

Equipe - Baião de Dados

Segmentação de Estradas e Ruas

Alunos:

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- **João Pedro Pereira da Silva**
- **José Lucas da Silva Pinheiro**

Sumário

- Introdução
- Metodologia
- Resultados
- Conclusões

1. Introdução

Introdução

Resumo do problema

O DeepGlobe Road Extraction Challenge apresenta o desafio de extrair, automaticamente, estradas e ruas a partir de imagens de satélite.

Porque esse problema?

Devido à grande necessidade de informações acerca de acessibilidade nas zonas de catástrofe, com intuito de dar respostas rápidas às crises que se encontram.

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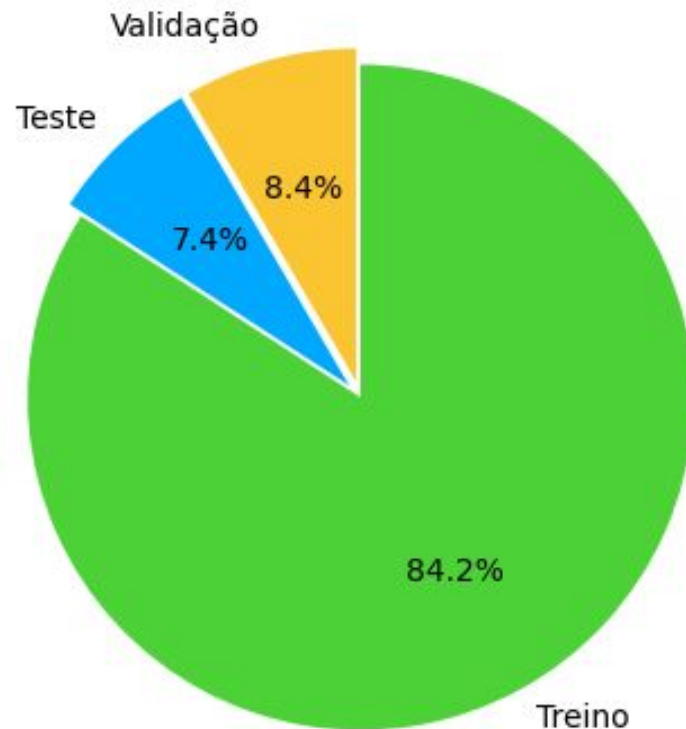
Objetivo geral

Segmentar as imagens do dataset a fim de criar uma rede neural capaz de dissociar estradas de terreno selvagem em imagens de satélite.

Introdução

BASE DE DADOS:

- Total de imagens: 14.796 imagens
 - Conjunto de treinamento: 12.452 imagens;
 - Conjunto de validação: 1.243 imagens;
 - Conjunto de teste: 1.101 imagens.

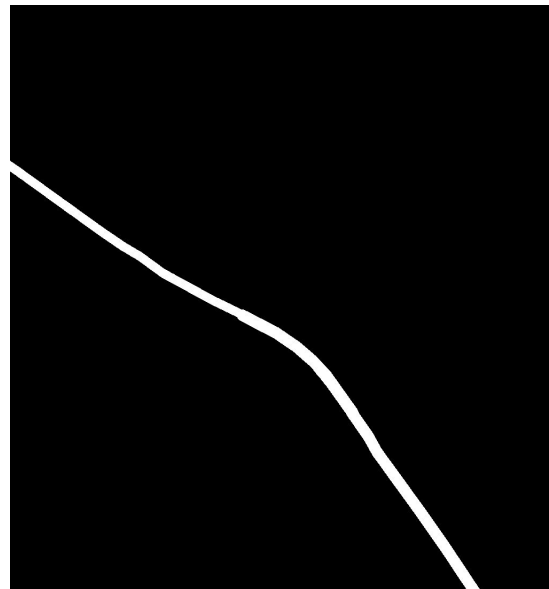


Introdução

- Conjunto de treinamento
 - 6.226 pares de imagens e suas respectivas máscaras.



Imagem de satélite



Mascára da imagem

Introdução

- Conjunto de validação e de teste
 - "imagem_sat.jpg"



Imagem de validação



Imagem de teste

Introdução

- Foi atestado que os arquivos estão em estado de análise e uso para treinamento e teste;
 - Imagens de satélite: .jpg
 - Imagens de máscara: .png
 - Dimensões das imagens: 1024px X 1024px

