

# Video Super Resolution

Computer Graphics

한국인

컴퓨터공학과 권민재 · 컴퓨터공학과 도승욱 · 컴퓨터공학과 최은수

# Contents

Introduction

Progress

Demo

# Chapter 1.

**Introduction**

**Modeling**

**Progress**

# Introduction

디스플레이 기술의  
집약적인 발전

턱없이 부족한  
고해상도 컨텐츠

Deep learning을 이용한 Video Super Resolution

# Objective



4K 미만의 영상 화질 개선



CVPR Paper의 구현

Deep Video Super-Resolution Network  
Using Dynamic Upsampling Filters Without Explicit



사용자 대상 웹 서비스 구현

# Chapter 2.

Introduction

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# Progress



**Network**

구현



**Dataset**

제작



**Network**

학습

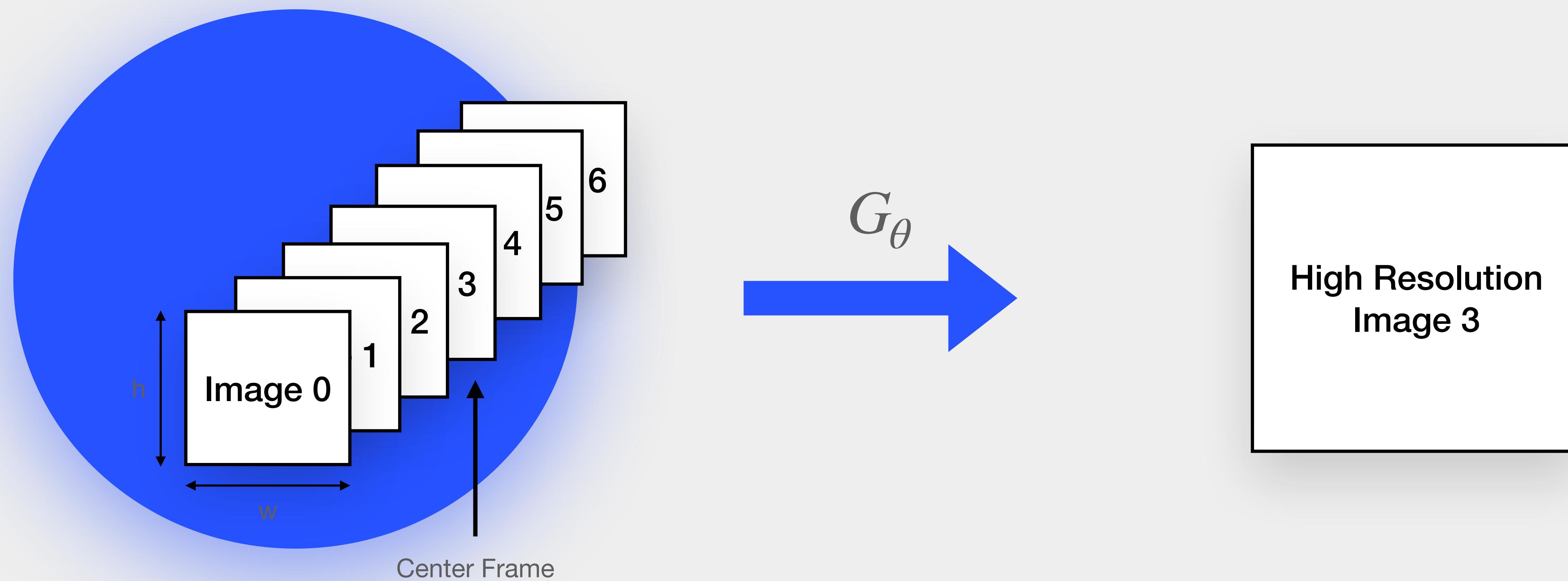
# Deep Learning Model

Neural Network를 이용해 저해상도 비디오로부터 고해상도 비디오를 생성

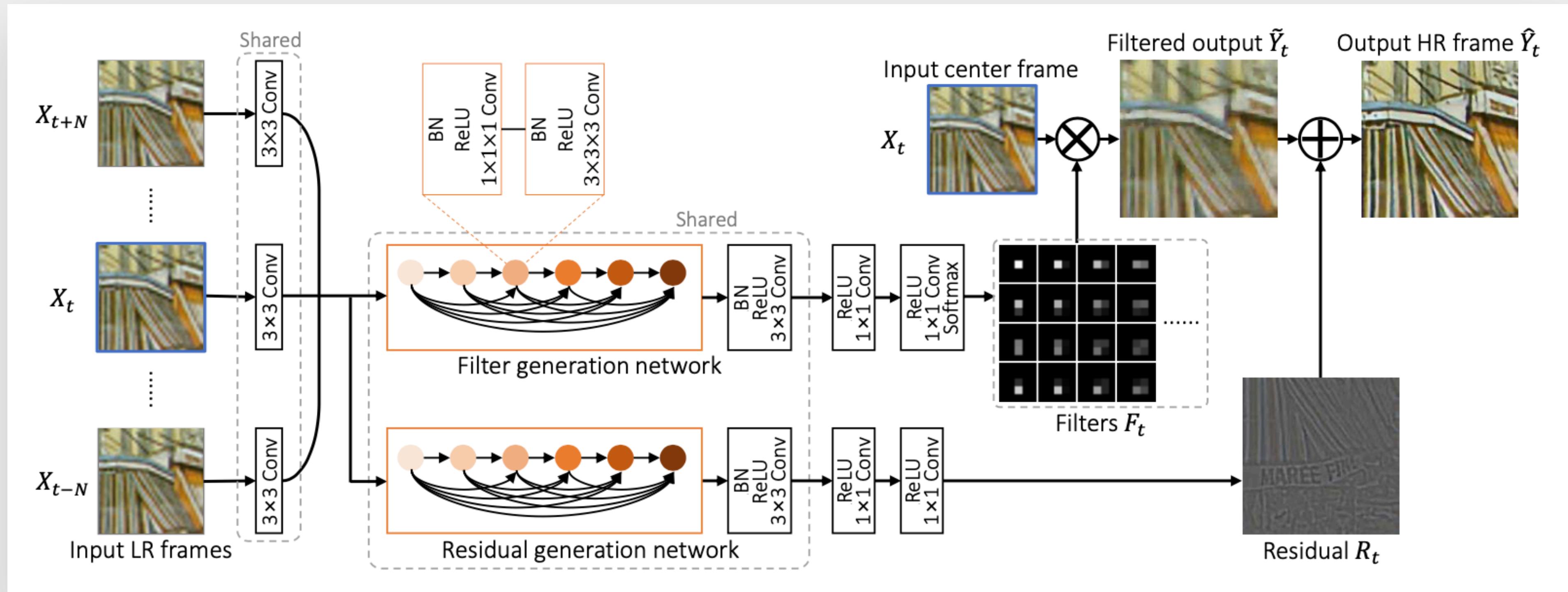
CVPR Paper의 구현

Deep Video Super-Resolution Network  
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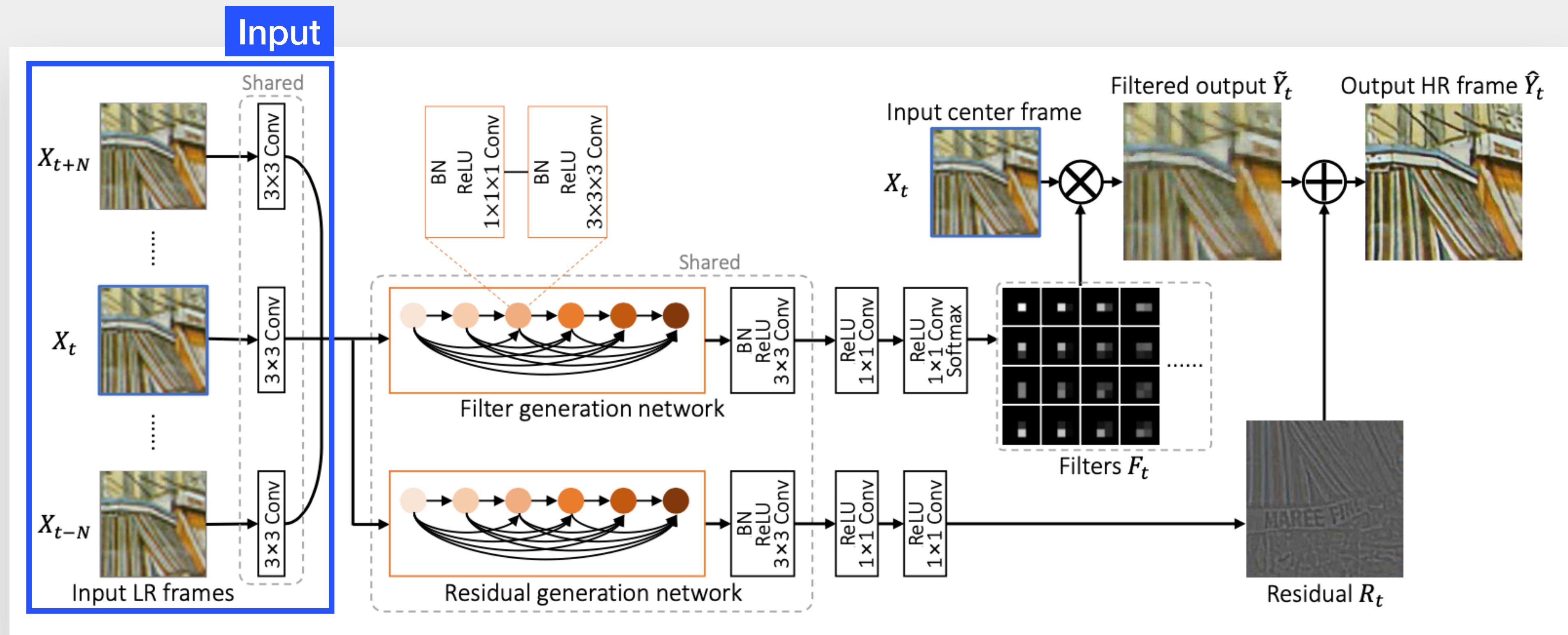
# Problem Definition



