Equipe - Baião de Dados

Segmentação de Estradas e Ruas

Alunos:

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- João Pedro Pereira da Silva
- José Lucas da Silva Pinheiro
- Karen Evellyn Vieira Ribeiro
- Sofia Soares Cavalcante

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- Introdução
- Metodologia
- Resultados
- Conclusões

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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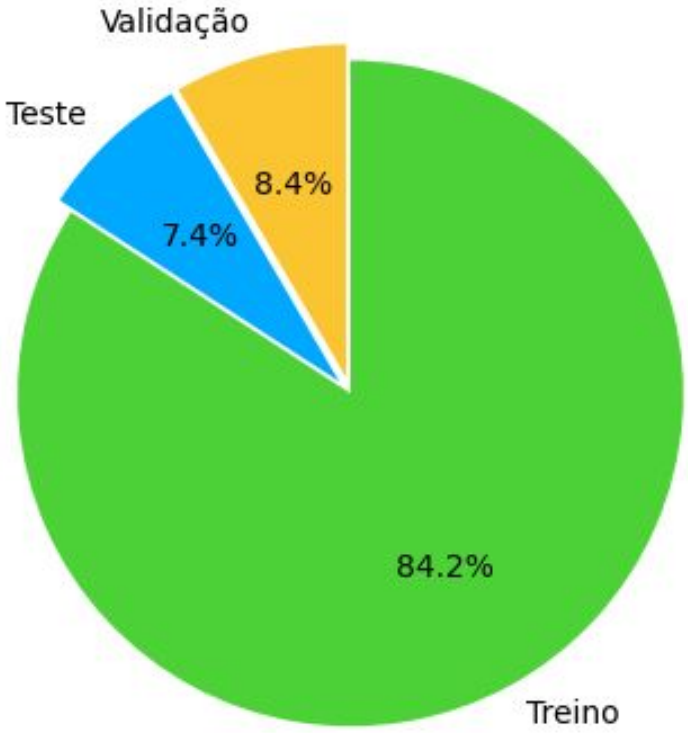
Objetivo geral

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:

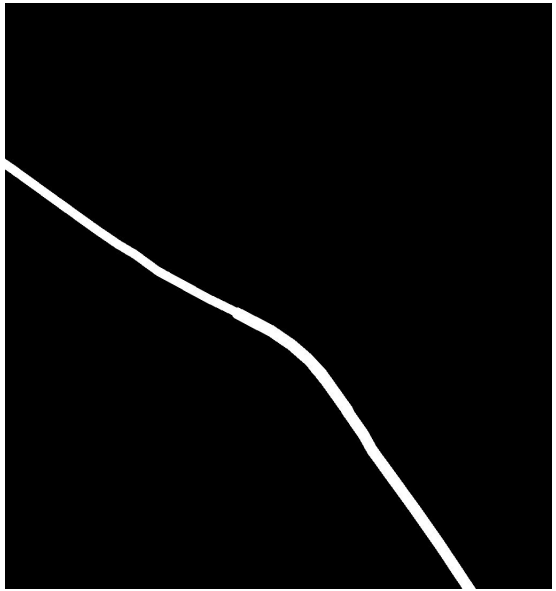
- Total de imagens: 14.796 imagens
  - Conjunto de treinamento: 12.452 imagens;
  - Conjunto de validação: 1.243 imagens;
  - Conjunto de teste: 1.101 imagens.



Introdução

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

Imagem de satélite



Mascára da imagem

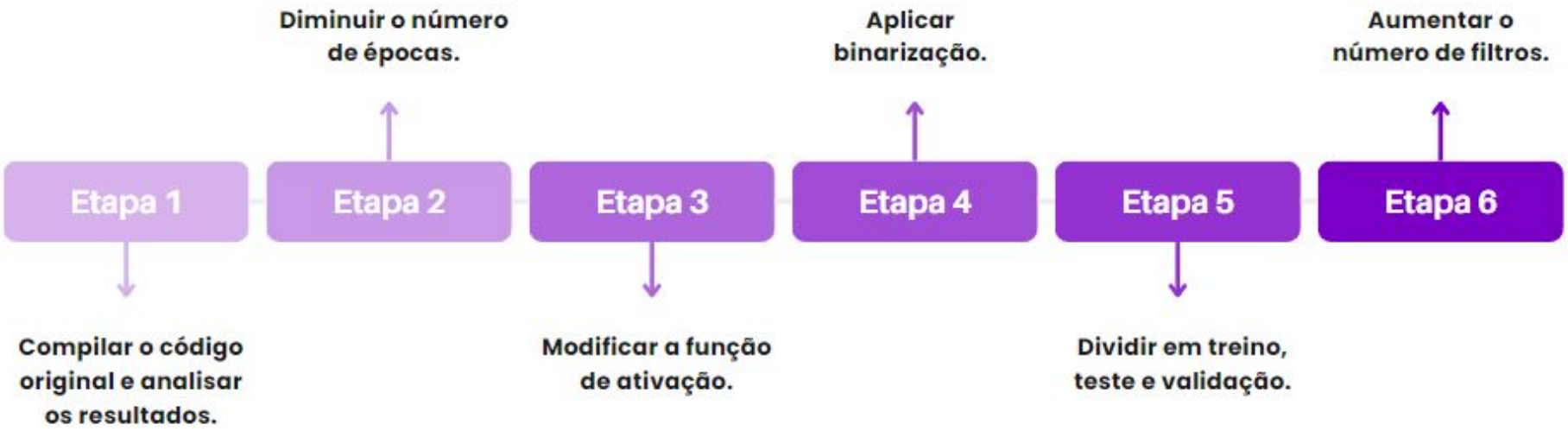
Introdução

- Conjunto de validação e de teste
  - “imagem_sat.jpg”

