

An abstract geometric pattern on the left side of the slide. It features a network of interconnected lines and dots in various colors including blue, green, yellow, orange, red, and purple. The lines form a complex web of triangles and polygons, some of which are highlighted with a glowing effect. The dots are small, circular nodes at the intersections of the lines. The overall effect is a dynamic, digital-looking structure.

Real-time Smile Detection

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Introduction

- Facial expressions used to indicate emotion
- Smile = Happy
- Emerging need in for smile detection
- photo selection - user analysis - patient feeling conditions
- Real-time reliability is an issue



Related Works

Malesevic & Jojic

- Haar Cascade
- Grey scale
- Standardised locations

Syaputra & Syamsuar

- Histogram equalisation
- Focuses on the colour of each block

Zhang, Huang, Wu & Wang

- Convolutional Neural Networks

Ali & Dua

- Amalgamation of geometric feature extraction (GFE)
- Regional local binary pattern (LBP)

Proposed Method

Pre-Processing

- GENKI-4K data-set
- Labeled: "smiling" / "non-smiling"
- Extract face cut-out (68-feature point algorithm)



Feature Extraction

- Histogram of Oriented Gradients
- Find Orientation + Magnitude
- Block size = 32x32
- 9 bins



Classifier

- Support Vector Machine
- Hyperplane to split 2 values
- 90% for training
- 10% for testing
- Accuracy = 87%

		Ground truth	
		Positive	Negative
Predicted results	Positive	True positive (TP)	False positive (FP)
	Negative	False negative (FN)	True Negative (TN)

$$F_1 = 2 \cdot \frac{PPV \cdot TPR}{PPV + TPR} = \frac{2TP}{2TP + FP + FN}$$

Results



Secondary Approach

Pre-Processing

- SMILES data-set
- Labeled: "smiling" / "not smiling"
- Convert 64x64 to 28x28

Classifier

- CNN (LeNet-5)
- 80 Training / 20 Testing
- Run for 20 epochs
- Accuracy = 91%

Feature Extraction

- Haar Cascade
- Find ROI of face
- Use gray scale for higher process speed



Results



References

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Listening!