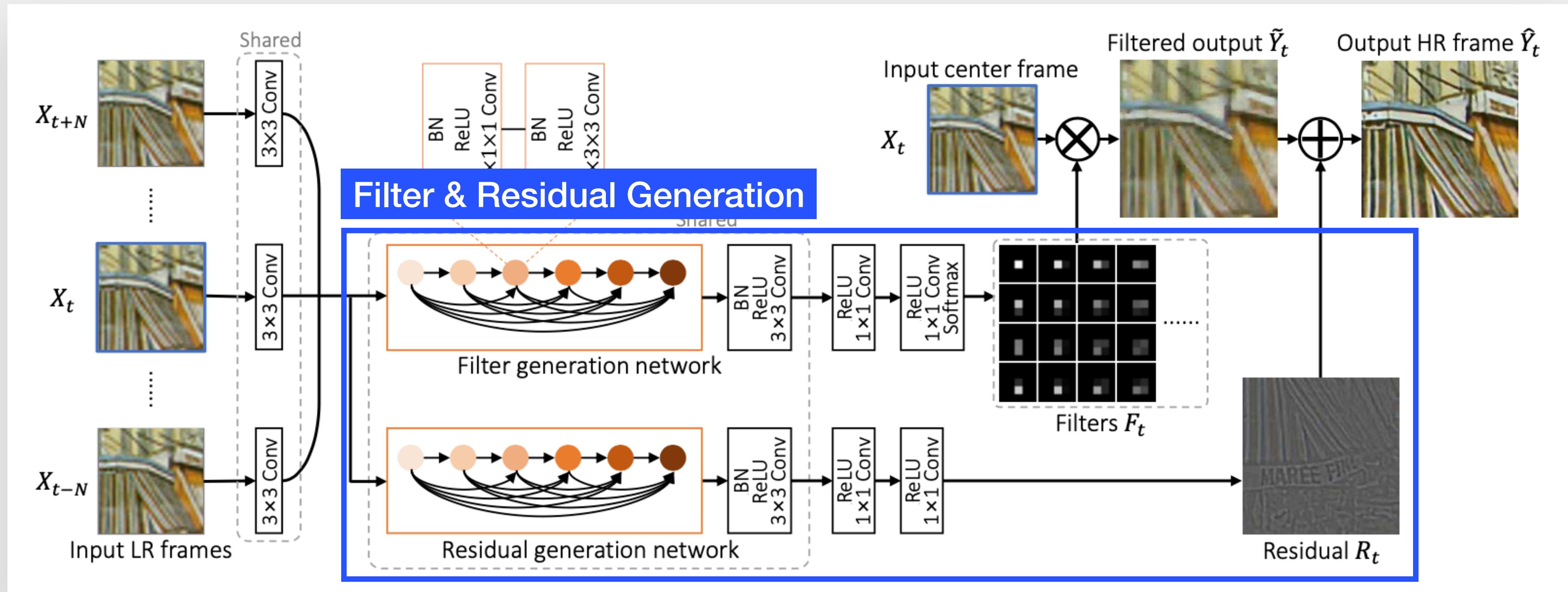
# Network Architecture



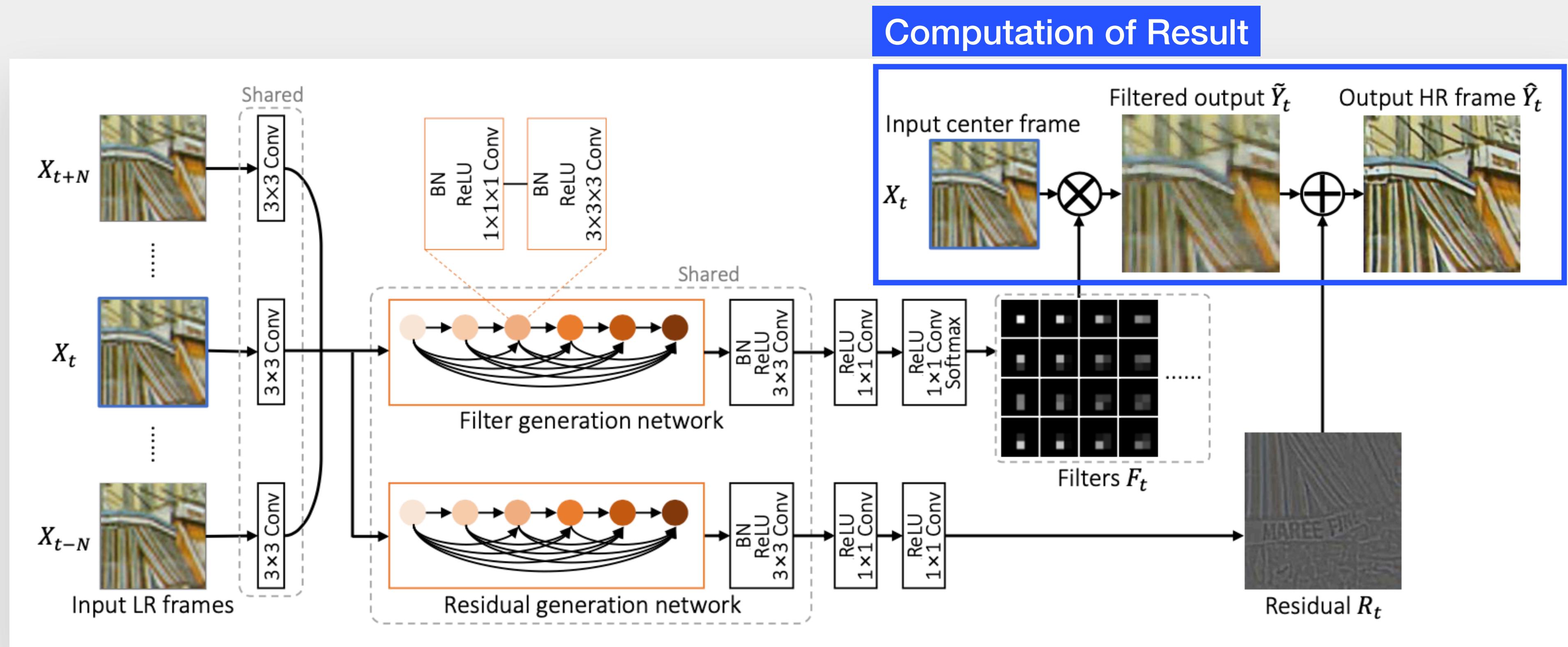
# Network Architecture



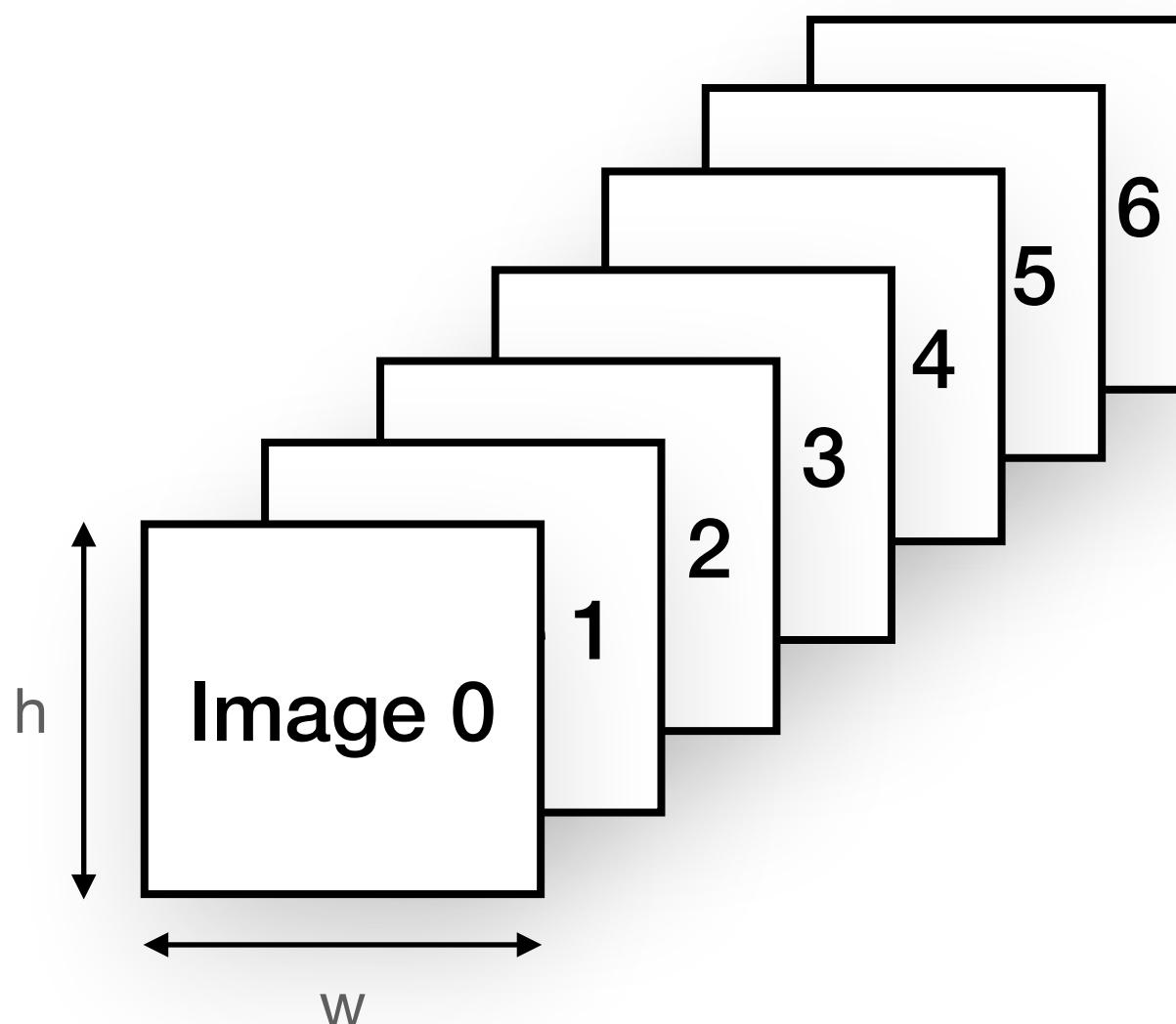