Imagem de validação

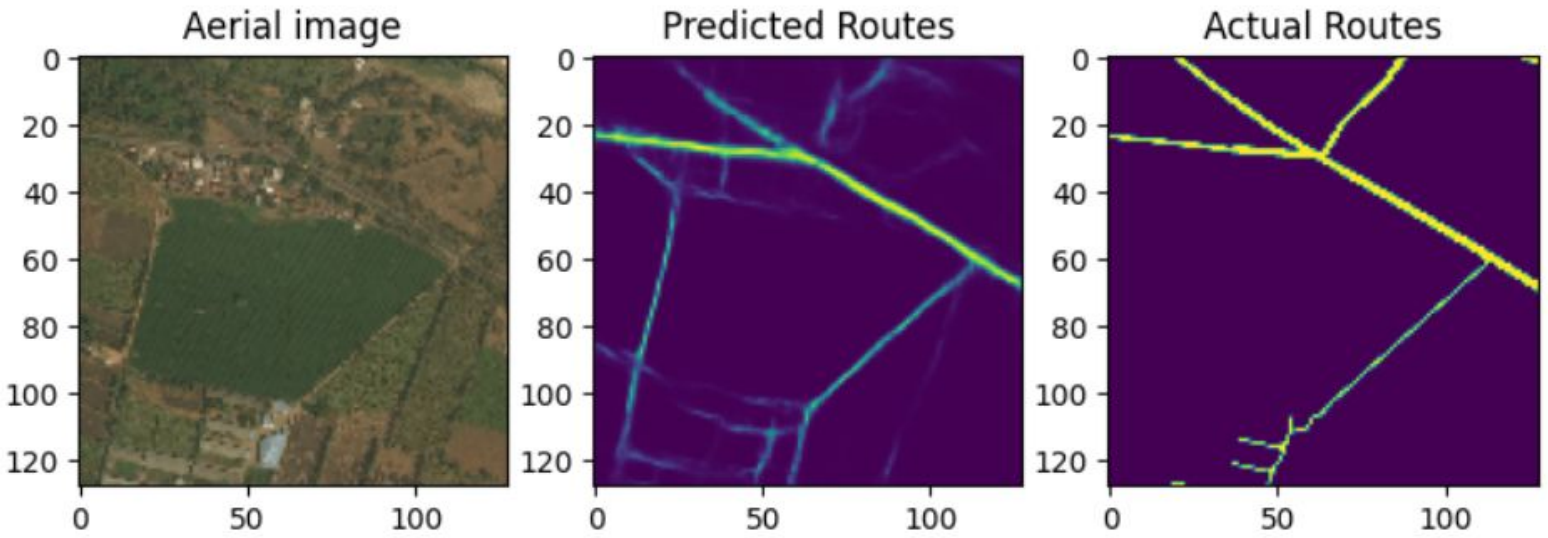
Imagem de teste

Metodologia



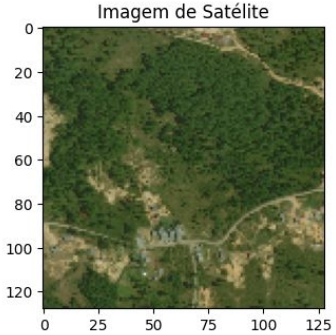
Metodologia

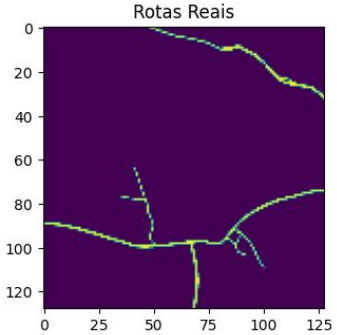
ETAPA 1 – Código original

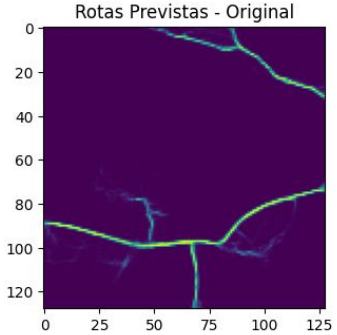


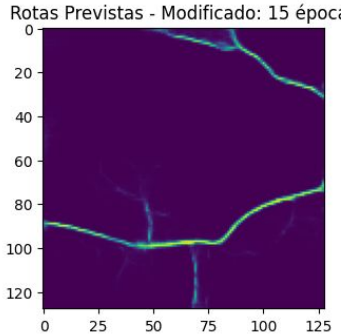
Metodologia

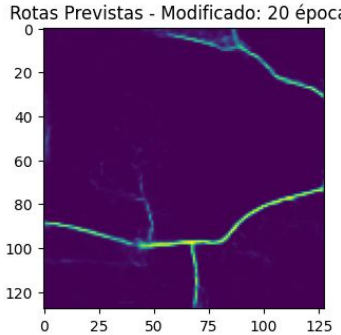
ETAPA 2 - Reduzindo o número de épocas

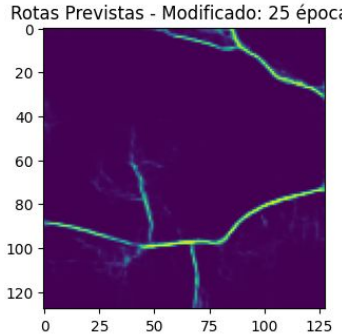












Metodologia

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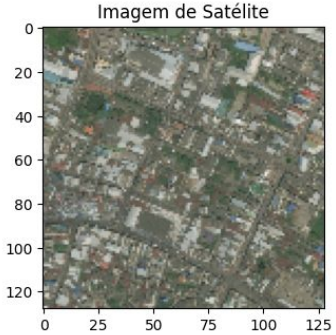
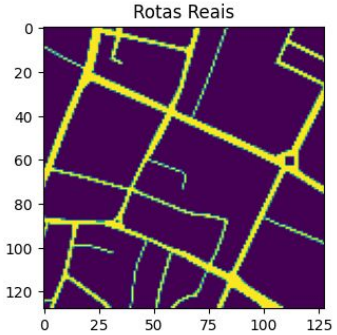
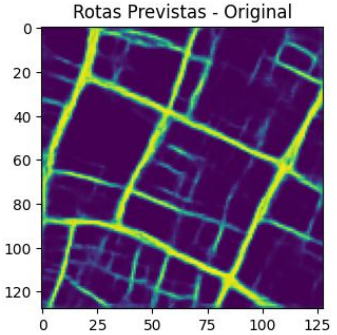
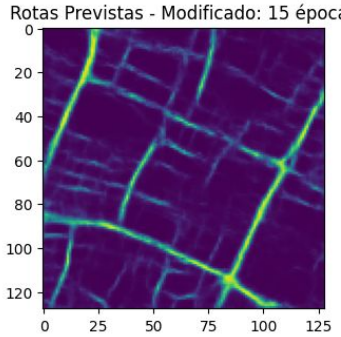
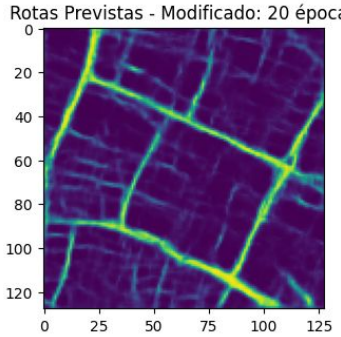
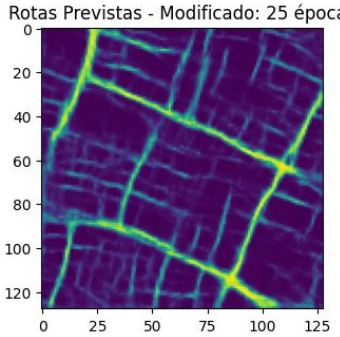






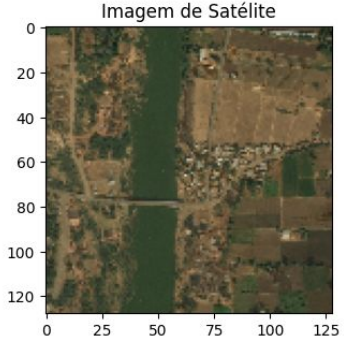


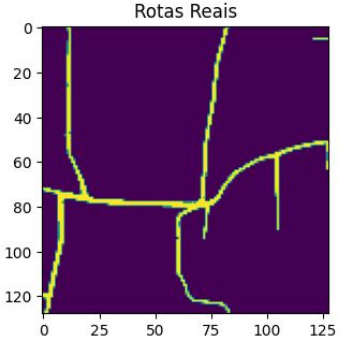


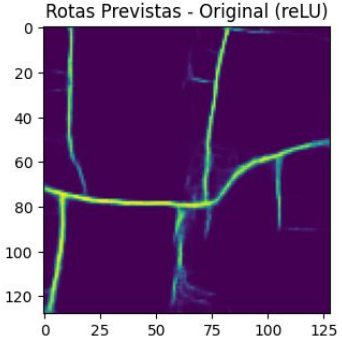


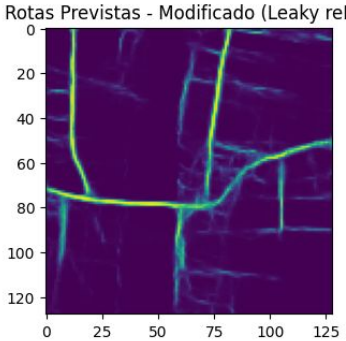
Metodologia

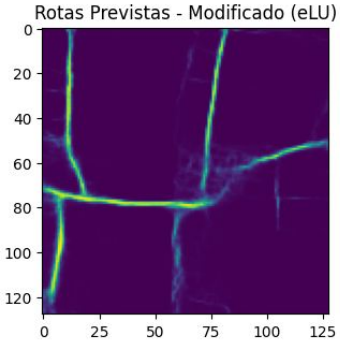
ETAPA 3 - Modificando a função de ativação











