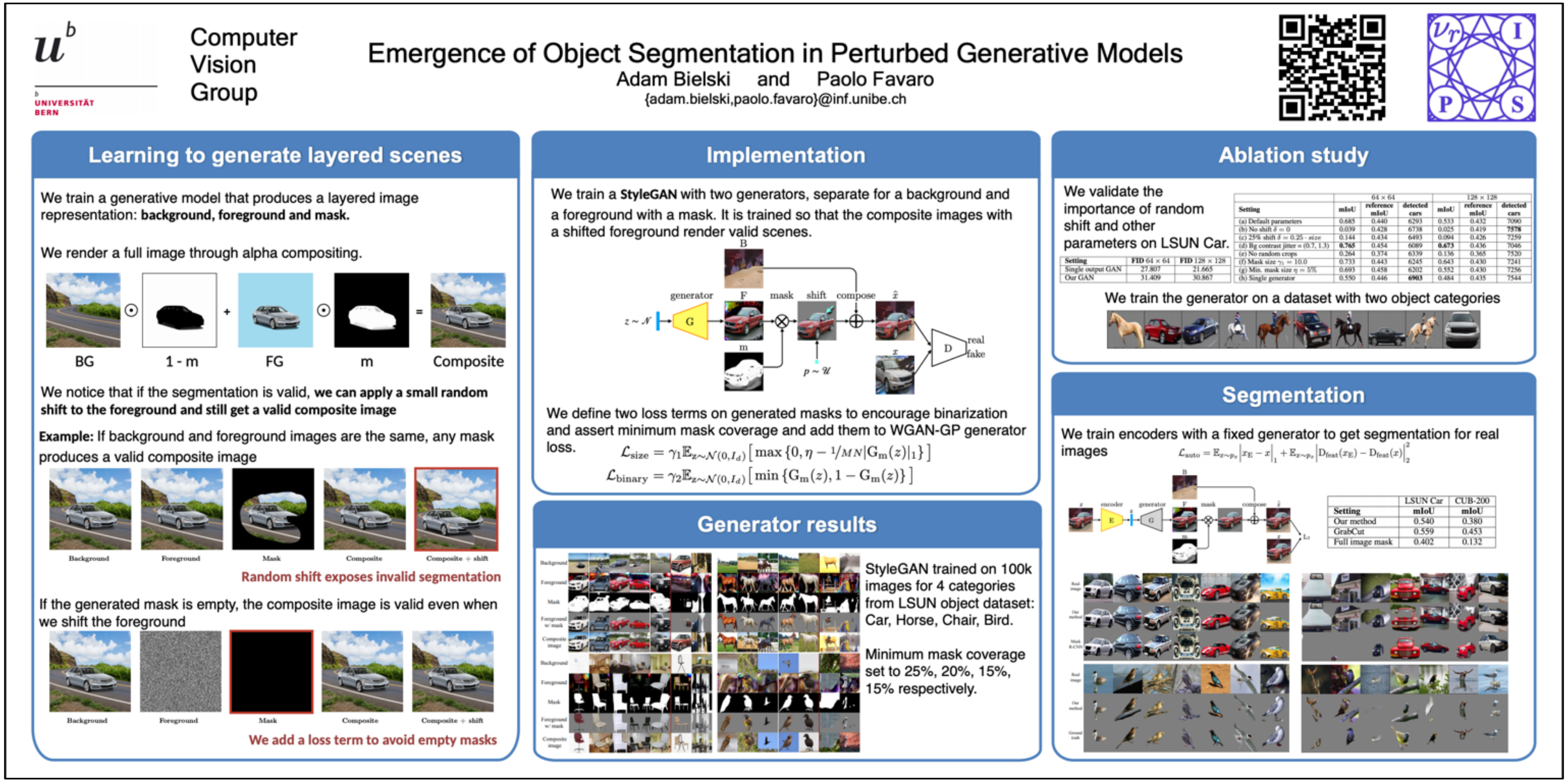
Approx.
ground truth

Real image

Our results

Ground truth





Poster #60

East Exhibition Hall B + C