# Network Architecture



# Network Architecture

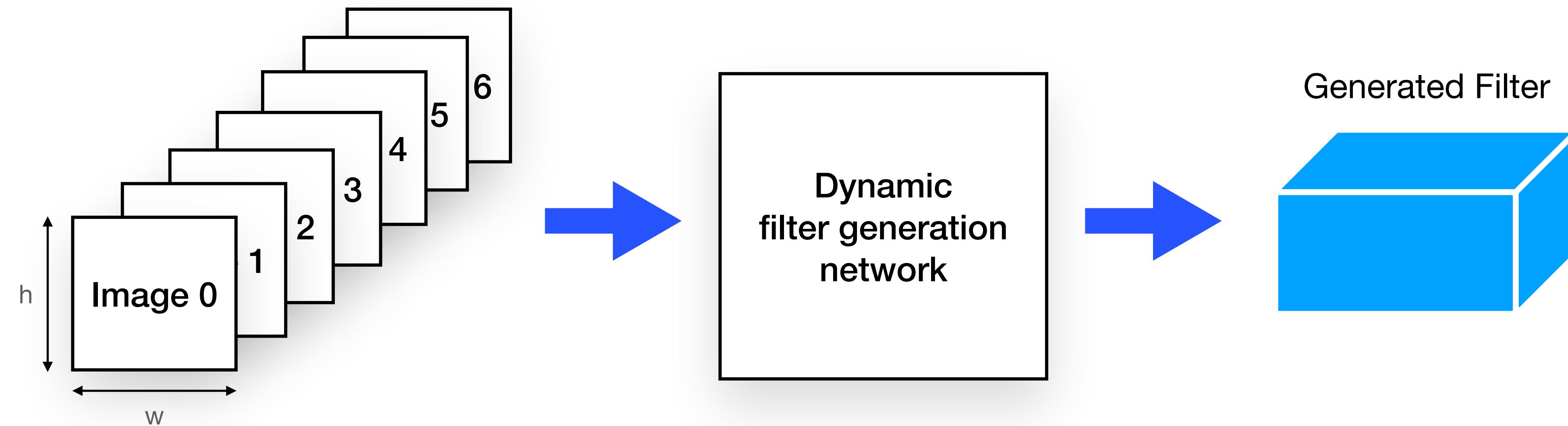


# Temporal Augmentation

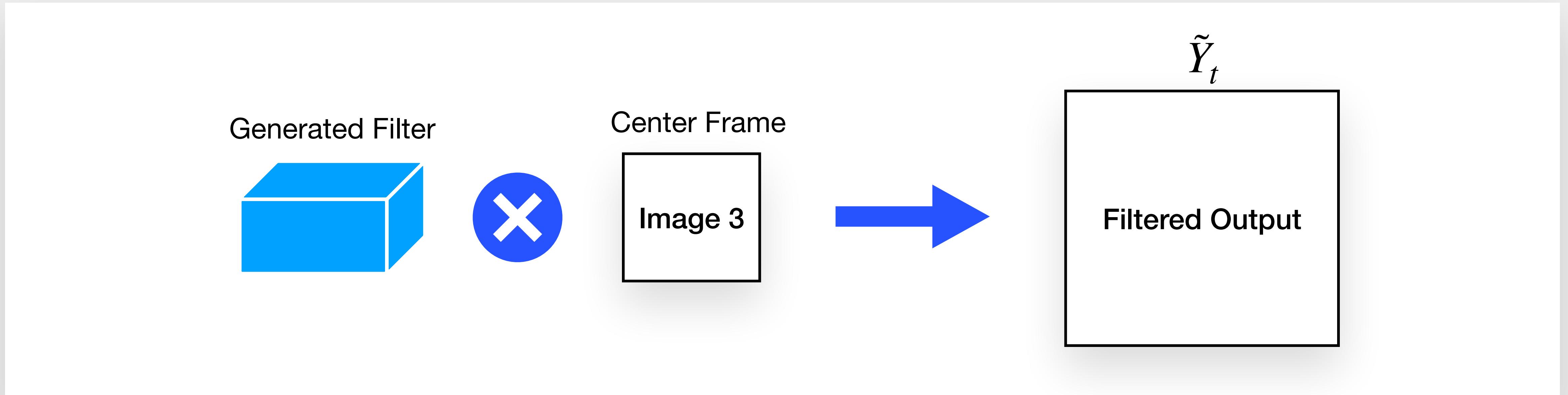


Temporal Consistency 향상

# Dynamic upsampling filters

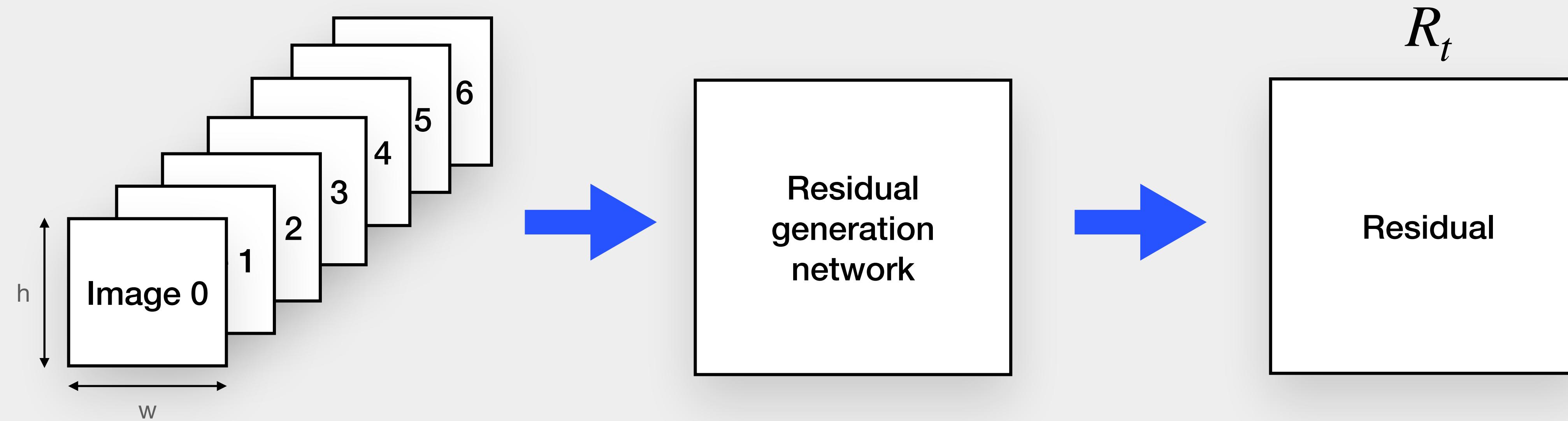