Metodologia

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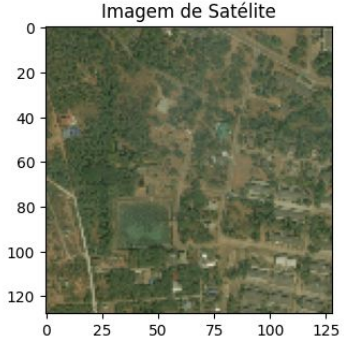

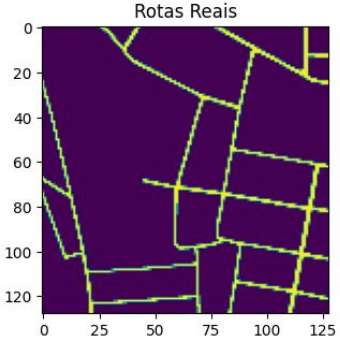

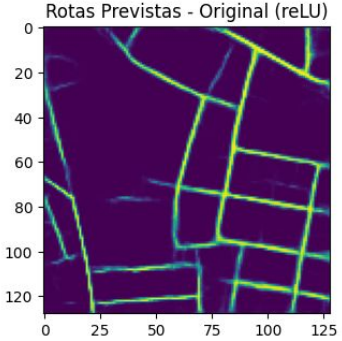

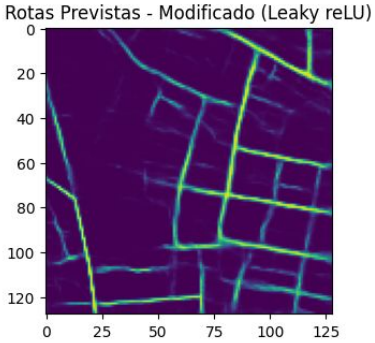

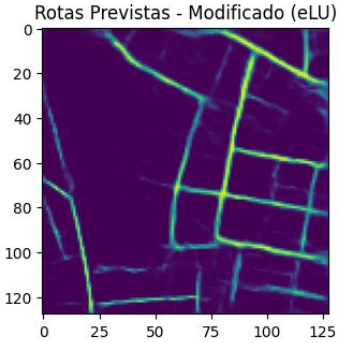

Metodologia

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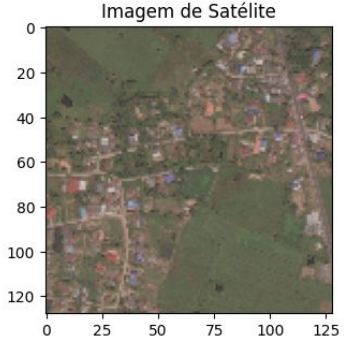
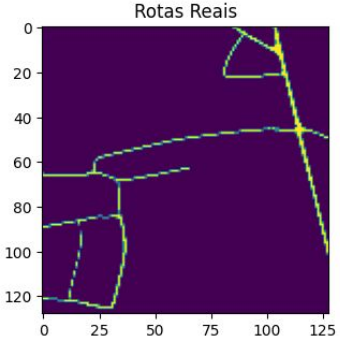
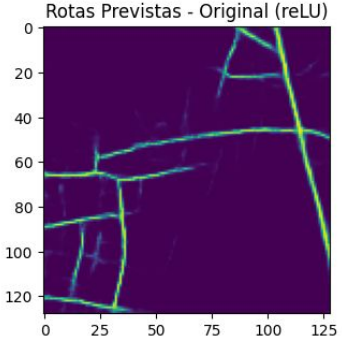
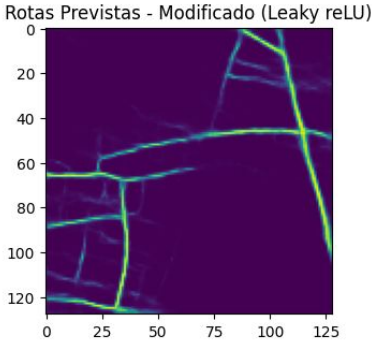
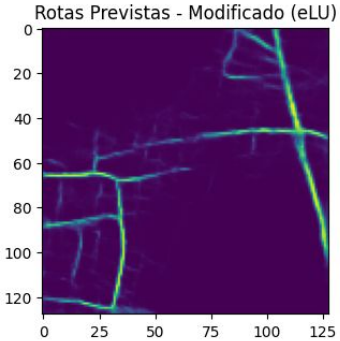




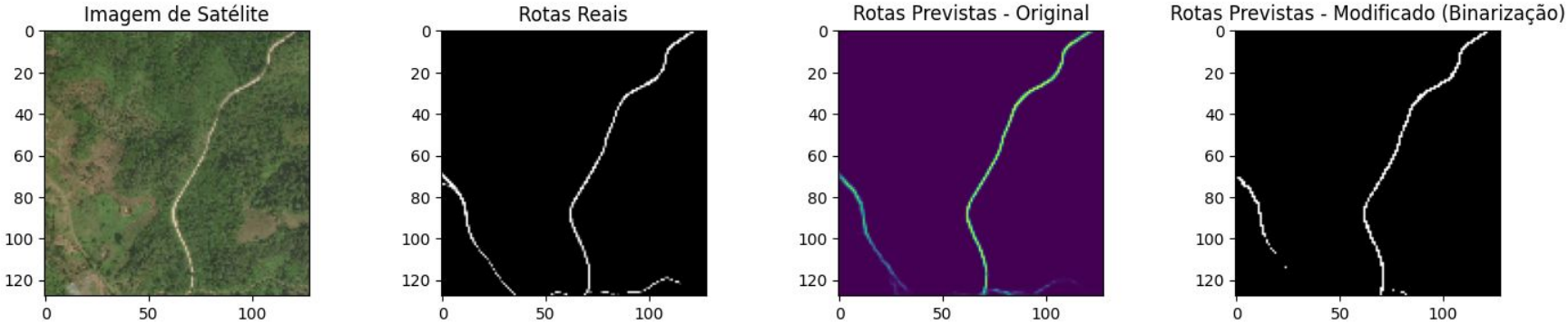






Metodologia

ETAPA 4: Aplicando binarização no resultado



Metodologia

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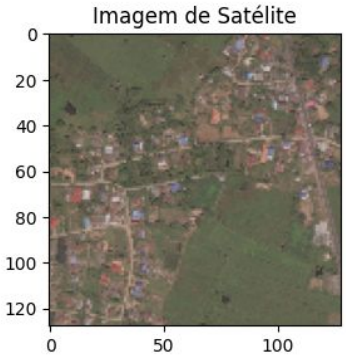