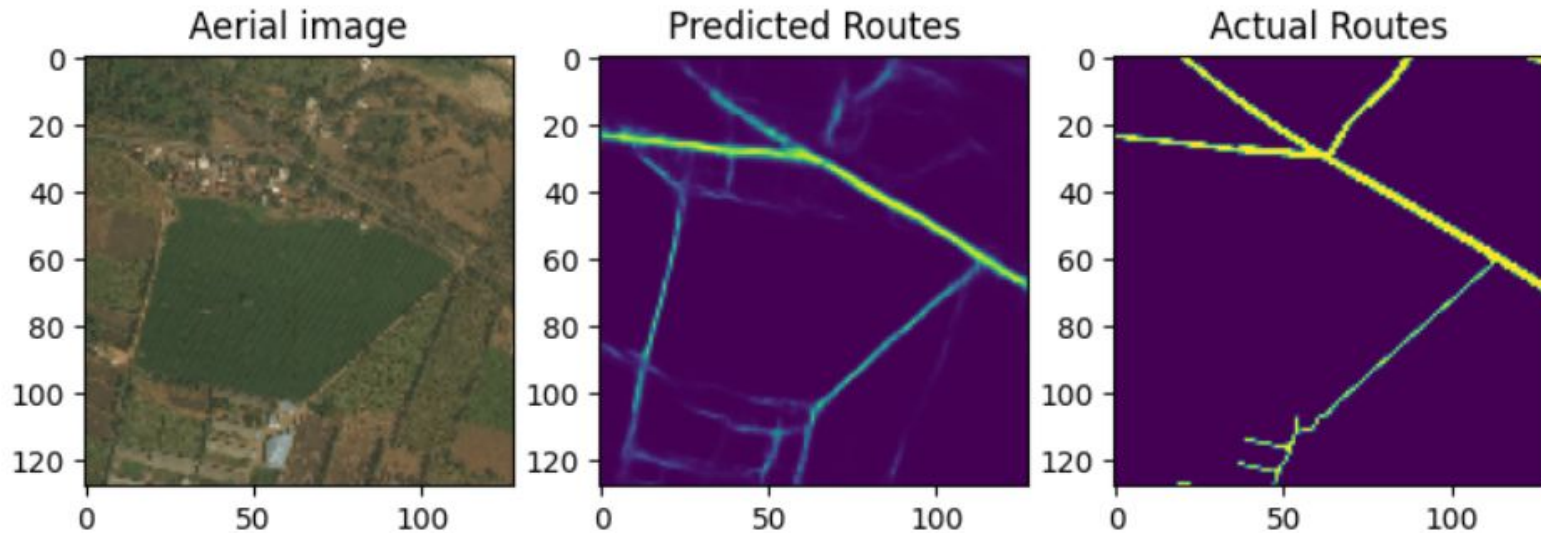
2. Metodologia

Metodologia



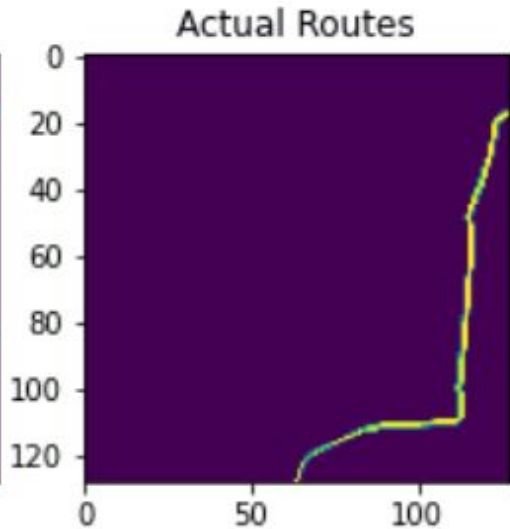
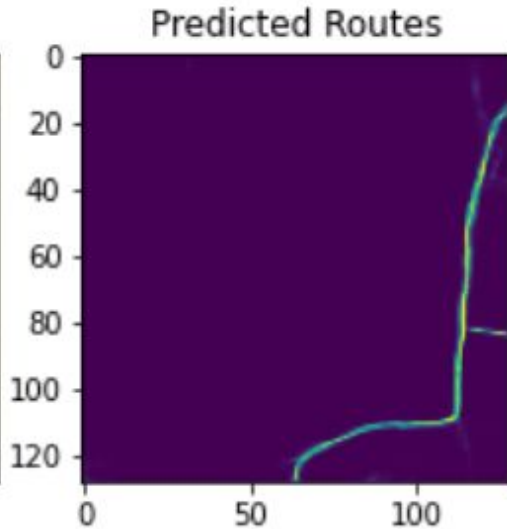
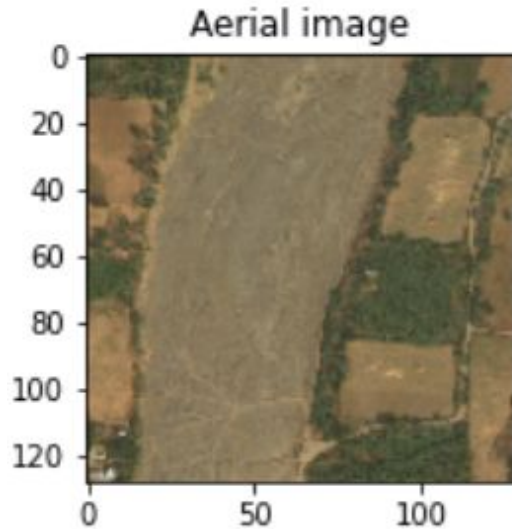
Metodologia

ETAPA 1 - Código original



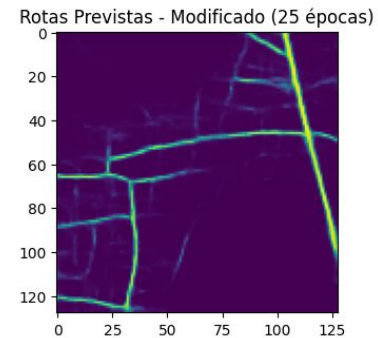
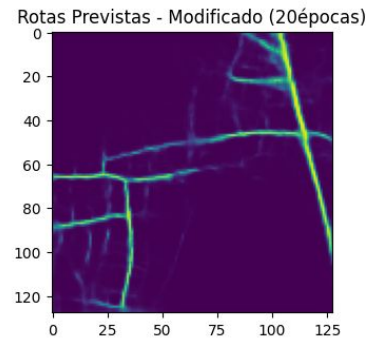
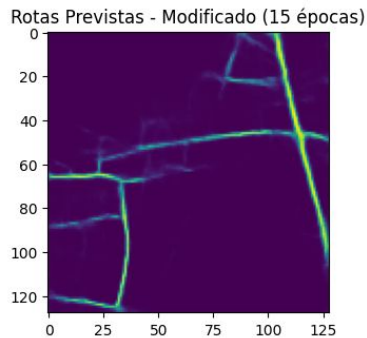
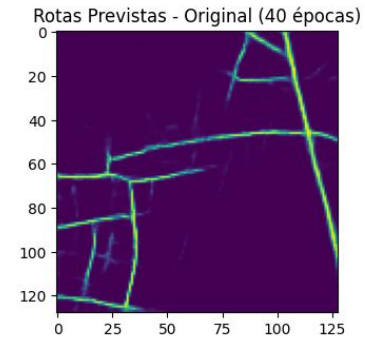
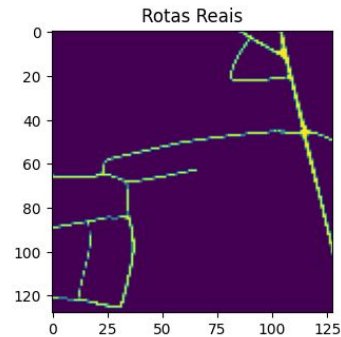
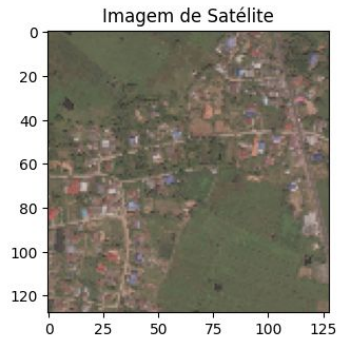
Metodologia

ETAPA 1 - Código original



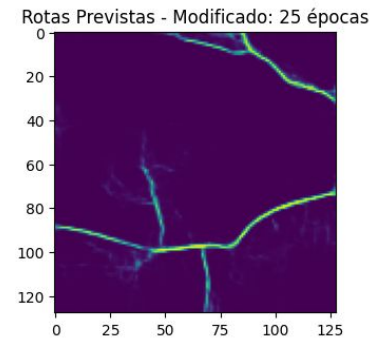
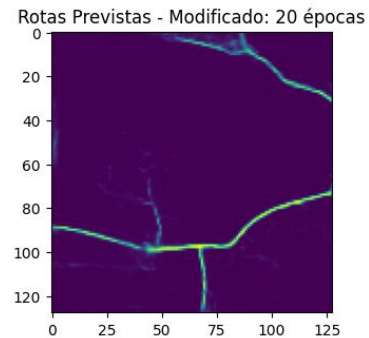
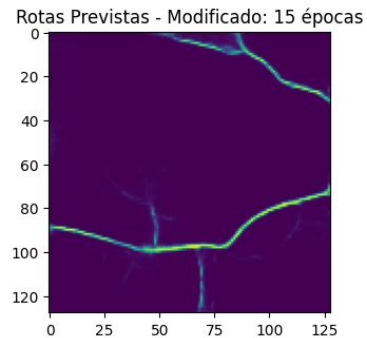
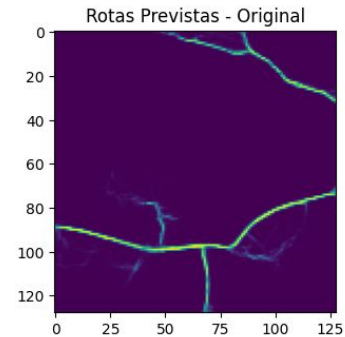
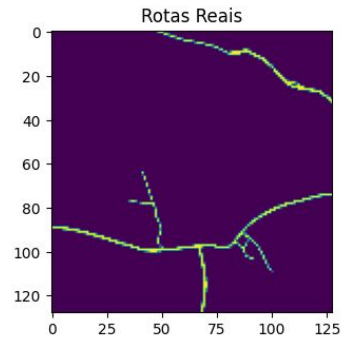
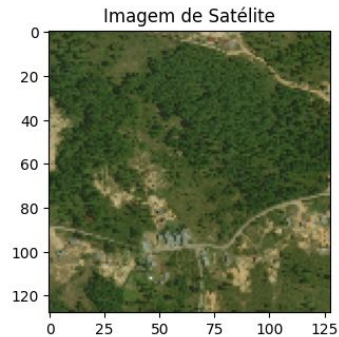
Metodologia

