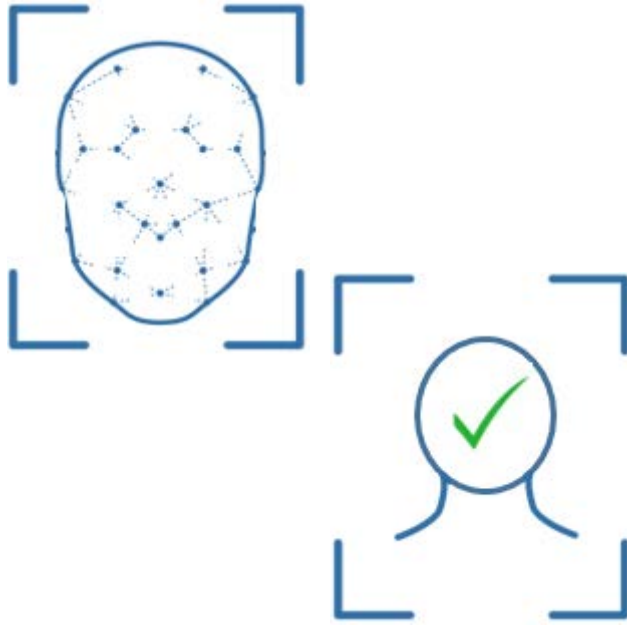




MPSxDC

Face Recognition

AI and Machine Learning Experiments



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Face Recognition

1. Background

Sarthak is a Mobile-Based Employee Management Solution for the government of Madhya Pradesh. It is used to manage Employee Attendance, Activity, Tour, Holidays etc..

Using Sarthak APP employees mark their attendance by taking selfie Photograph from their mobile device. There is a need to recognize whether or not the selfie photograph taken at the time of marking the attendance belongs to the same employee.

2. Problem Statement

Build a Machine Learning Algorithm to Detect a Face in an Input Photograph Image and find out whether or not it matches with the Face in the respective Base Photograph Image. If there is a Face Match, then calculate the Similarity Score between two photographs.

3. Methodology

Azure Machine Learning Algorithm offered by Microsoft Cognitive Services (**“azure-cognitiveservices-vision-face”**) have been used and in this experiment and following is the Process flow implemented for Face Recognition using the respective Microsoft Cognitive Services library.