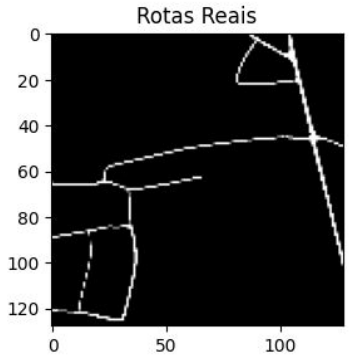

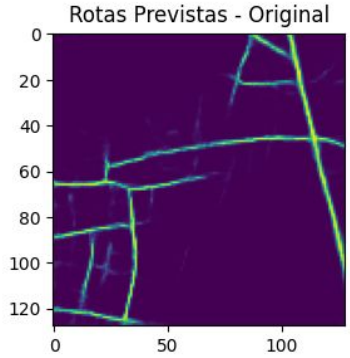

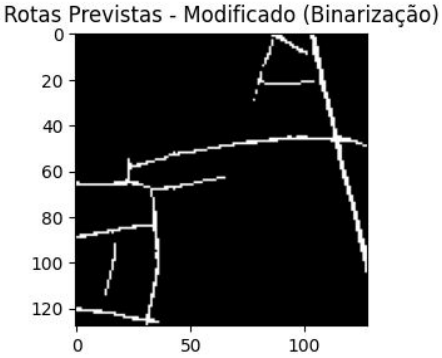

Metodologia

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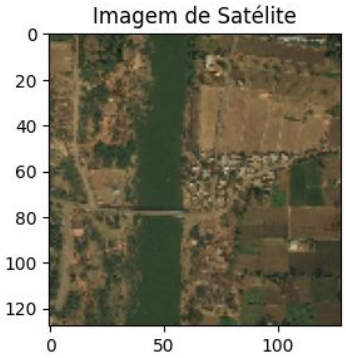
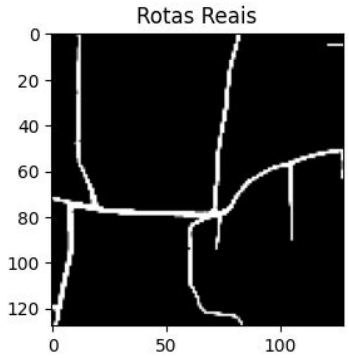
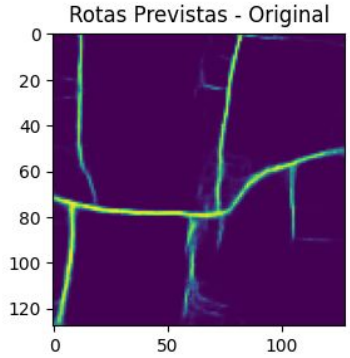
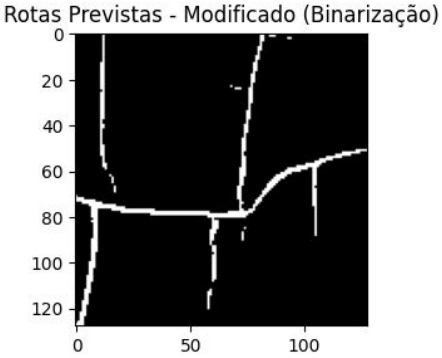