ETAPA 2 – Reduzindo o número de épocas



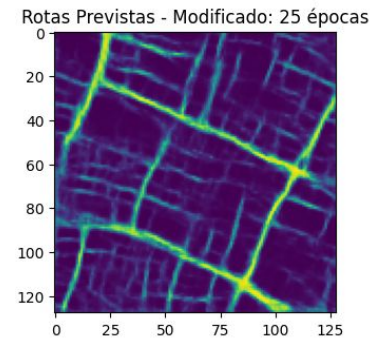
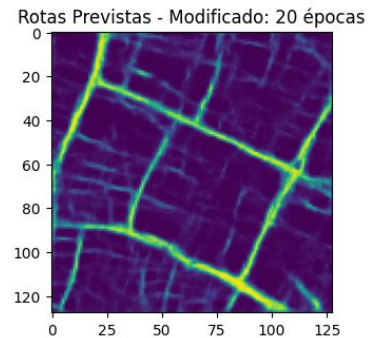
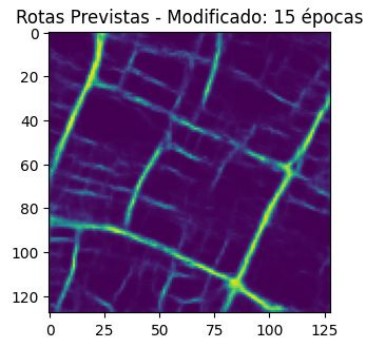
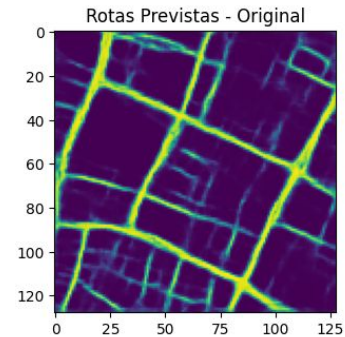
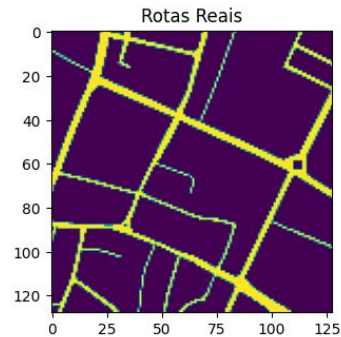
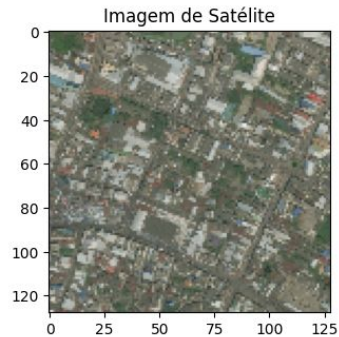
Metodologia

ETAPA 2 – Reduzindo o número de épocas



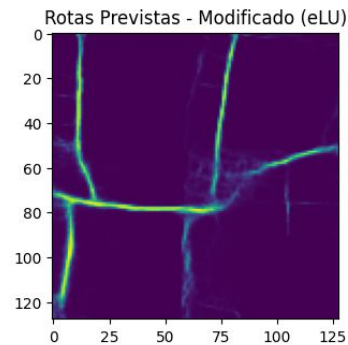
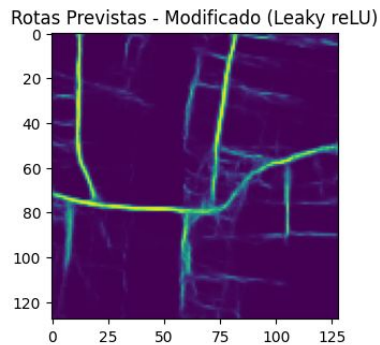
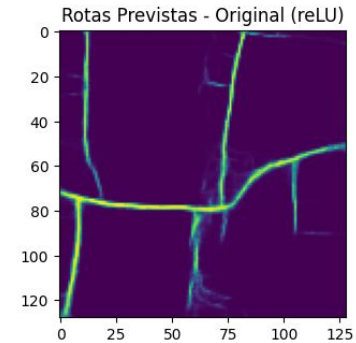
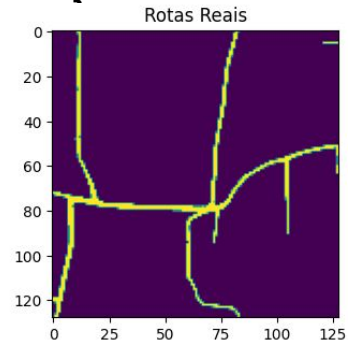
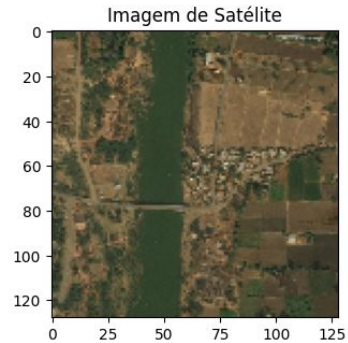
Metodologia

ETAPA 2 – Reduzindo o número de épocas



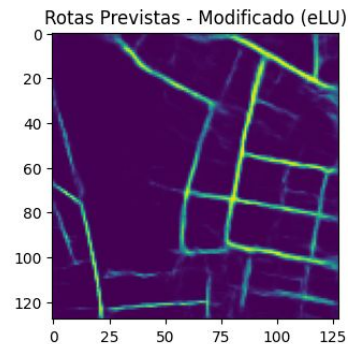
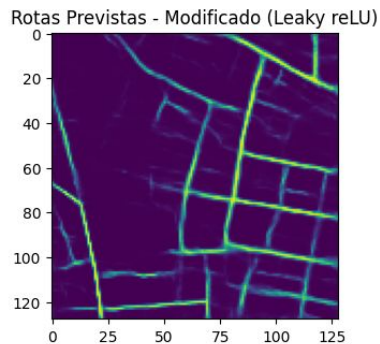
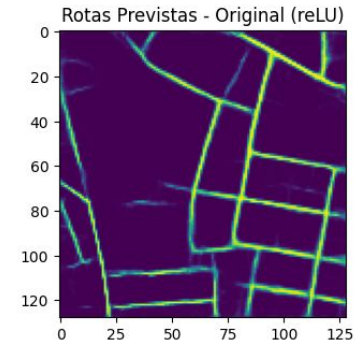
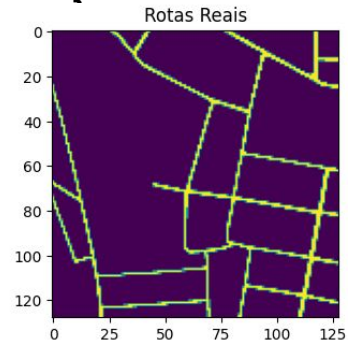
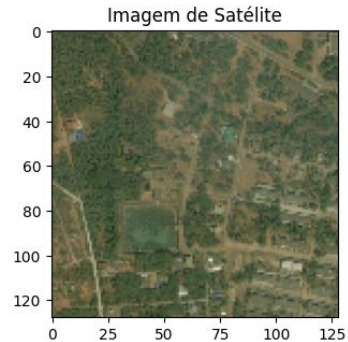
Metodologia

ETAPA 3 – Modificando a função de ativação



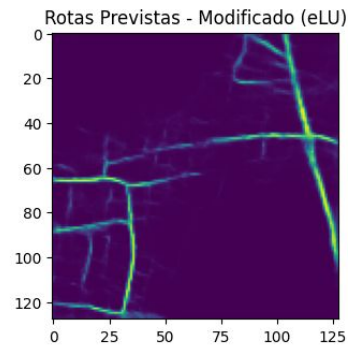
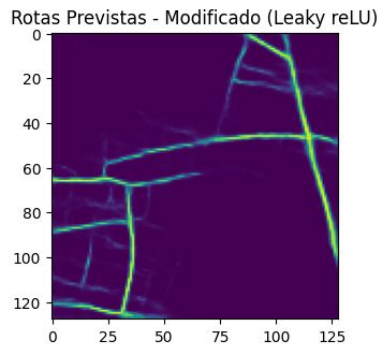
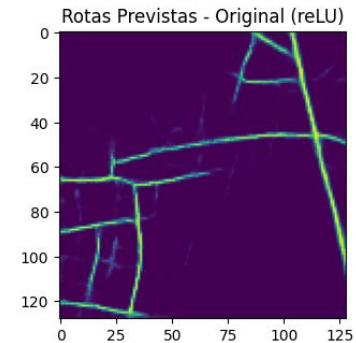
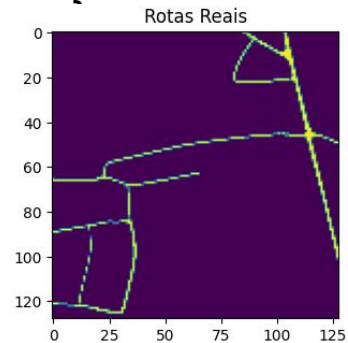
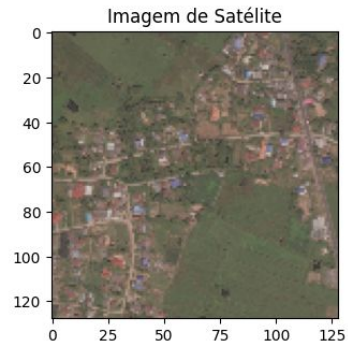
Metodologia