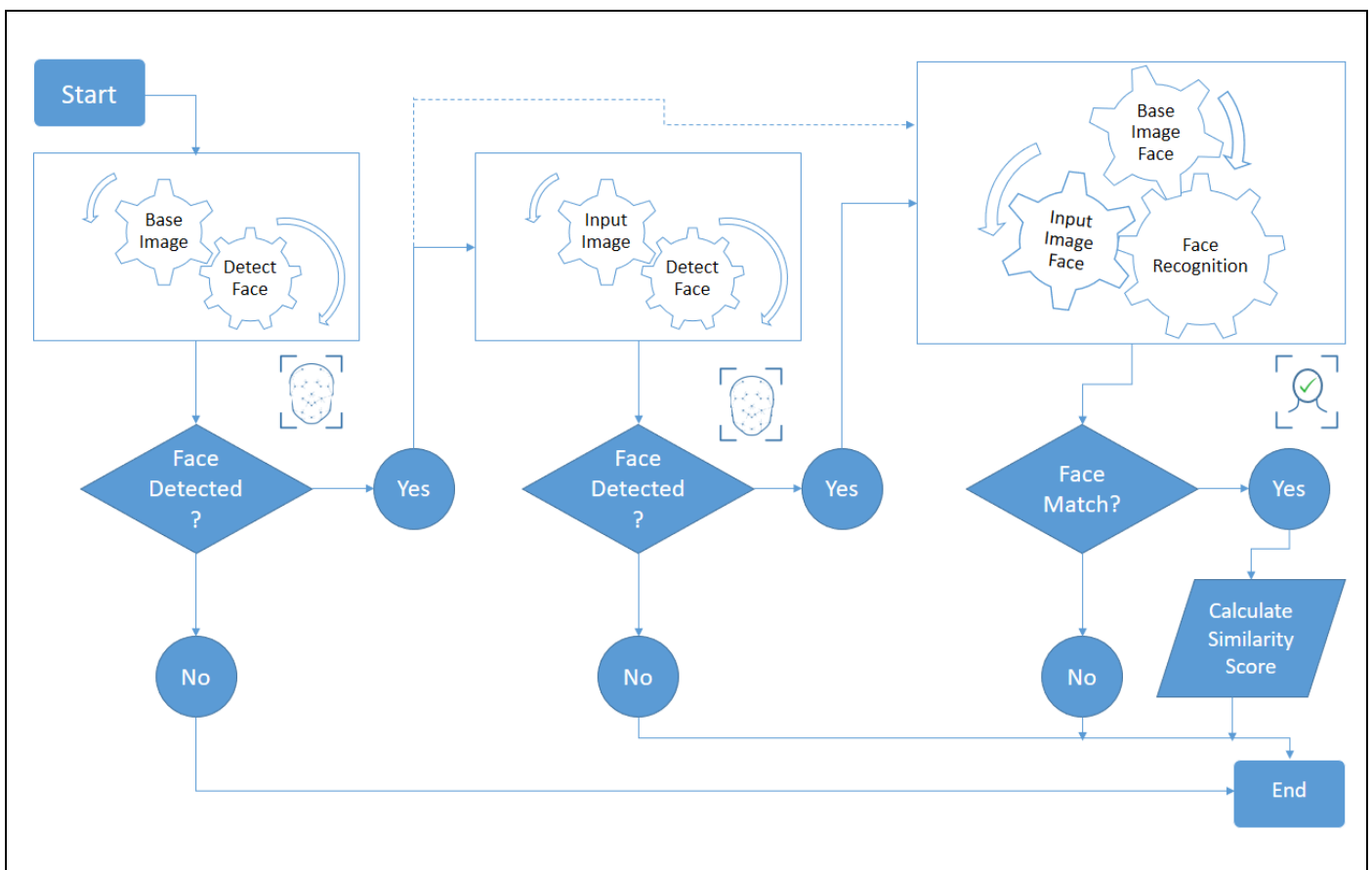


Figure 1 Face Recognition Process

4. Input Data

The Face Recognition Algorithm takes input data as images stored in a location accessible through web link URL as shown in the Figure 2 below.

4.1. Data Fields

'Input_Image' : - Image Path URL (The supported input image formats are JPEG, PNG, GIF for the first frame, and BMP.)

'Base_Image' : - Image Path URL (The supported input image formats are JPEG, PNG, GIF for the first frame, and BMP.)

Base_Image	Input_Image
https://.blob.core.windows.net/facec	https://.blob.core.windows.net/fa
https://i .blob.core.windows.net/facec	https://i .blob.core.windows.net/fa
https://i .blob.core.windows.net/facec	https://i .blob.core.windows.net/fa
https://i .blob.core.windows.net/facec	https://i .blob.core.windows.net/fa
https://i .blob.core.windows.net/facec	https://i .blob.core.windows.net/fa
https://i .blob.core.windows.net/facec	https://i .blob.core.windows.net/fa
https://i .blob.core.windows.net/facec	https://i .blob.core.windows.net/fa

Figure 2 Input Data

5. Output Result

Base_Image	Input_Image	Base Image Face Detect	Input_Image_Face_Detect	Similarity_Score
https://mpsedc6161308471.k	https://i	1.blob.core.windows	https://re.wi	0.7167287
https://mpsedc6161308471.k	https://i	1.blob.core.windows	https://i e.wi	0.6146962
https://mpsedc6161308471.k	https://i	1.blob.core.windows	None	0
https://mpsedc6161308471.k	https://i	1.blob.core.windows	https://re.wi	0.850254
https://mpsedc6161308471.k	https://i	1.blob.core.windows	https://re.wi	0.7380087
https://mpsedc6161308471.k	https://i	1.blob.core.windows	None	0
https://mpsedc6161308471.k	https://i	1.blob.core.windows	https://i e.wi	0.5685071