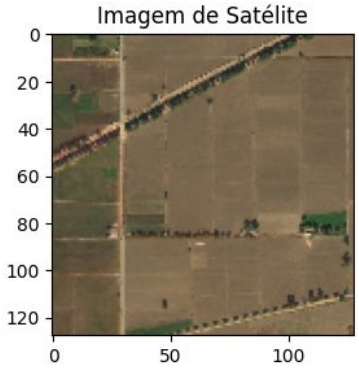


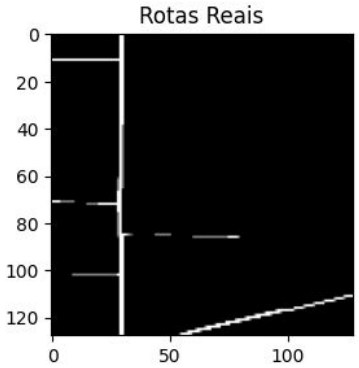


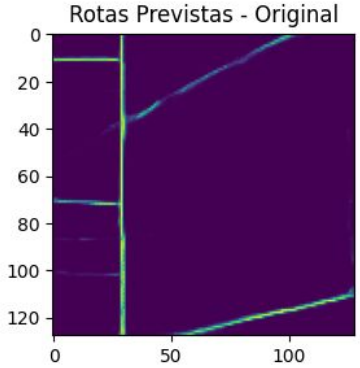


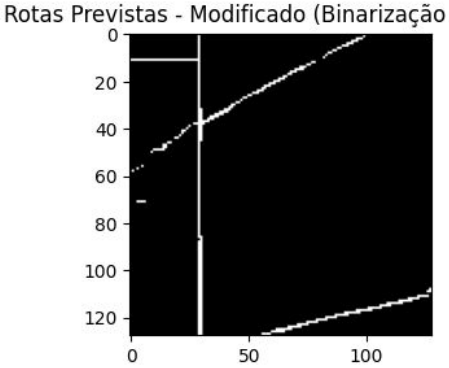
Metodologia

ETAPA 5 - Dividir em treino, teste e validação



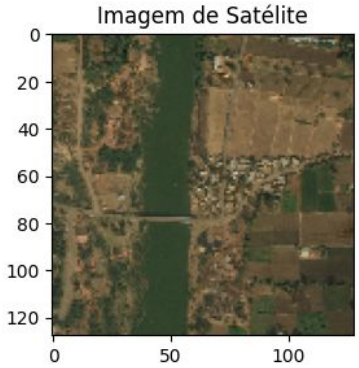


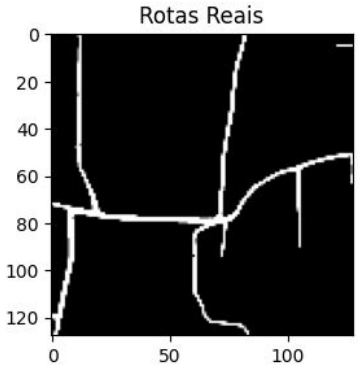


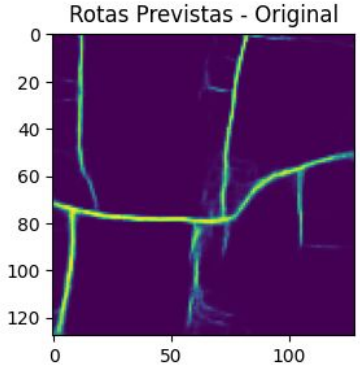


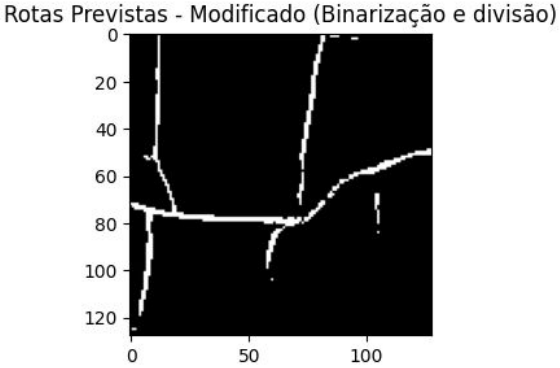
Metodologia

ETAPA 5 - Dividir em treino, teste e validação



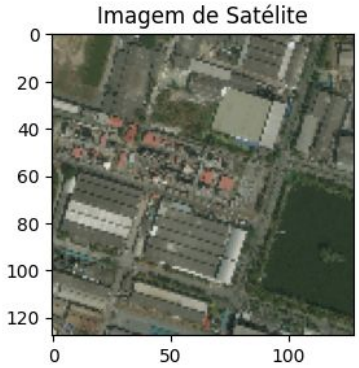


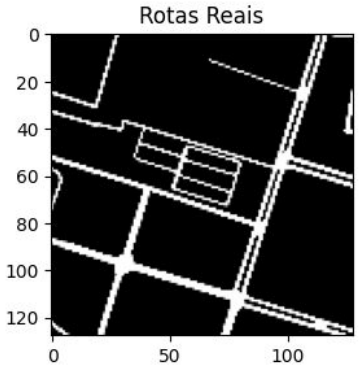


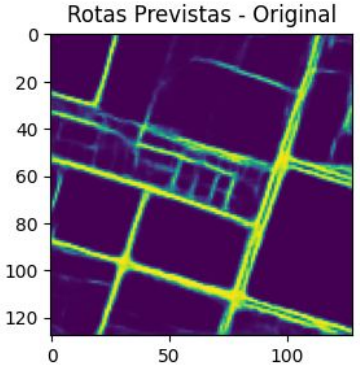


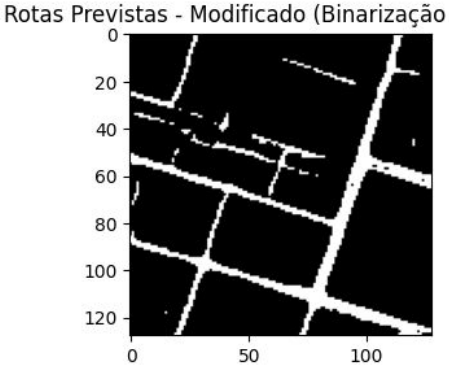
Metodologia

ETAPA 5 - Dividir em treino, teste e validação



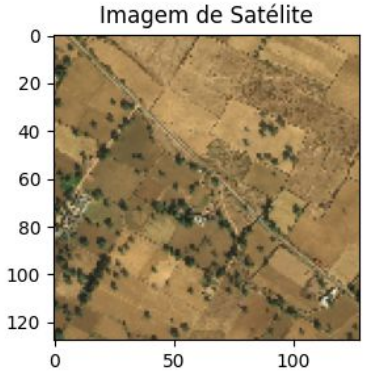