ETAPA 3 – Modificando a função de ativação



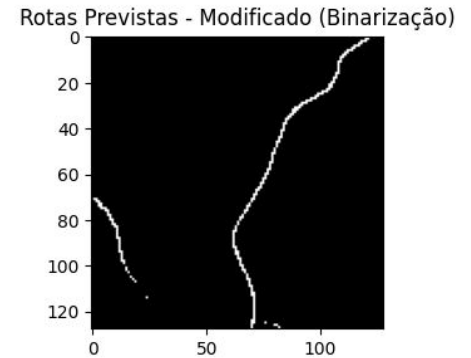
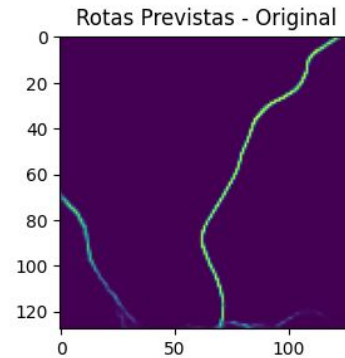
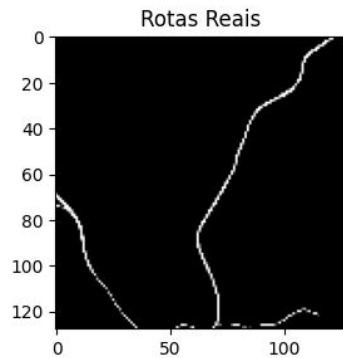
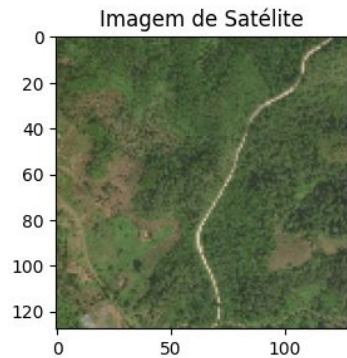
Metodologia

ETAPA 3 – Modificando a função de ativação



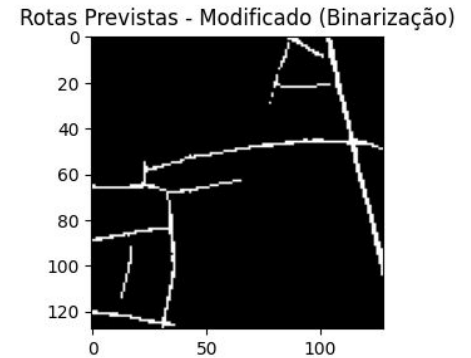
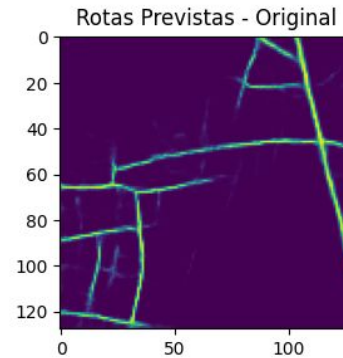
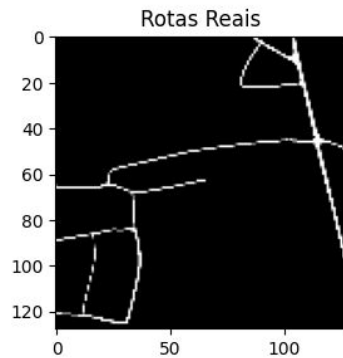
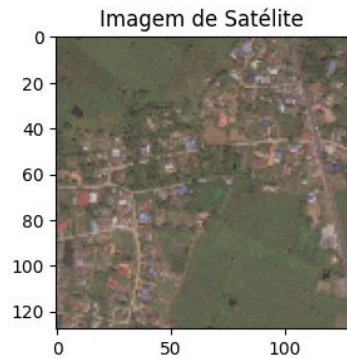
Metodologia

ETAPA 4: Aplicando binarização no resultado



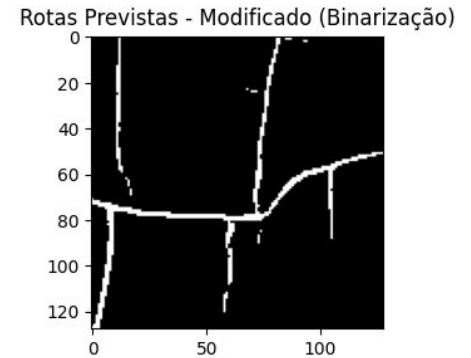
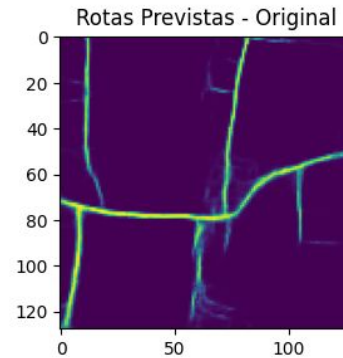
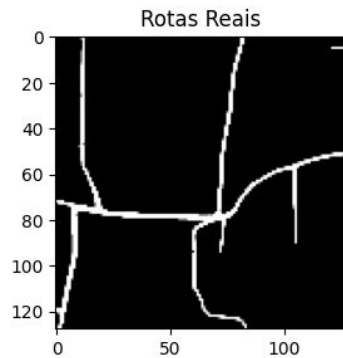
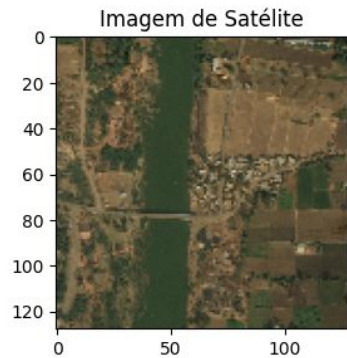
Metodologia

ETAPA 4: Aplicando binarização no resultado



Metodologia

ETAPA 4: Aplicando binarização no resultado

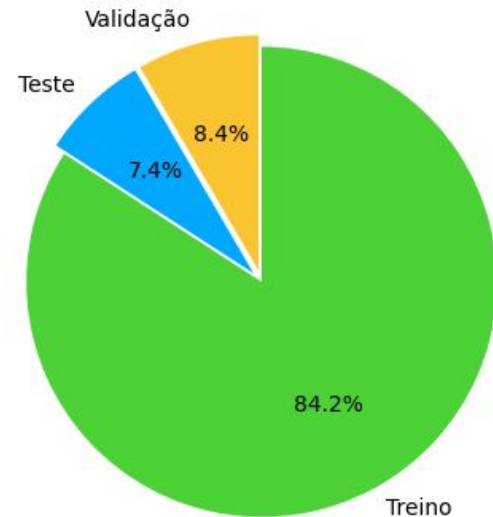


Metodologia

ETAPA 5 – Dividir em treino, teste e validação

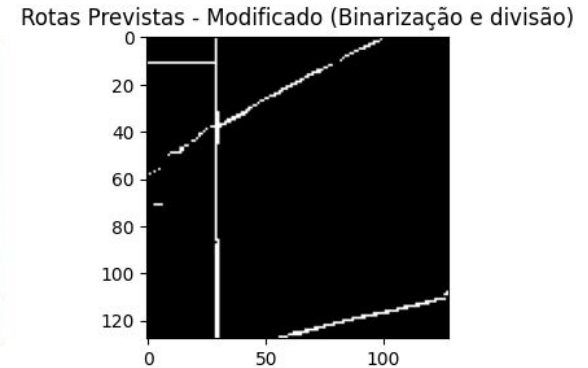
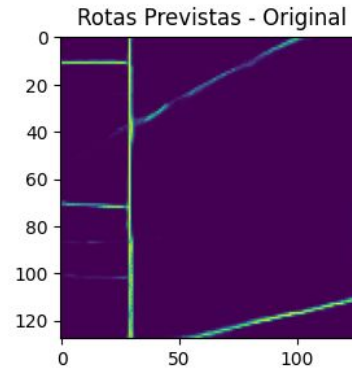
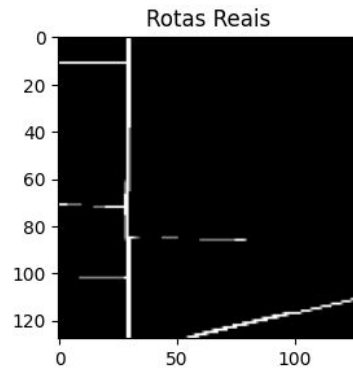
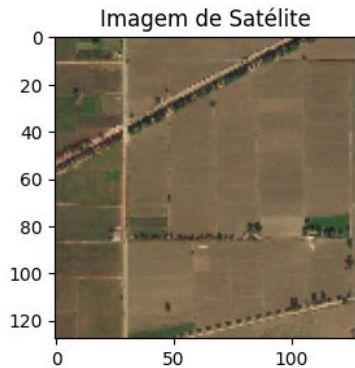
Total de imagens: 14.796 imagens

- Conjunto de treinamento: 12.452 imagens;
- Conjunto de validação: 1.243 imagens;
- Conjunto de teste: 1.101 imagens.



