

# Digital Image Processing

## Project #1 Face Detection using Viola Jones (VJ) Algorithm

Computer Vision Lab.  
Inha University

# Overview

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## ❖ Objectives

- ❖ To have hands-on programming practices in implementing the VJ algorithm using OpenCV and using Haar features to detect the faces.

## ❖ Goals

- ❖ Real-time face detector using VJ algorithm
- ❖ Performance evaluation of face detector

# Training

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## ❖ Face detection

- Use the GUI for training
- Use any face related datasets for training your Haar cascade classifier
- Also, include your team's self-made dataset in the training data alongside public dataset
- Team's self-made dataset MUST contain all your team members faces in different orientations, scales and illumination conditions
- Finally, use the trained model (cascade classifier for testing and evaluation)

# Testing & Evaluation

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## ❖ Face detection

- Size of image: 1024 x 768 (pixels)
- Problem 1: Find the minimum detectable size of faces
- Problem 2: Find the maximum detectable size of faces
- Problem 3: Find the average detection time
  - Per image
  - Per face

# Discussions

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- ❖ Write the Team-observations on the evaluations and comment on the performance of your detector w.r.t below aspects.
- ❖ Analyze the accuracy of the VJ detector in the presence of the *6 challenges* of Object detection
  - ◆ *Viewpoint variation*
  - ◆ *Deformation*
  - ◆ *Occlusion*
  - ◆ *Illumination conditions*
  - ◆ *Cluttered or textured Background*
  - ◆ *Intra-class variation*

# Submission

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## ❖ Must be a team report

### ❖ Submit to I-Class (team leader can submit on the behalf of whole team)

- ◆ Create a free GitHub Account for your team
- ◆ Upload the following to the GitHub account
  - **source code.py** file
  - **cascade classifier.xml** file
  - **report.pdf** file describing your work including each team member's FULL details (name, ID), contributions and other elements related to the project
  - **Self-made dataset (folder with .jpg images)**
  - **5 min demo video (.mp4)**
- ◆ Generate the GitHub Link and submit it in the I-class.

### ❖ Deadline: 31<sup>st</sup> October