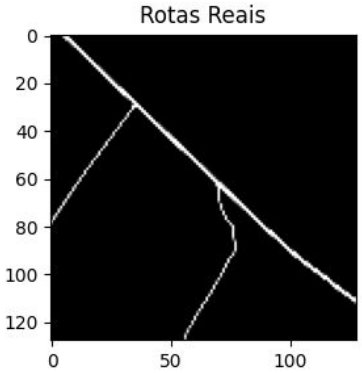


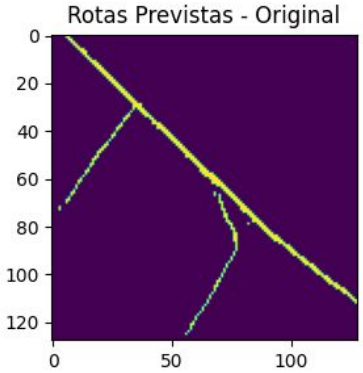


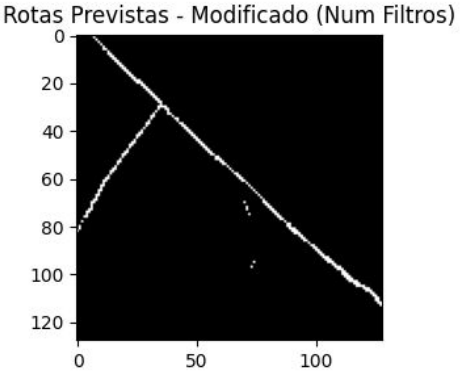
Metodologia

ETAPA 6 - Aumentando o número de filtros



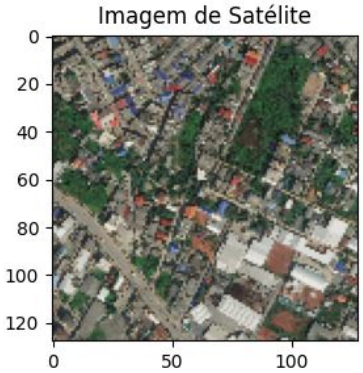


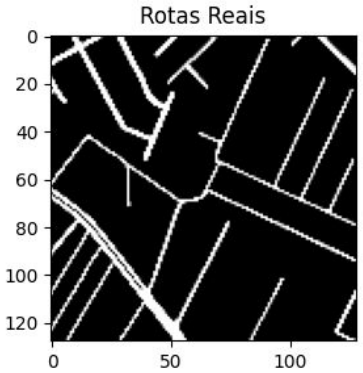


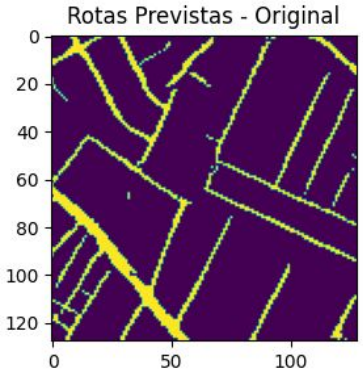


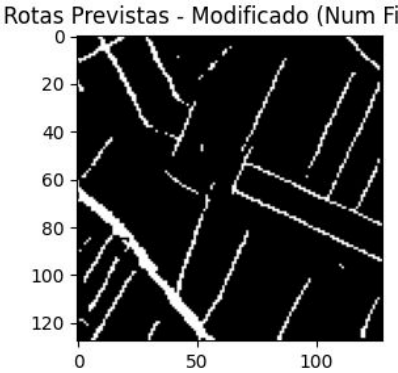
Metodologia

ETAPA 6 - Aumentando o número de filtros



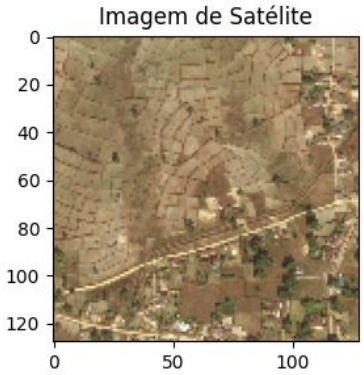


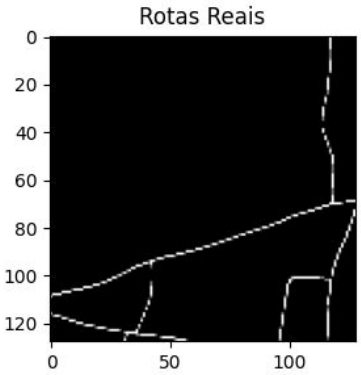


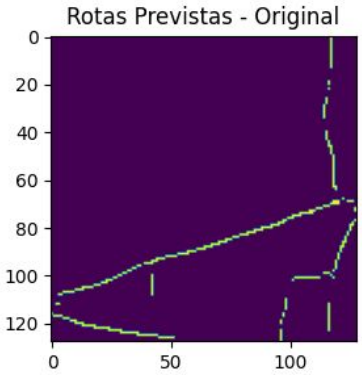


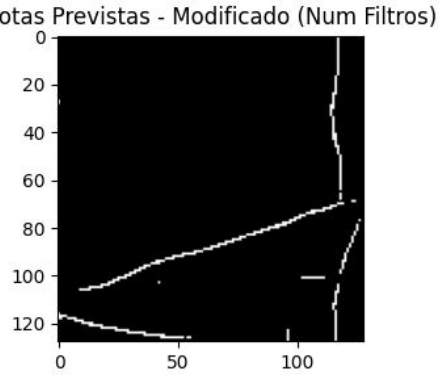
Metodologia

ETAPA 6 - Aumentando o número de filtros









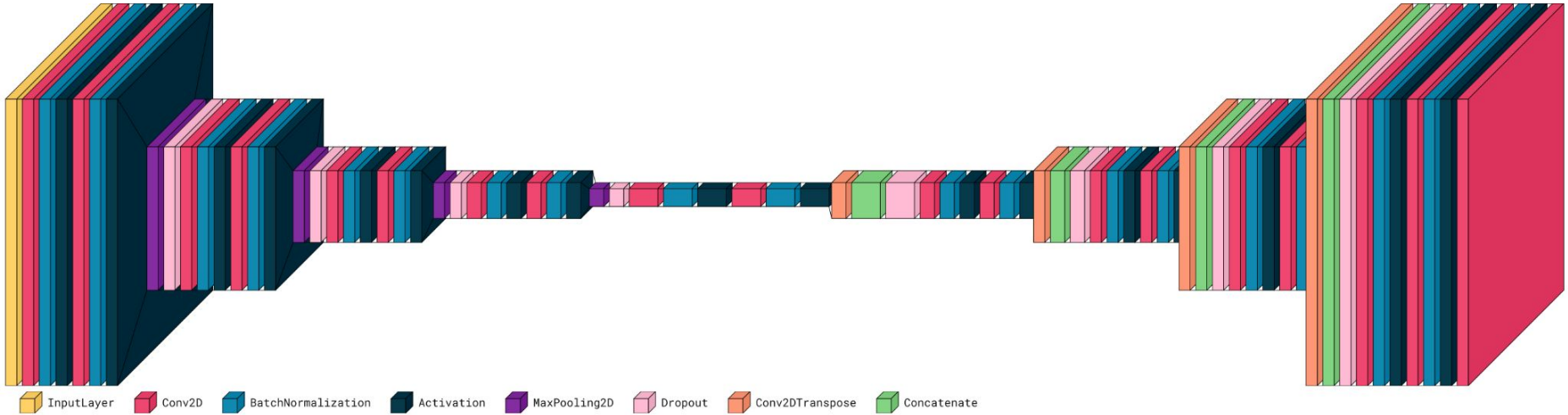
Resultados