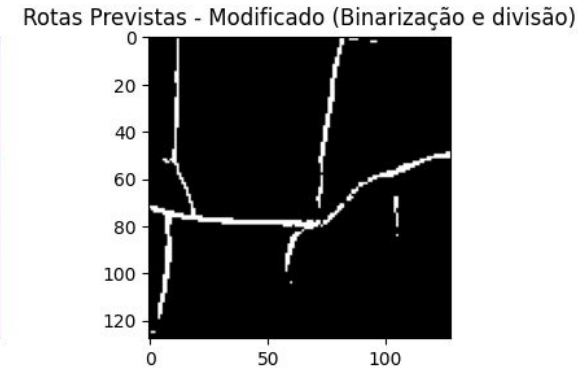
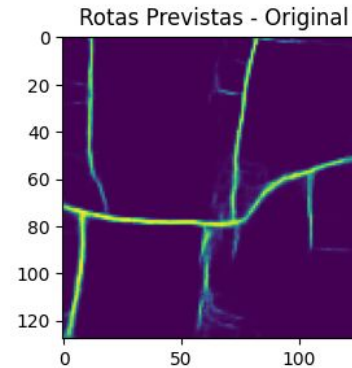
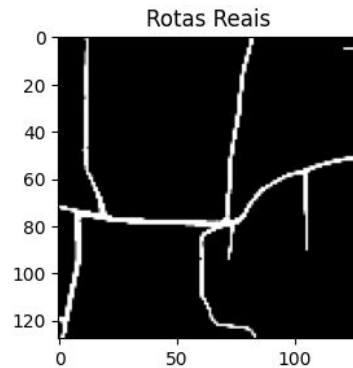
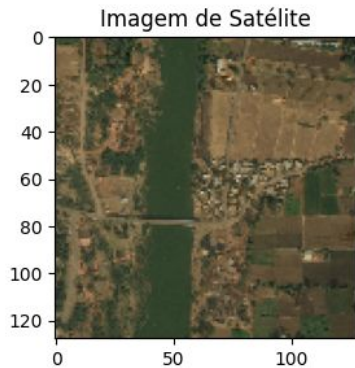
Metodologia

ETAPA 5 - Dividir em treino, teste e validação



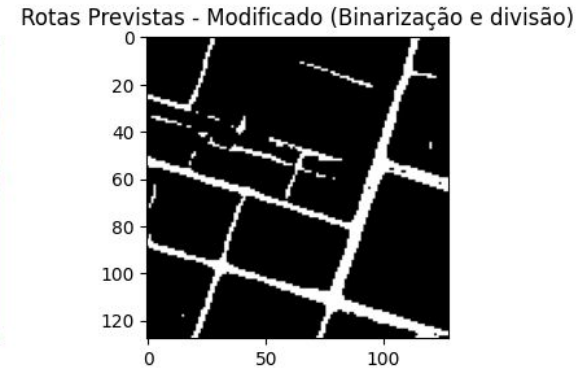
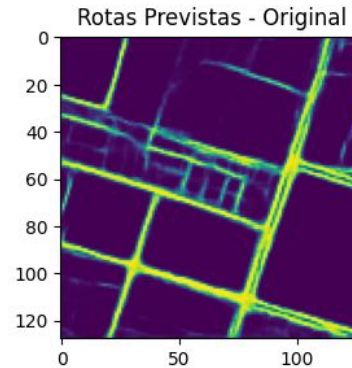
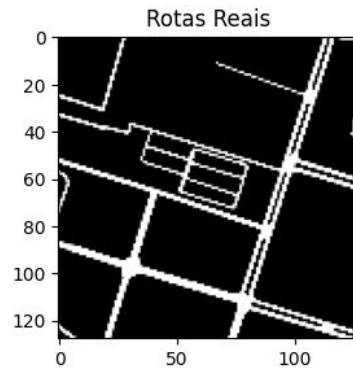
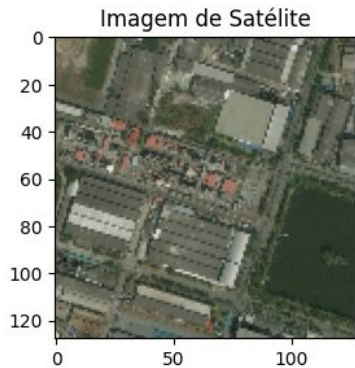
Metodologia

ETAPA 5 – Dividir em treino, teste e validação



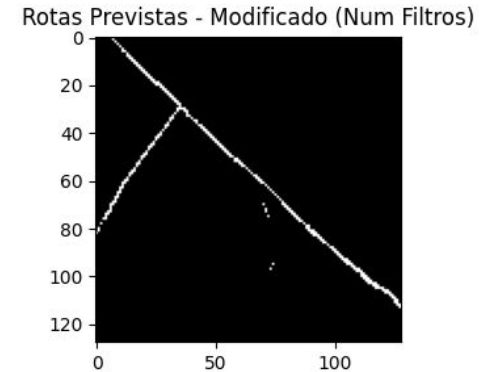
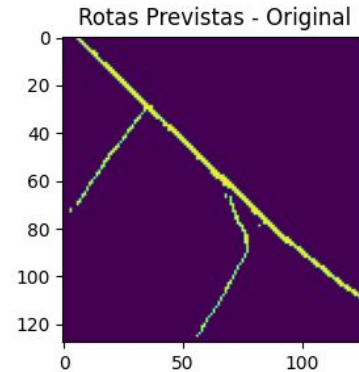
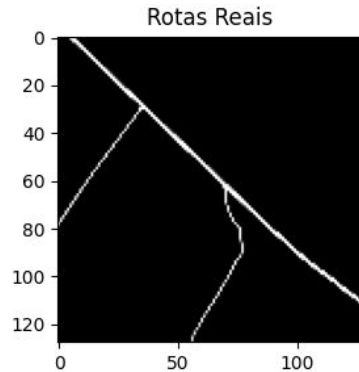
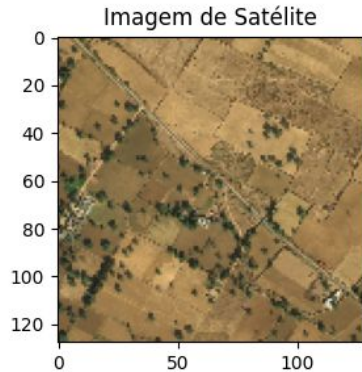
Metodologia