# Dynamic upsampling filters

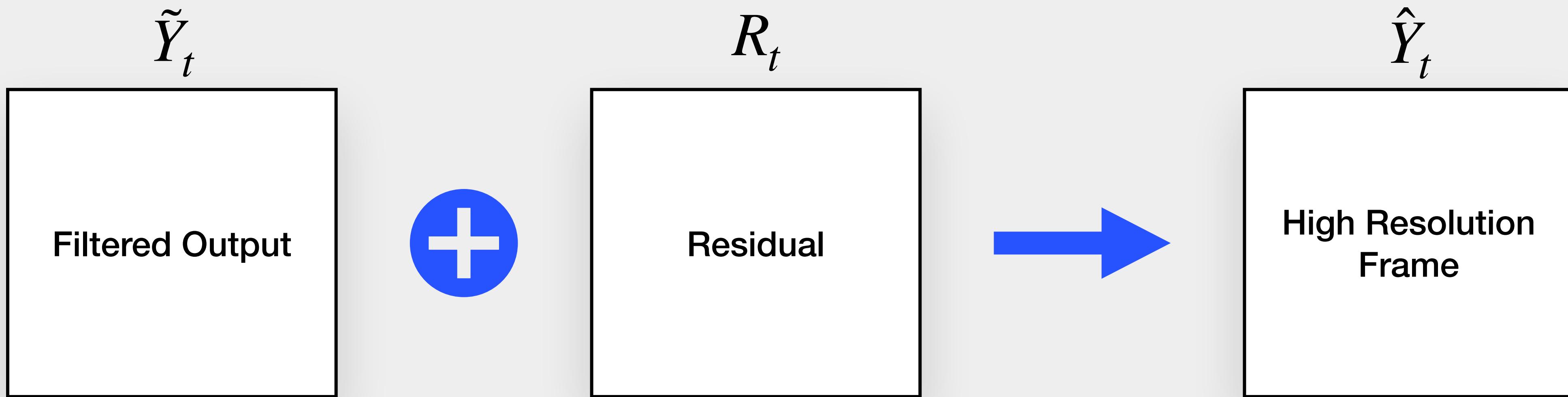


$$\tilde{Y}_t(yr + v, xr + u) = \sum_{j=-2}^2 \sum_{i=-2}^2 F_t^{y,x,v,u}(j+2, i+2) X_t(y+j, x+i)$$