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

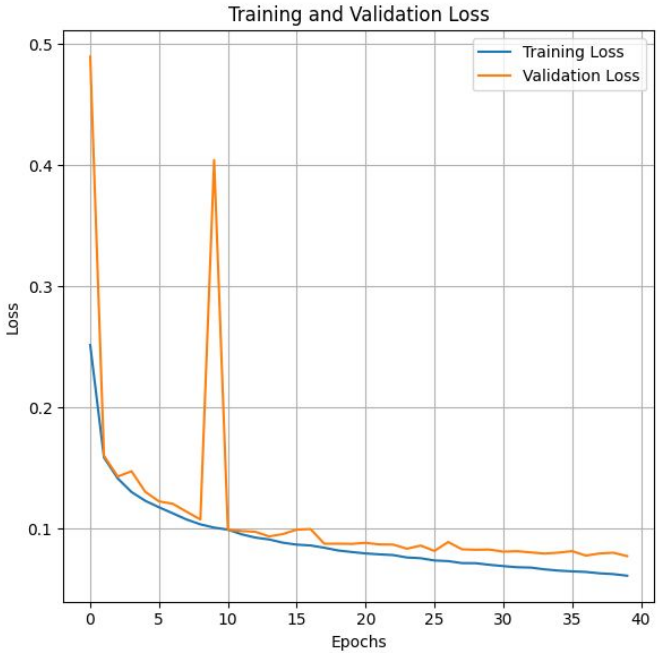


Resultados

Detalhes

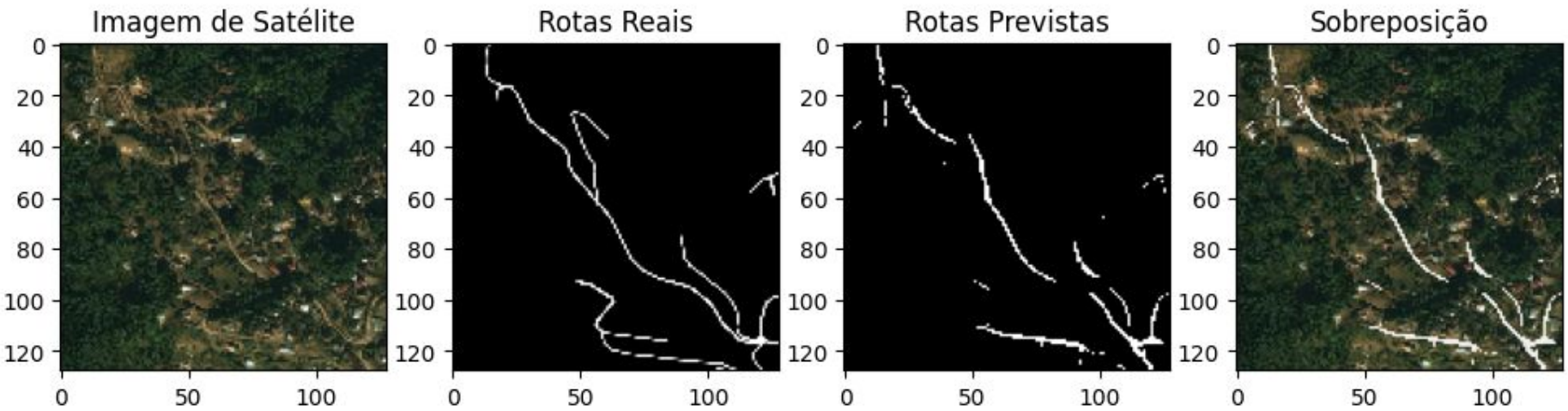
Resultados

Métricas



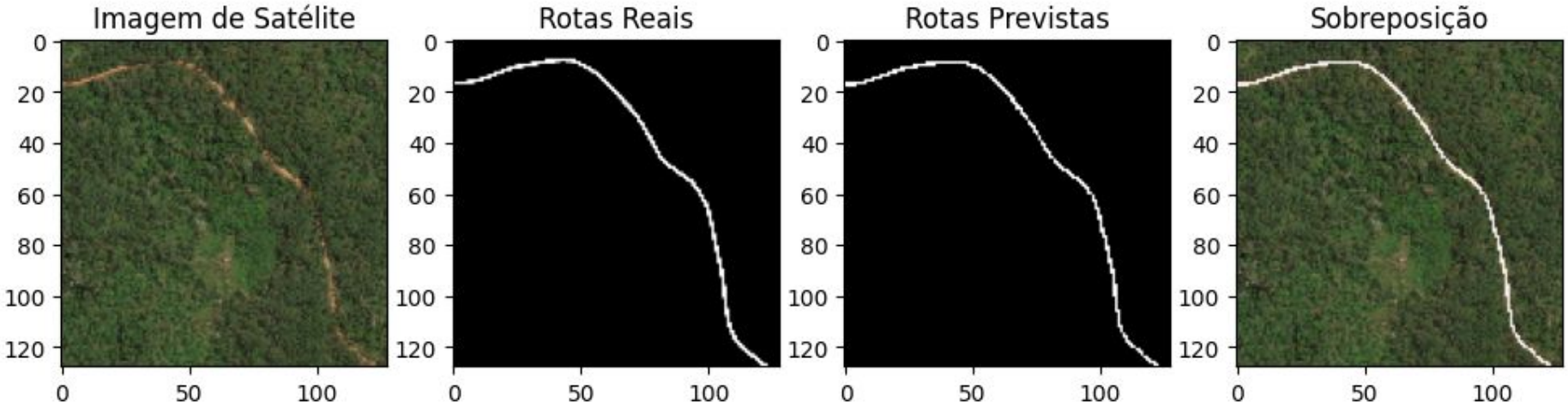
Resultados

Modelo com validação



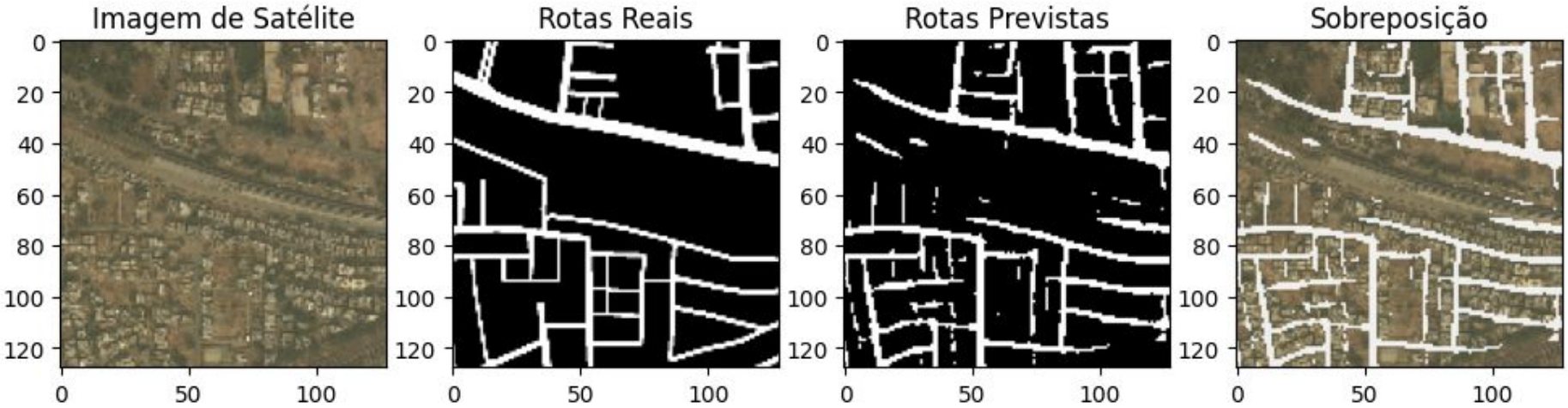
Resultados

Modelo com validação



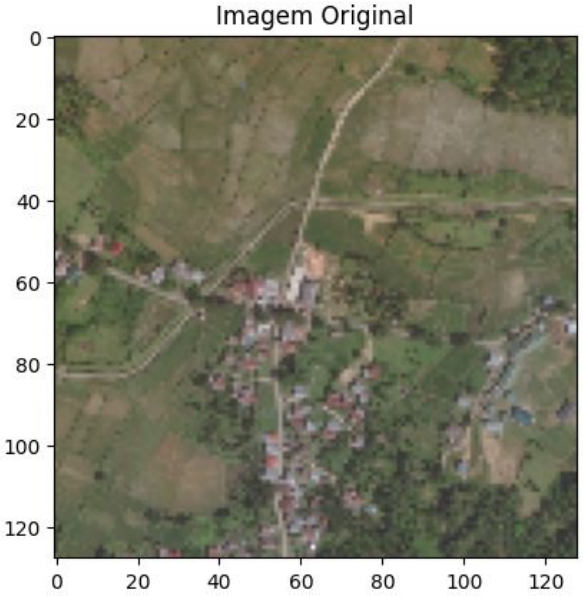
Resultados

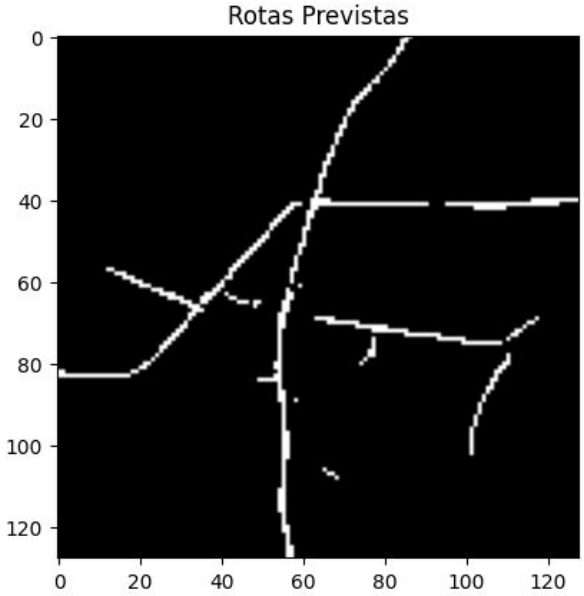
Modelo com validação

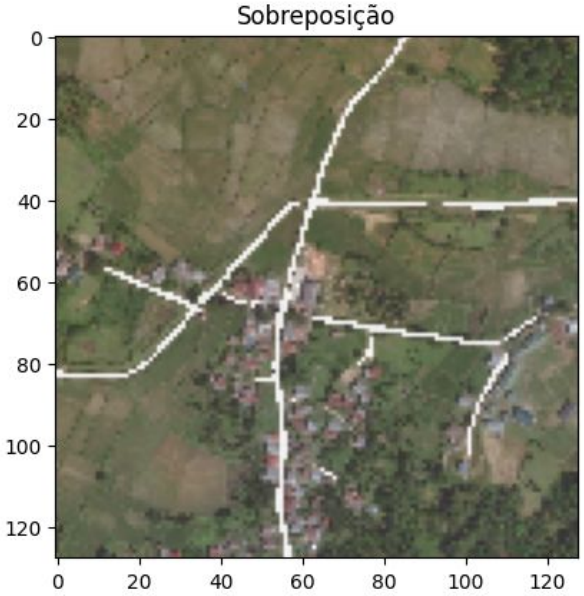


Resultados

Testes

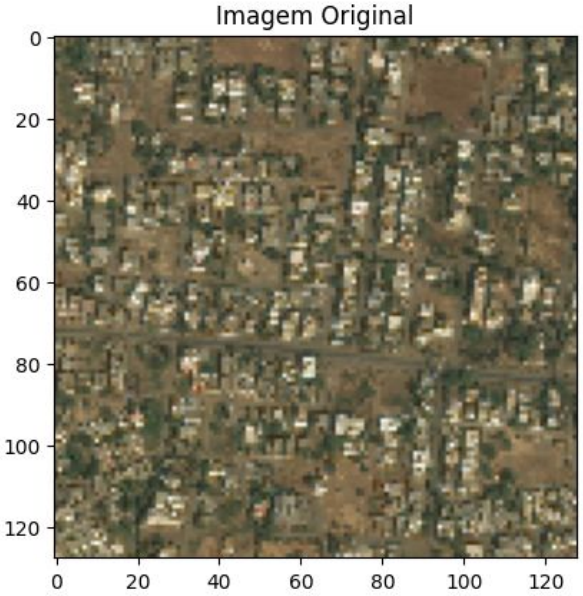


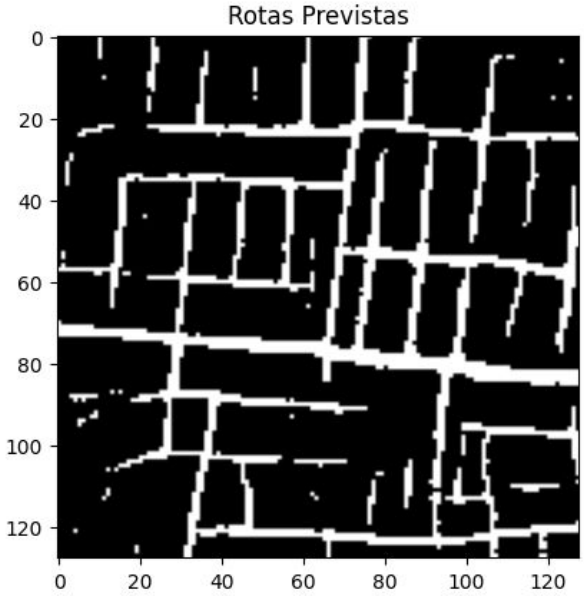


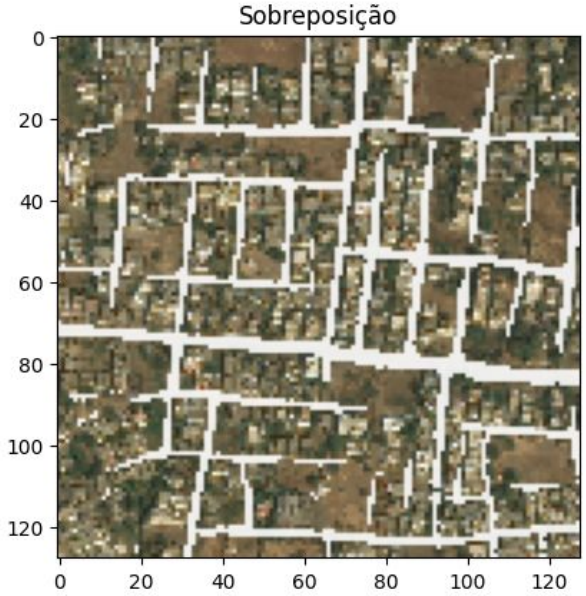


Resultados

Testes

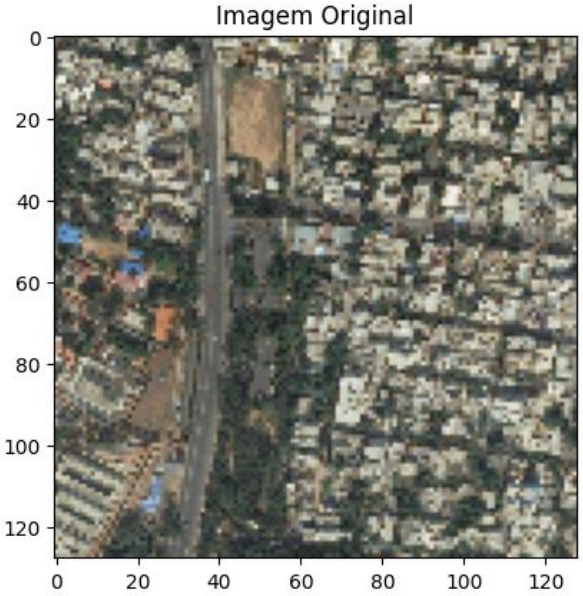