ETAPA 5 – Dividir em treino, teste e validação



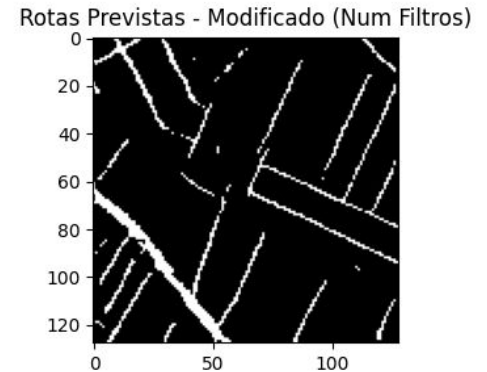
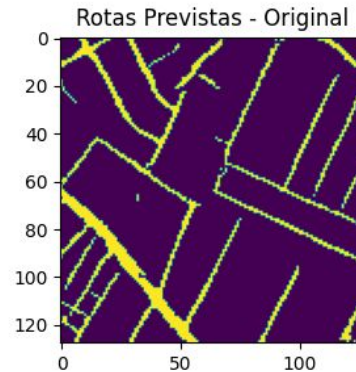
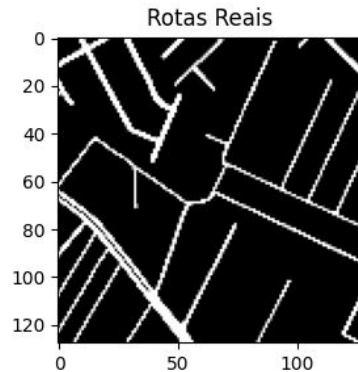
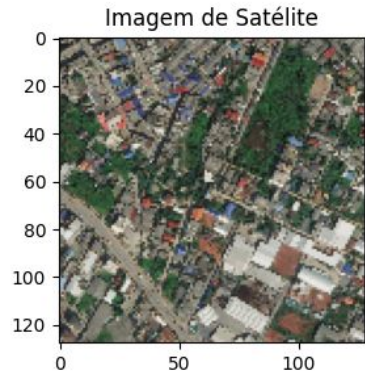
Metodologia

ETAPA 6 – Aumentando o número de filtros



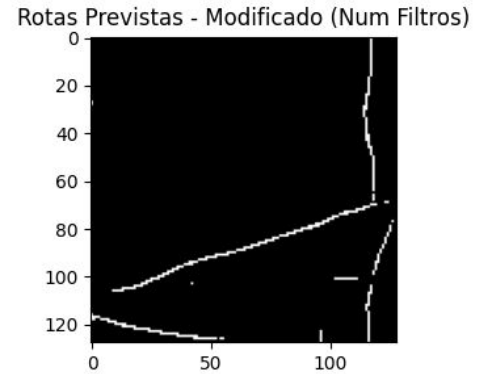
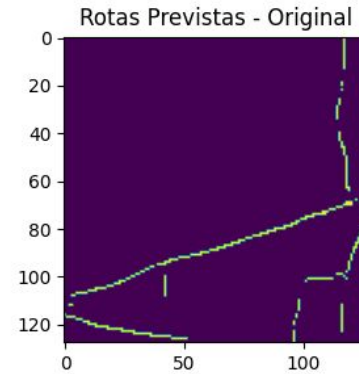
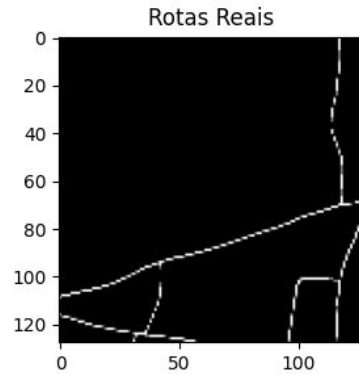
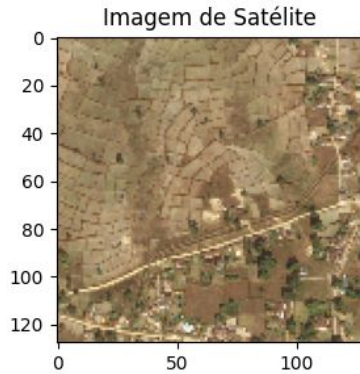
Metodologia

ETAPA 6 – Aumentando o número de filtros



Metodologia

ETAPA 6 – Aumentando o número de filtros



3. Resultados

Resultados

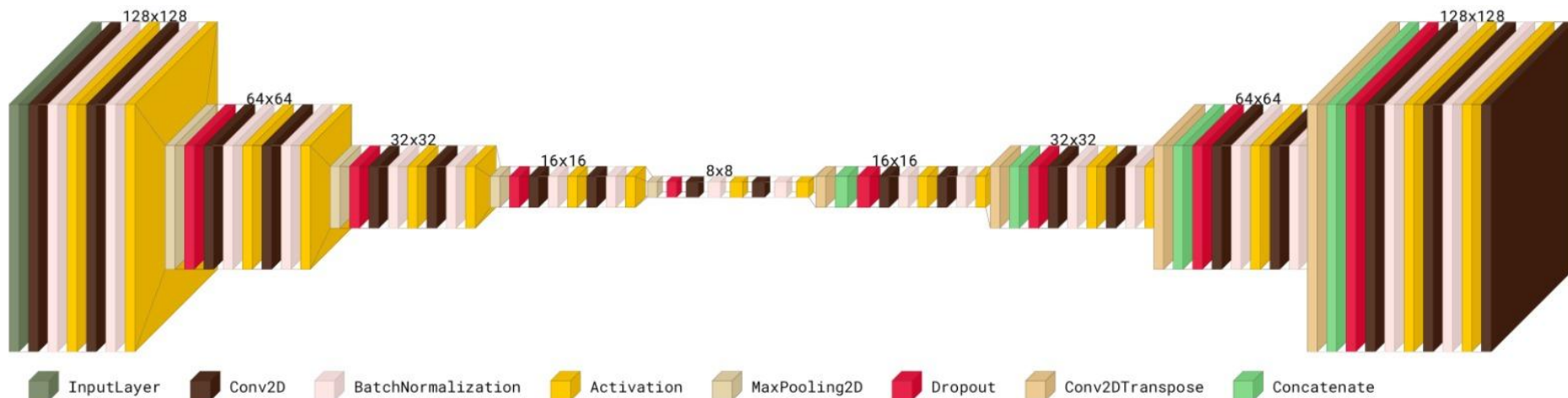
Sugestões

- Diminuir o número de épocas;
- Aumentar o número de camadas de convolução;
- Modificar a função de ativação;
- Utilizar as imagens em escala de cinza;
- Aplicar filtros.