# Residual Learning



# Residual Learning



선명도 향상 효과 기대

# Network Implementation



Tensorflow 1.0

Based on  
Author's Implementation



Pytorch

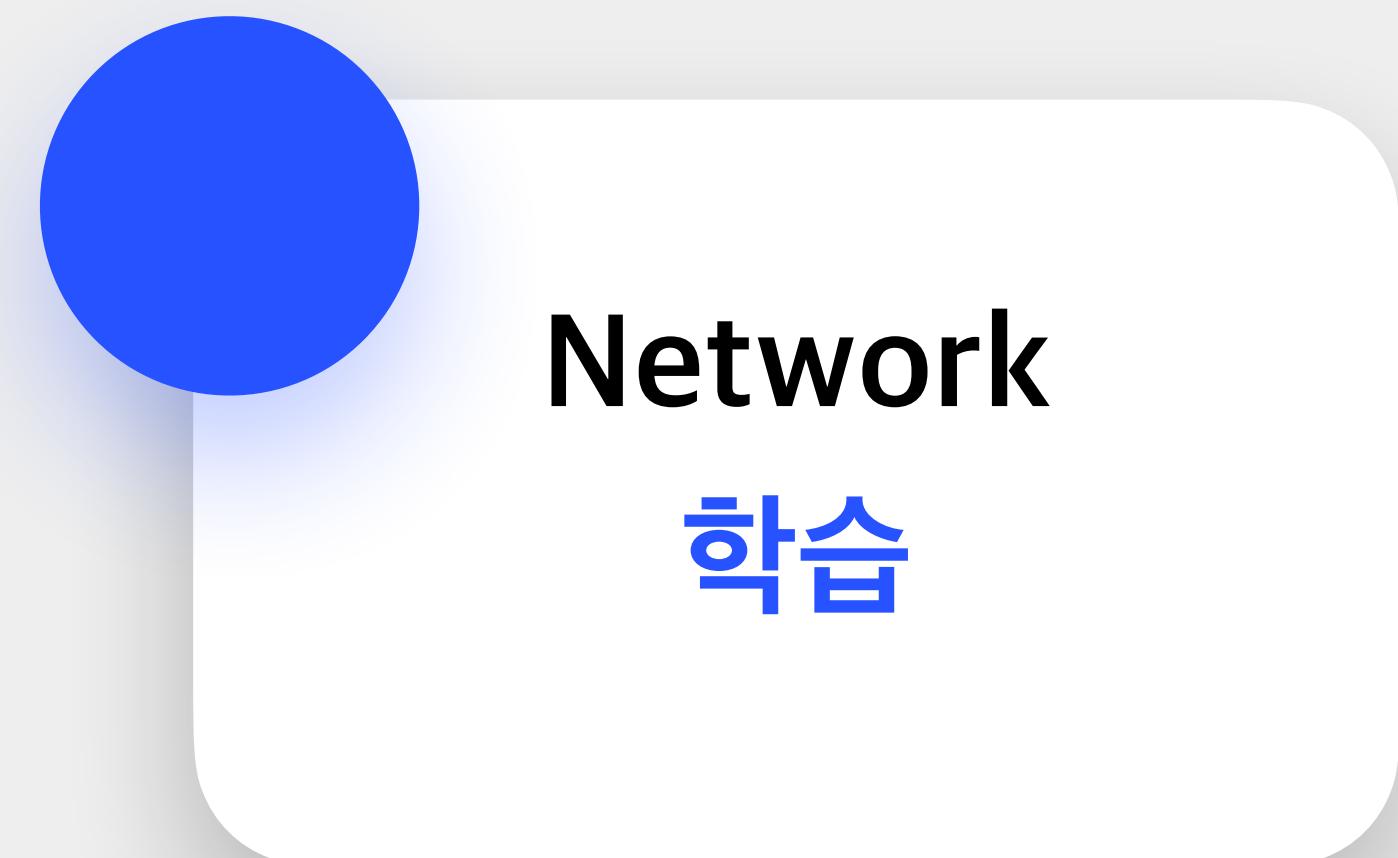
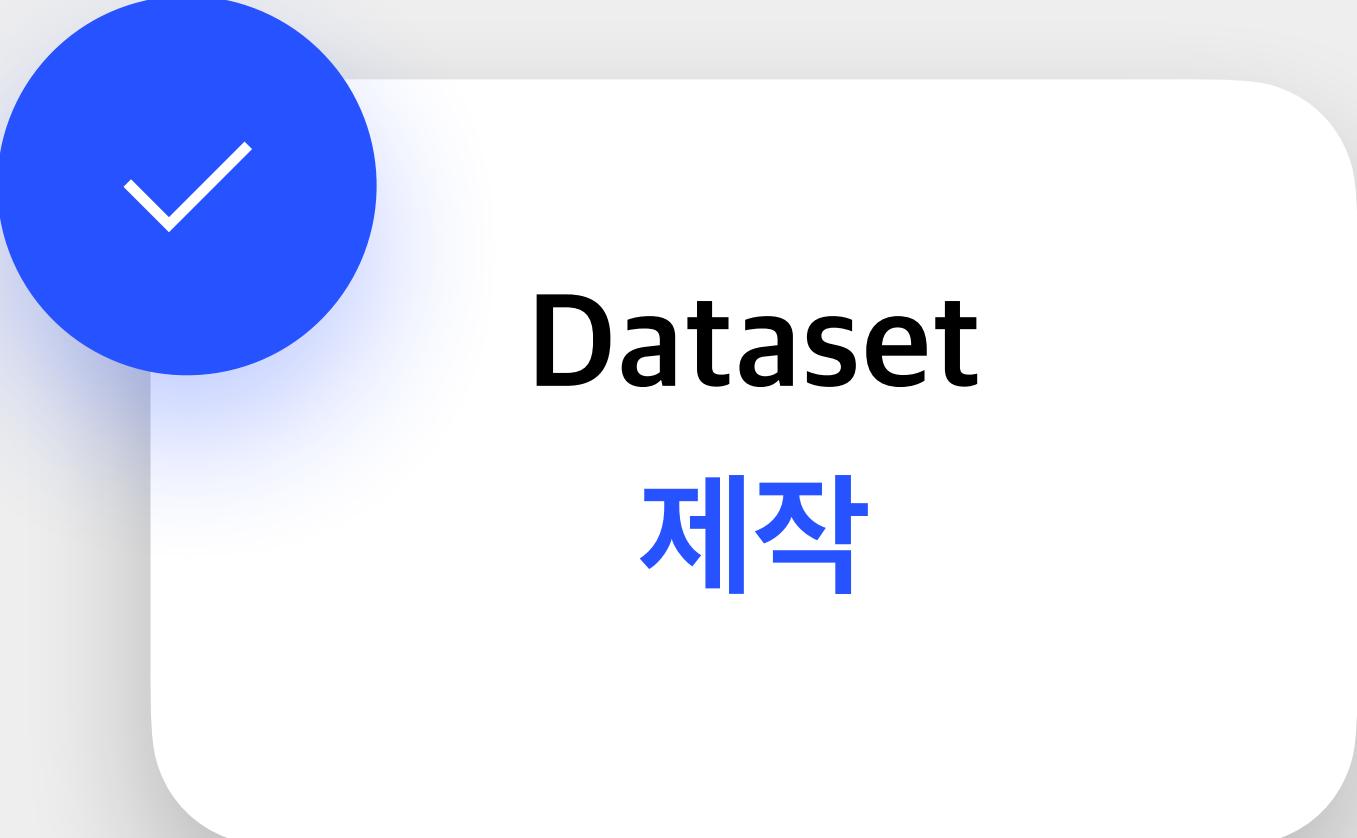
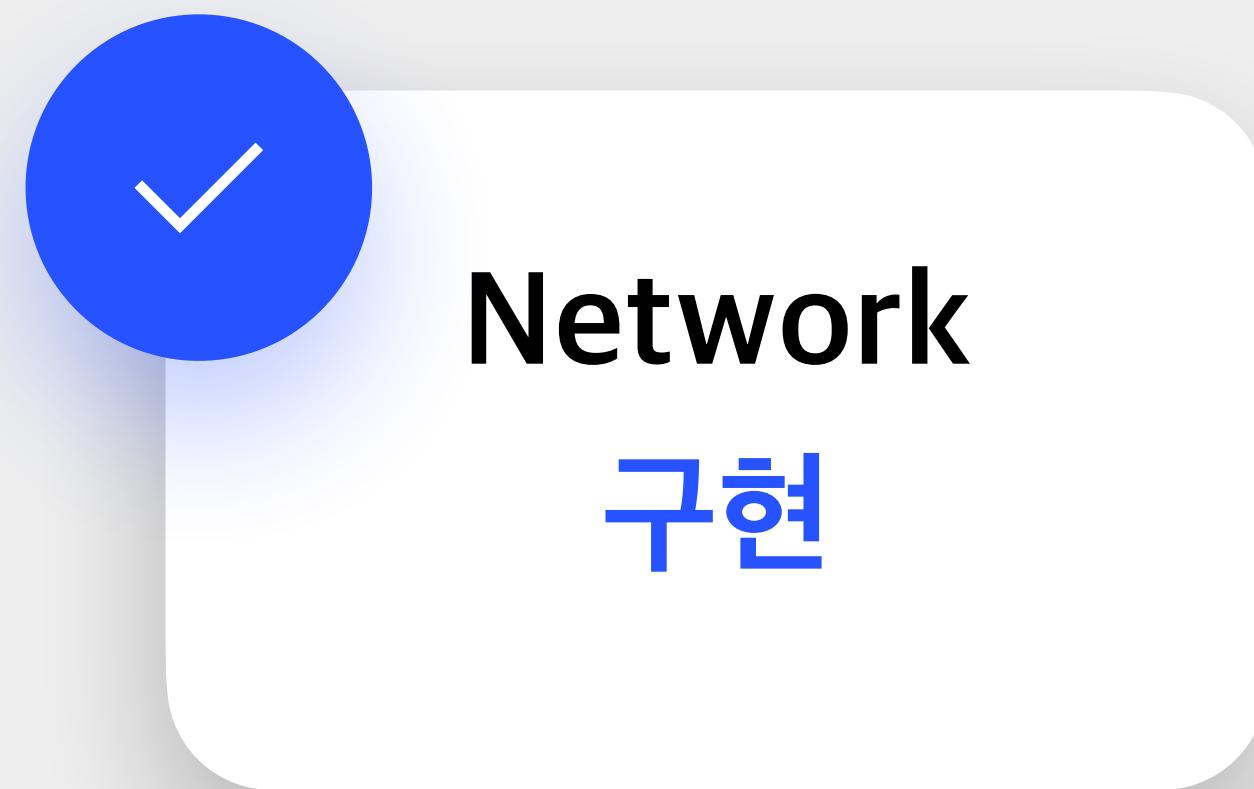
First Trial of  
Our Implementation