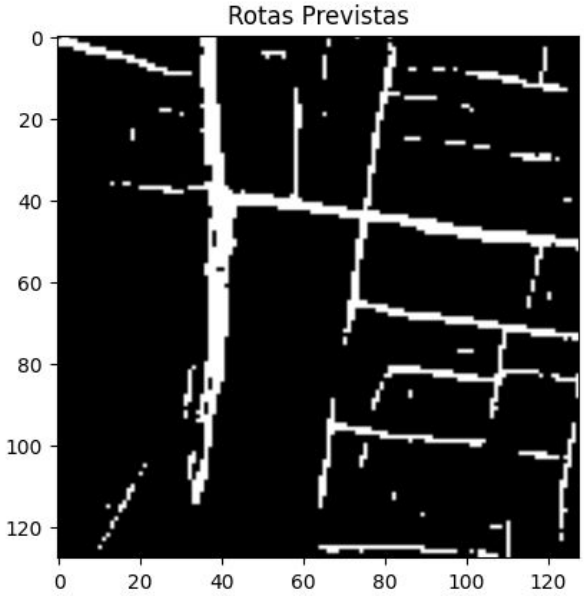


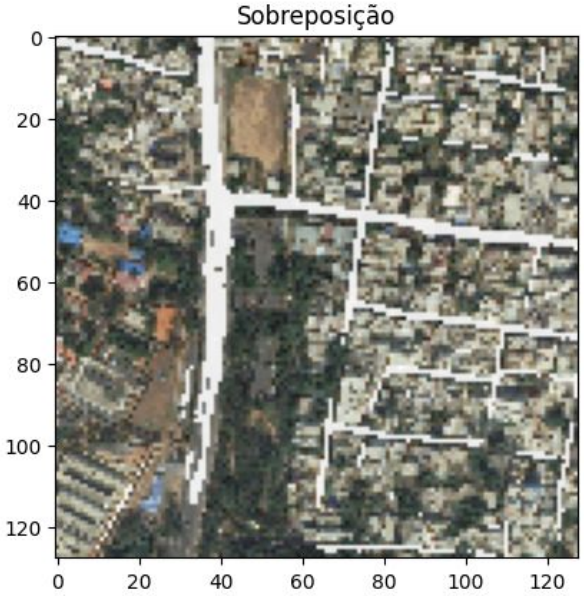


Resultados

Testes







Conclusões

- 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
- Não foi necessário classificar os arquivos por não ser um problema de classificação;
- É inconclusivo se o modelo possui capacidade de discernir diferenças entre rodovias e ferrovias nas imagens;

Conclusões

- Imagens muito grandes podem ser um obstáculo para treinamento de modelos de segmentação. É necessário alguma espécie de tratamento, especialmente em máquinas mais iniciais;
- Datasets robustos podem ser reduzidos a depender dos resultados obtidos;

Atlântico Avanti

Agradecemos a atenção!

Referências Bibliográficas

Seguir regras da ABNT NBR 10520