Resultados

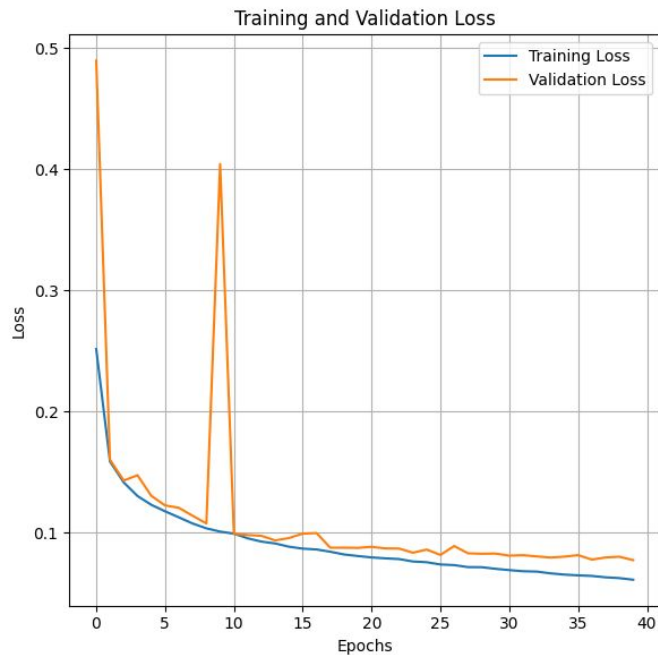
Estrutura da rede

- Parâmetros totais: 8.642.273



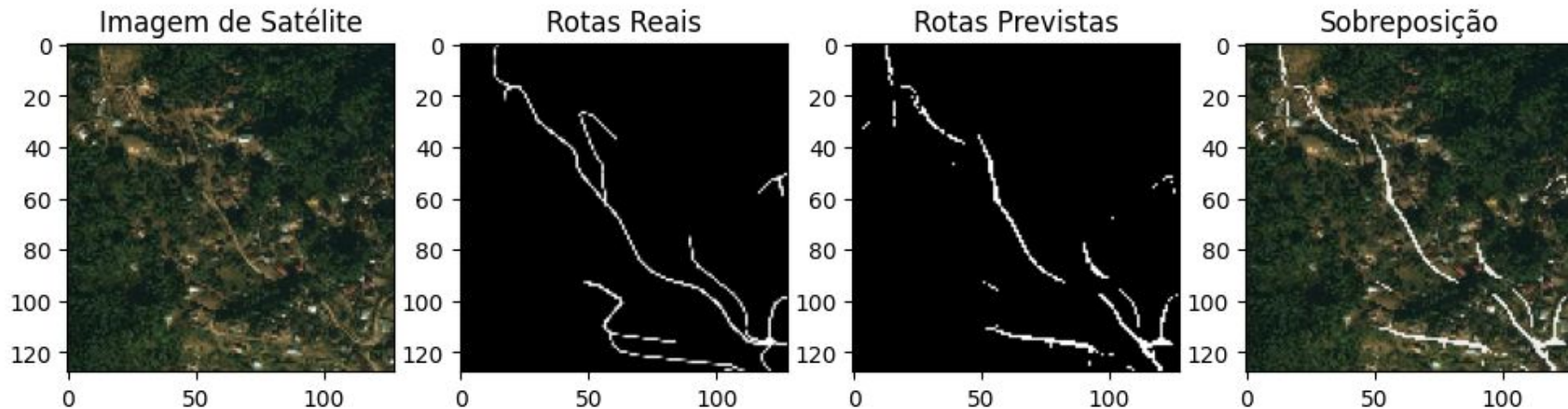
Resultados

Métricas



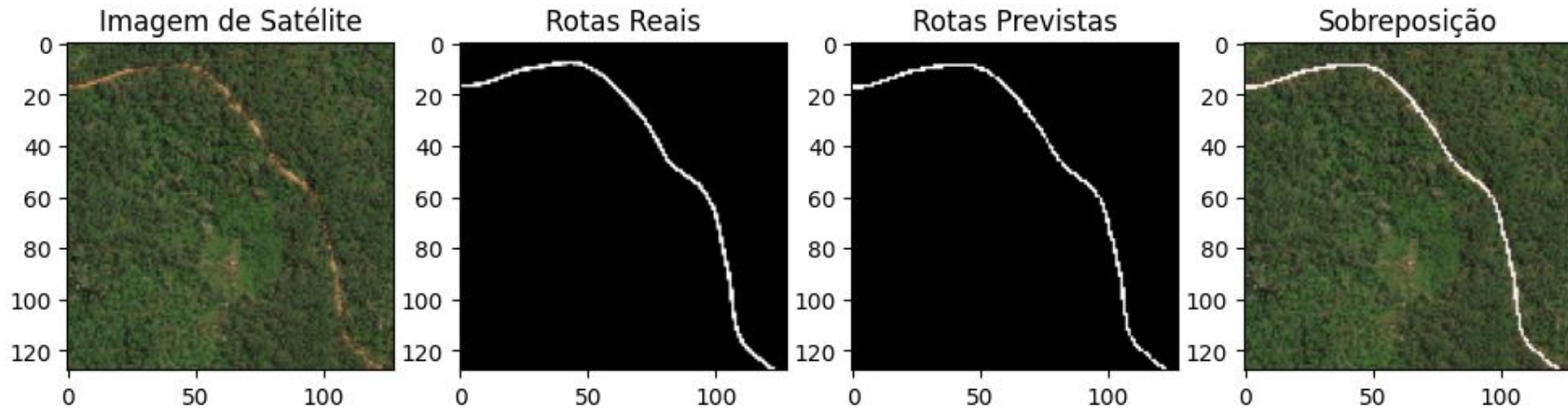
Resultados

Modelo com validação



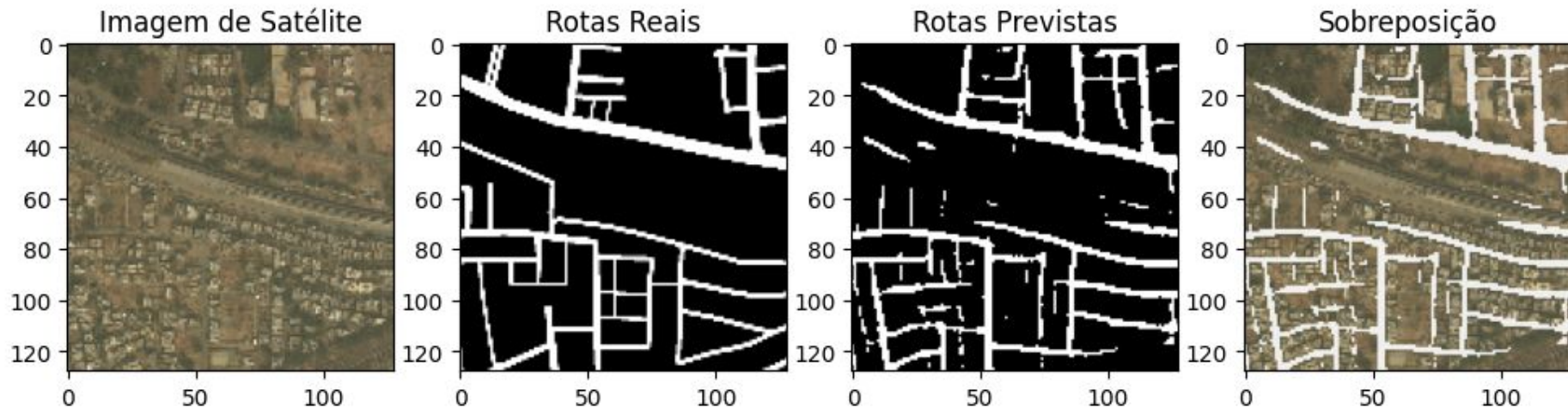
Resultados

Modelo com validação



Resultados

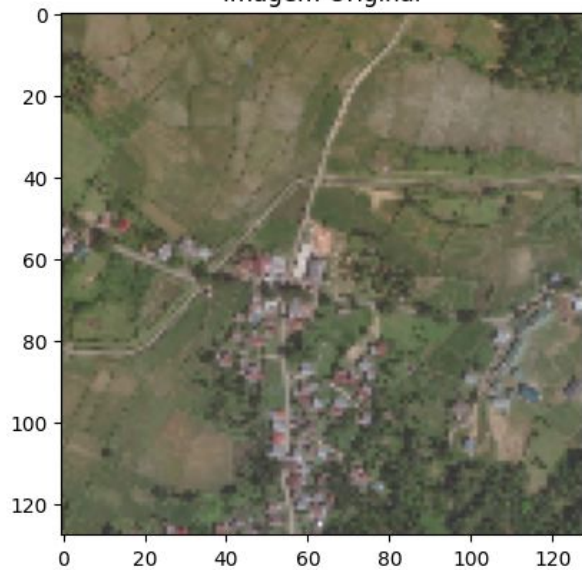
Modelo com validação



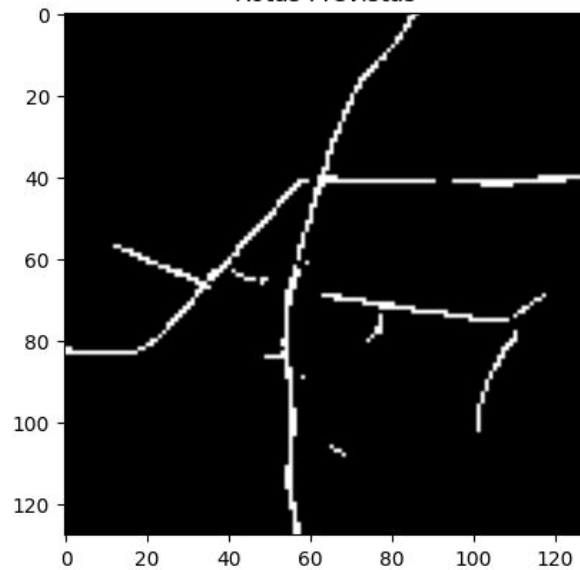
Resultados

Testes

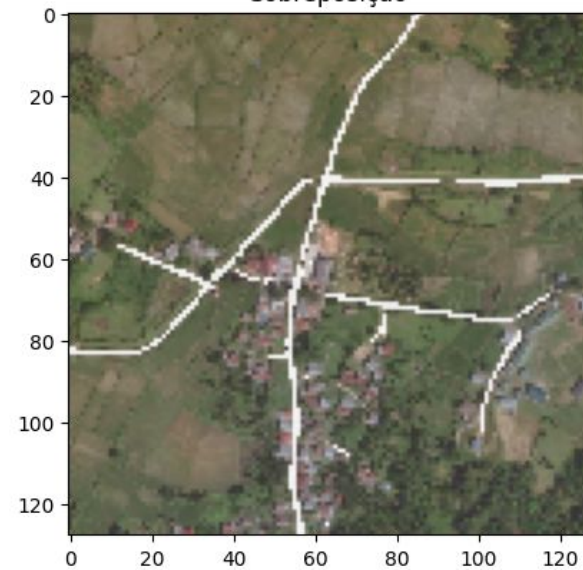
Imagem Original



Rotas Previstas



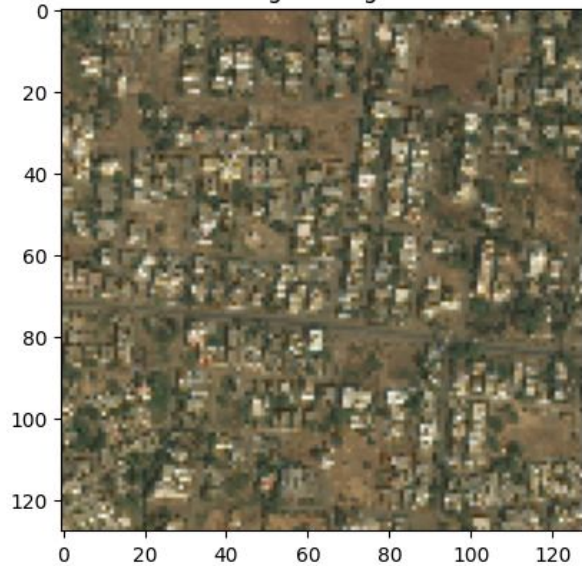
Sobreposição



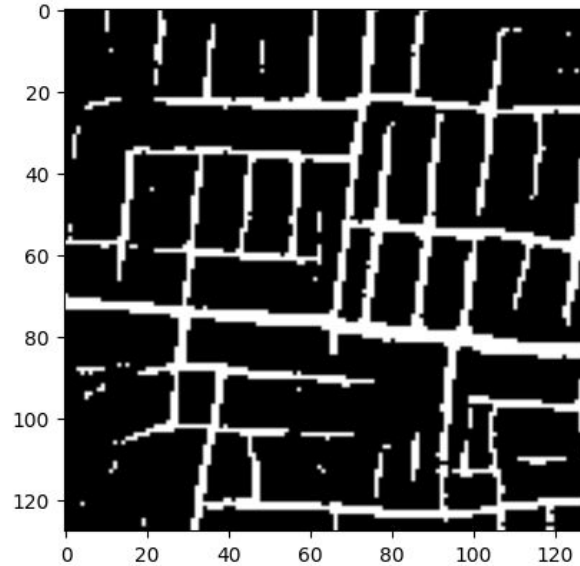
Resultados

Testes

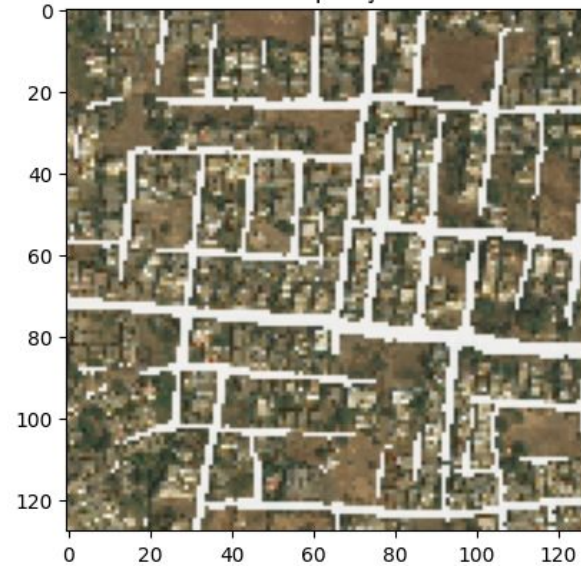
Imagem Original