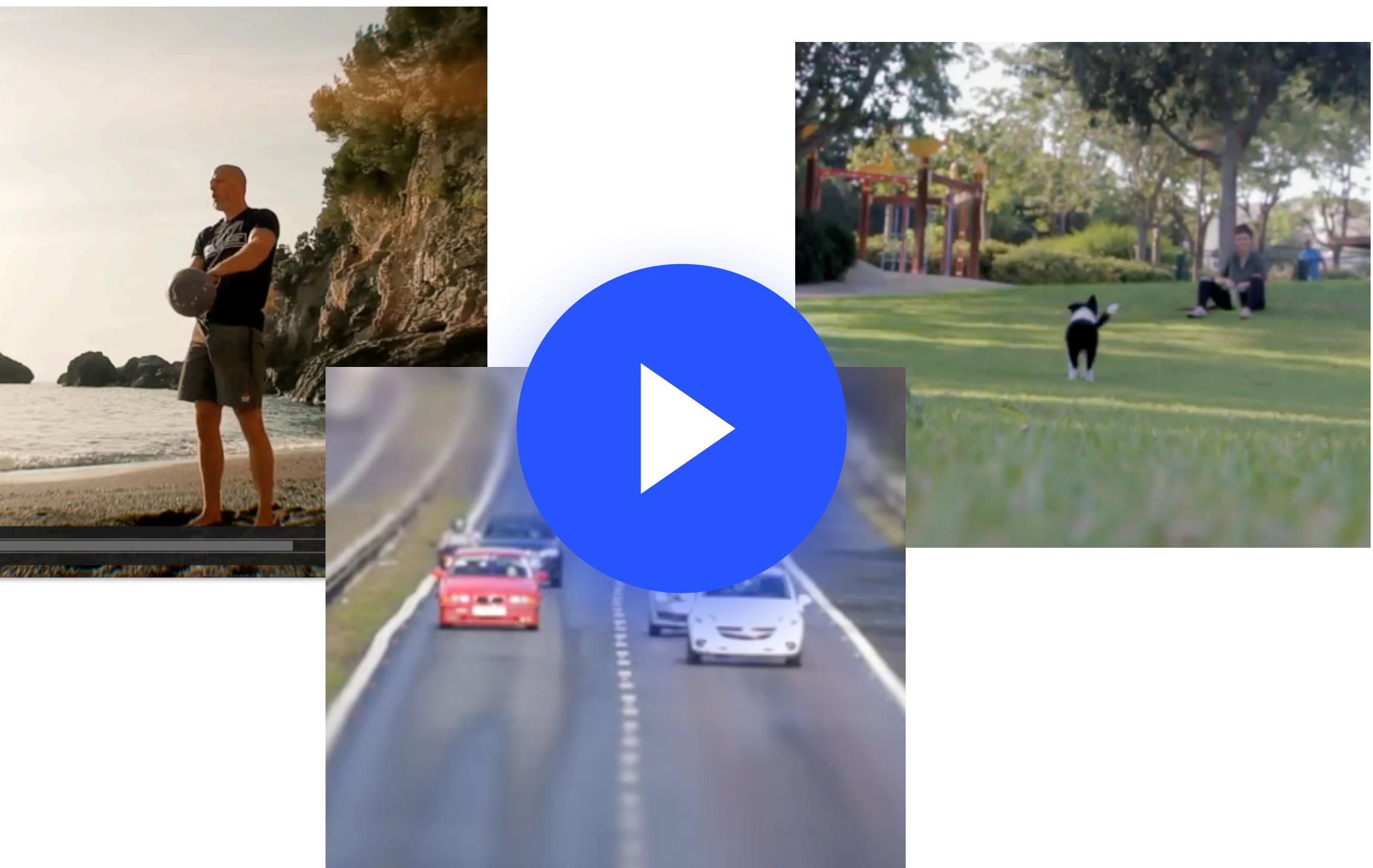
Tensorflow 2.0

Second Trial of  
Our Implementation

# Progress



# Dataset



## Pixabay License

상업적 용도로 사용 가능  
출처 안 밝혀도 됨

## 해상도

1920x1080