Figure 3 Output Results






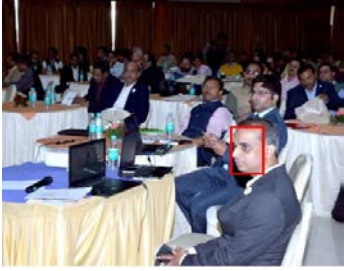









Base Image	Input Image Face Detected	Input Image Face Detected	Input Image
			
	Similarity Score 0.71, 71% Match	Similarity Score 0.73, 73% Match	Similarity Score 0.85, 85% Match

Table 1 Sample Output Result with Images

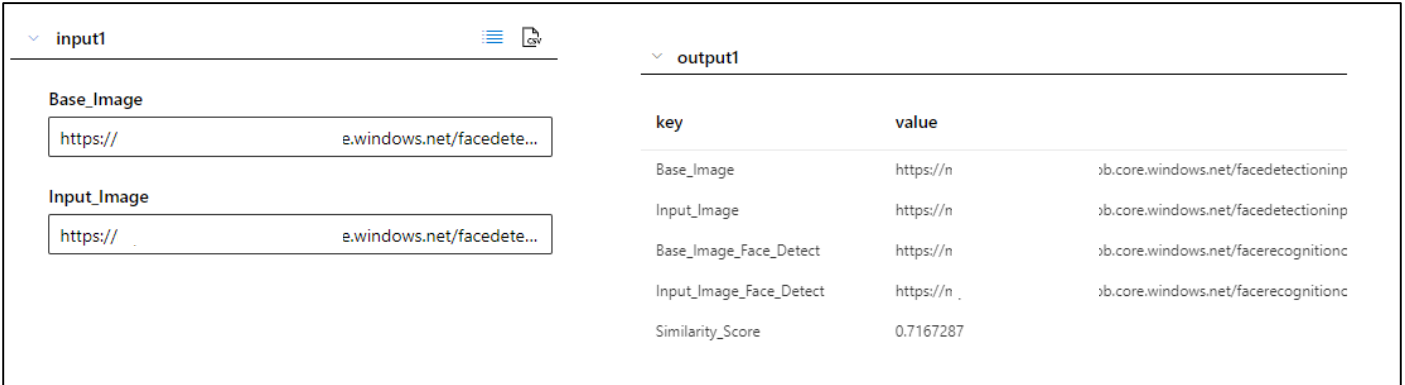
Base Image	Input Image Face Detected	Input Image Face Detected	Input Image Face Detected
			
	Similarity Score 0.56, 56% Match	Similarity Score 0.61, 61% Match	Similarity Score 0, No Match Found

Base Image	Input Image Face Detected	Input Image Face Detected	Input Image Face Detected
			
	Similarity Score 0.65, 65% Match	Similarity Score 0.68, 68% Match	Similarity Score 0.52, 52% Match

Base Image	Input Image Face Detected	Input Image Face Detected
		
	Similarity Score 0.68, 68% Match	Similarity Score 0.61, 61% Match

6. Deployment and Consumption

The Face Recognition process have been deployed in Microsoft Azure Kubernetes Cluster and the Endpoints have been provided for integration with Sarthak APP



input1		output1	
Base_Image	https:// e.windows.net/facedete...	key	value
Input_Image	https:// e.windows.net/facedete...	Base_Image	https://n >b.core.windows.net/facedetectioninp
		Input_Image	https://n >b.core.windows.net/facedetectioninp
		Base_Image_Face_Detect	https://n >b.core.windows.net/facerecognitionc
		Input_Image_Face_Detect	https://n >b.core.windows.net/facerecognitionc
		Similarity_Score	0.7167287

Figure 4 Web API Input and Output

6.1. Web API Input

The Web API takes 02 inputs

Input_Image – Image Captured while marking attendance by the employee

Base_Image – Image Captured from the Employee Profile

6.2. Web API Output

The Web API provide Output Result as

Input_Image_Face_Detect – Image with Rectangle drawn on the Face in Input_Image

Base_Image_Face_Detect – Image with Rectangle drawn on the Face in Base_Image

Similarity_Score – Value between 0 to 1 (indicates matching between face of Input Image and Base Image)

7. References

- <https://docs.microsoft.com/en-us/azure/cognitive-services/face/>
- <https://docs.microsoft.com/en-us/learn/modules/detect-analyze-faces/>