Rotas Previstas



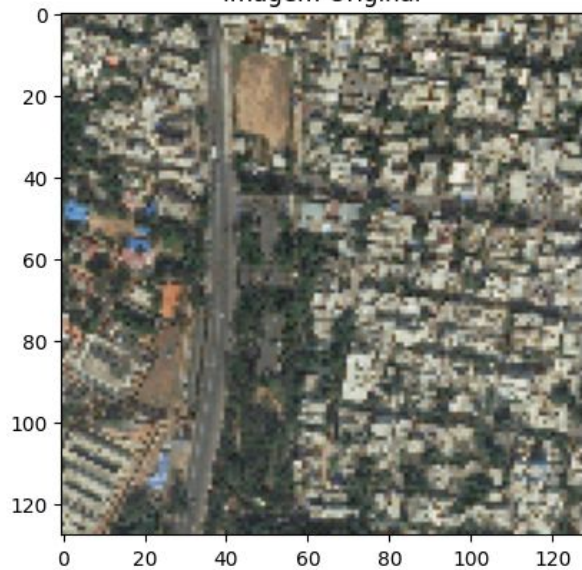
Sobreposição



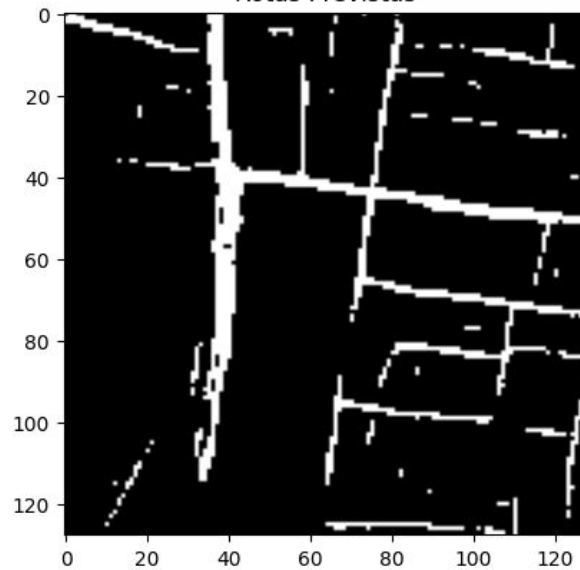
Resultados

Testes

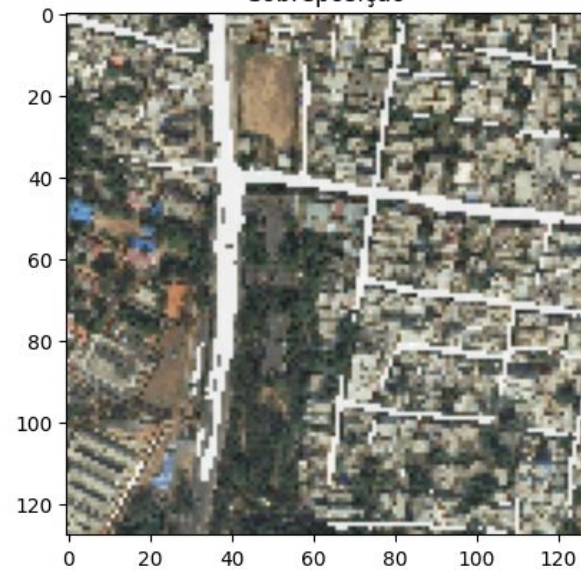
Imagem Original



Rotas Previstas



Sobreposição



4. Conclusão

Conclusões

- Imagens muito grandes podem ser um obstáculo para treinamento de modelos de segmentação. É necessário alguma espécie de tratamento, especialmente em máquinas menos potentes;
- Datasets robustos podem ser reduzidos a depender dos resultados obtidos;
- A redução das dimensões das imagens do Dataset compromete a capacidade do modelo de obter informações, a acurácia não parece corresponder o resultado;

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Agradecemos a atenção!