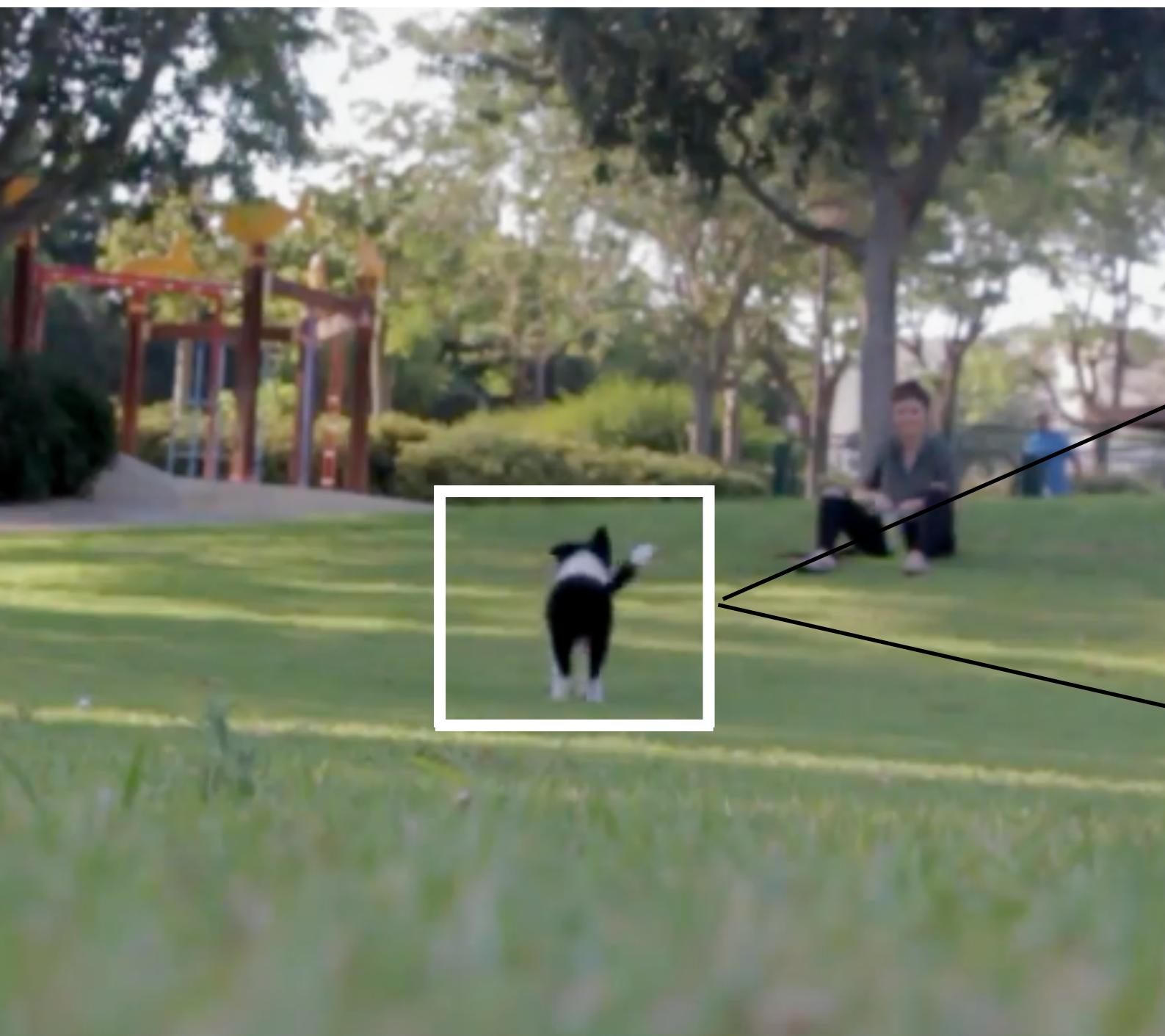
## Video

328

## Frame image

약 160,000

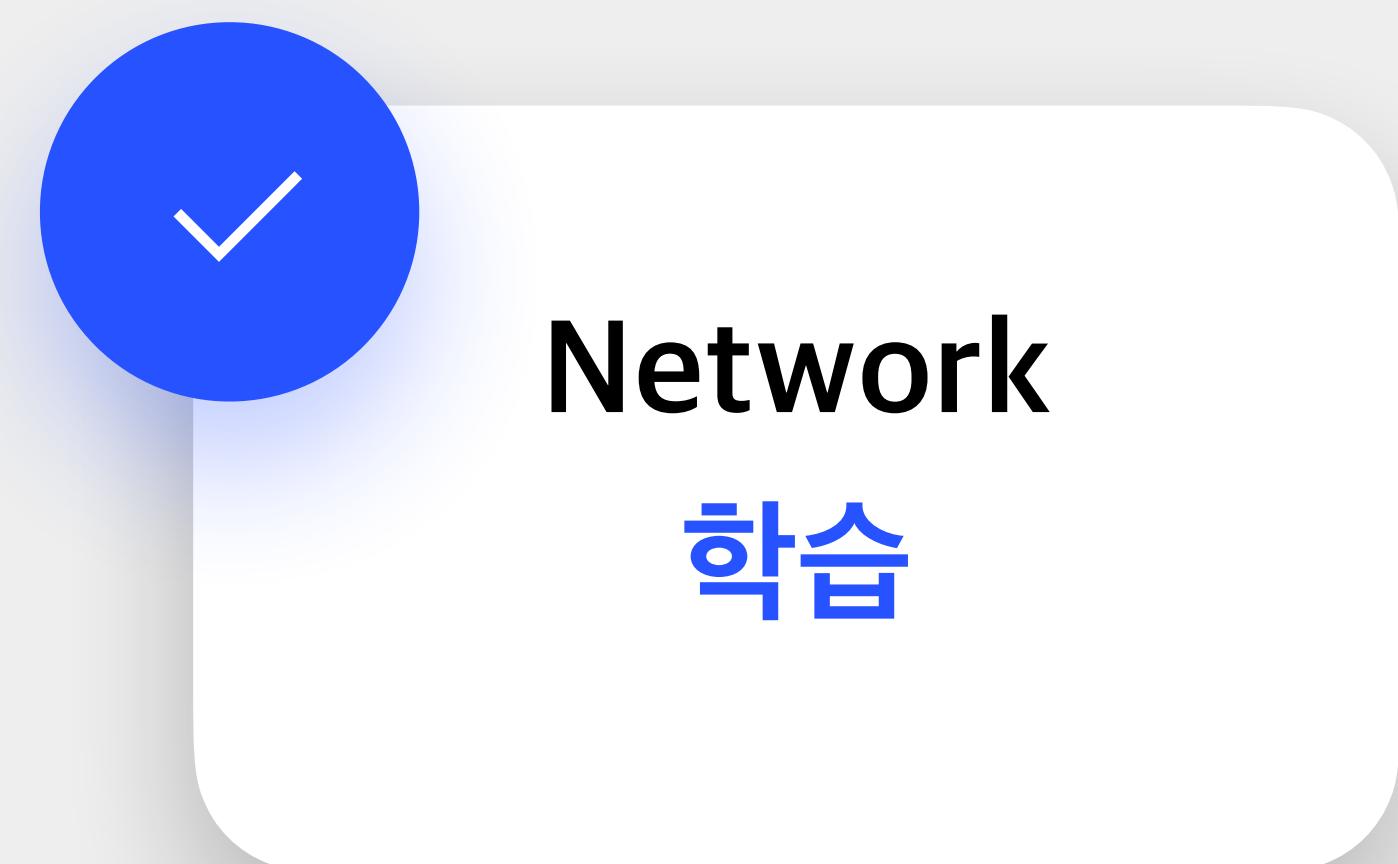
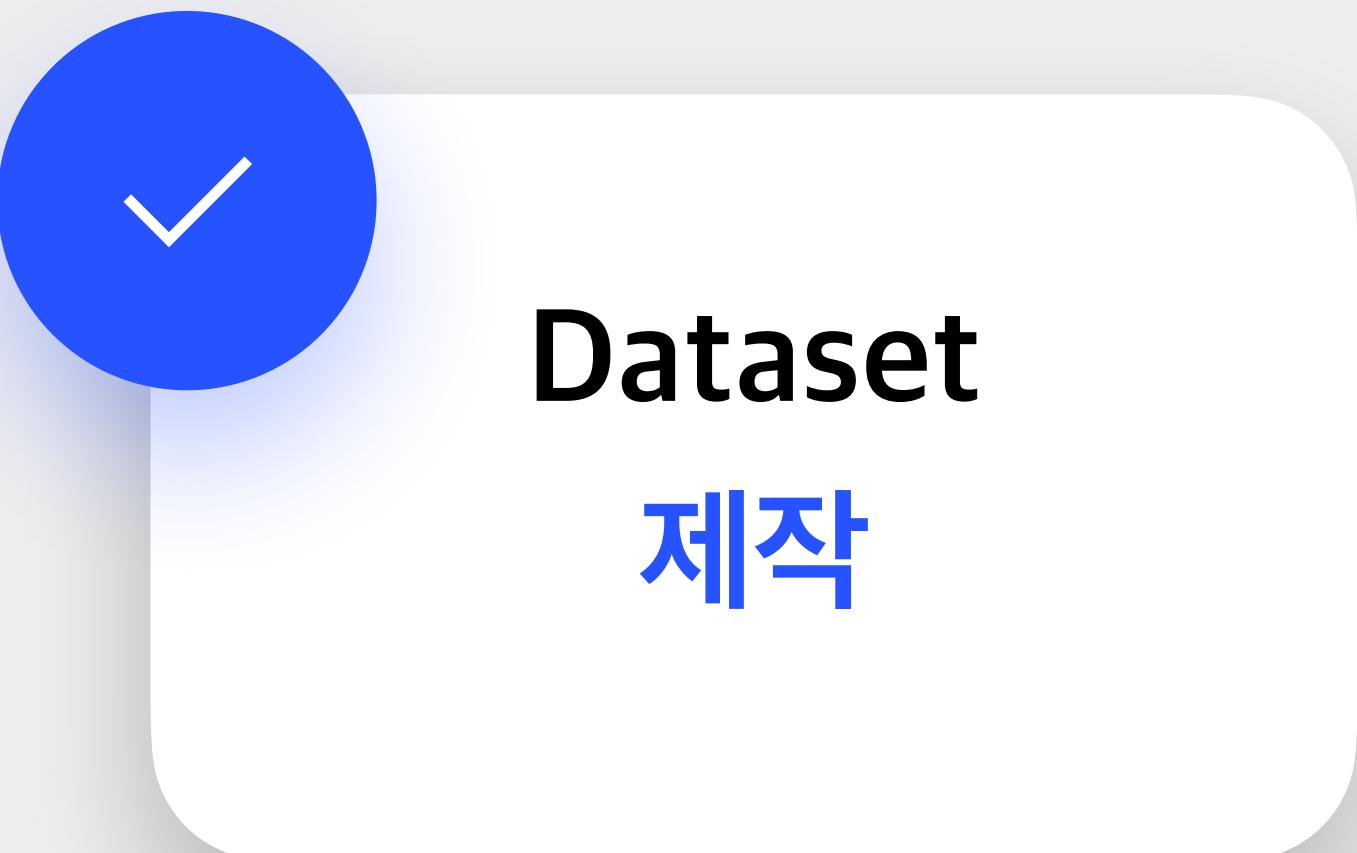
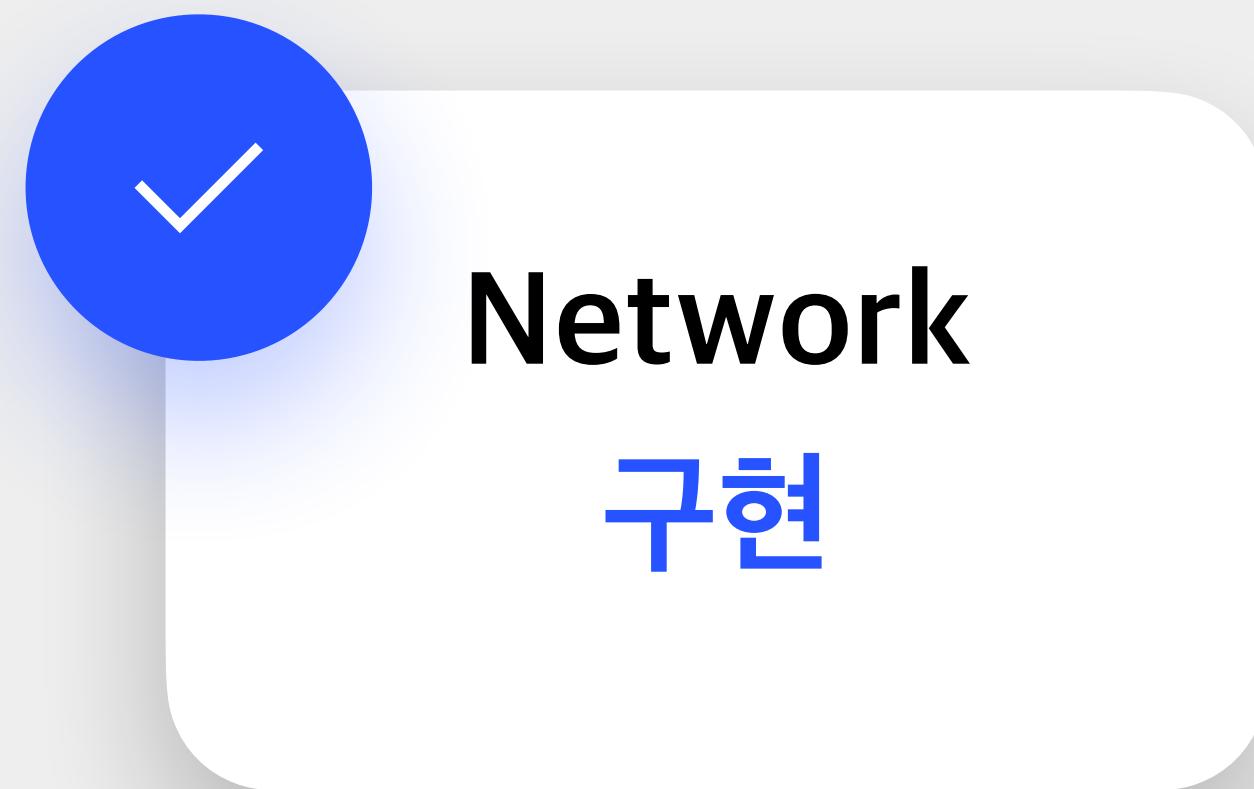
# Dataset



**Ground-truth**  
**144 x 144**

**Low-resolution Input**  
**32 x 32**

# Progress



# Training

## Resource

TitanXP in Cluster Server of  
Dept.CSE

## Hyperparameter

Initial LR

First decay step

Training set

Huber delta



TensorFlow



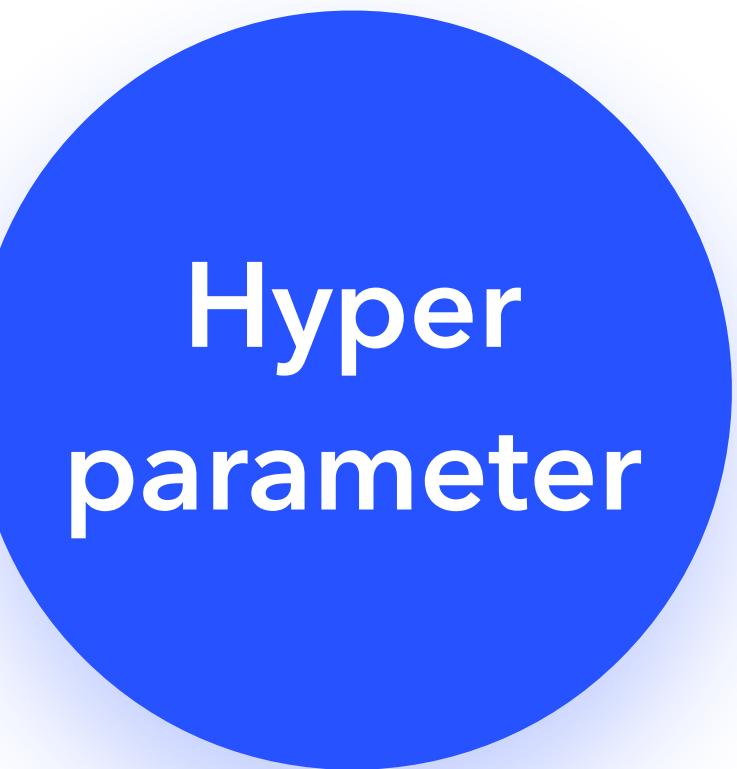
# Chapter 2.

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# Result



INIT\_LR = 0.005  
FIRST\_DECAY\_STEPS = 70  
TRAIN\_DATASET\_RATIO = 0.9  
HUBER\_DELTA= 200.0



사용자를 위한 웹 서비스 개발

Users can upload videos and download upscaled videos.

**Demo**  
web application

# Video Super Resolution

Computer Graphics Project Demo

파일 선택

선택된 파일 없음

Upload



# Demo

## Upscaling



# Video Super Resolution.

## Project Progress Report

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Computer Graphics, Spring, 2021.