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Coupled VOF and level set method in OpenFOAM⋆

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ABSTRACT

Motivated by the need to precisely capture the interface in the fuel and coolant reaction, a coupled level set and volume of fluid method (VOF) is implemented into OpenFOAM, the open source CFD code, for calculating incompressible two-phase flow. IsoAdvector as a VOF method using the concept of isosurface was implemented as an OpenFOAM extension and published as open source. This article takes isoAdvector method as the main VOF method and couples it with level set method. Use the level set function to calculate the normal direction and use the VOF function to calculate the void fractions of each cells. The coupled VOF and level set method can be used on both structured and unstructured meshes.

1. Introduction

The application of interface flow solver. bubble, droplet, water wave, jet break and so on.
The main method of interface capturing. VOF,front tracking, level set, coupled vof and level set.

1.1. Volume of fluid methods

Algebraic VOF. Geometrical VOF.

1.2. Level set methods

Level set function. WENO scheme. Reinitialization function.

⋆This is my first English paper.
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[1]This is author footnote for second author.

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Table 1. Summary of different works pertaining to face and speech fusion

Study	Algorithm used	DB Size	Covariates of interest	Top individual performance	Fusion Performance
UK-BWG (Mansfield et al., 2001)	Face, voice: Commercial	200	Time: 1–2 month separation (indoor)	TAR* at 1% FAR# Face: 96.5% Voice: 96%	–
Brunelli (Brunelli and Falavigna, 1995)	Face: Hierarchical correlation Voice: MFCC	87	Time: 3 sessions, time unknown (indoor)	Face: TAR = 92% at 4.5% FAR Voice: TAR = 63% at 15% FAR	TAR =98.5% at 0.5% FAR
Jain (Jain et al., 1999)	Face: Eigenface Voice: Cepstrum Coeff. Based	50	Time: Two weeks (indoor)	TAR at 1% FAR Face: 43% Voice: 96.5% Fingerprint: 96%	Face + Voice + Fingerprint = 98.5%
Sanderson (Sanderson and Paliwal, 2002)	Face: PCA Voice: MFCC	43	Time: 3 sessions (indoor) Noise addition to voice	Equal Error Rate Face: 10% Voice: 12.41%	Equal Error Rate 2.86%
Proposed study	Face, voice: Commercial	116	Location: Indoor and Outdoor (same day) Noise addition to eye coordinates	TARs at 1% FAR Indoor-Outdoor Face: 80% Voice: 67.5%	TAR = 98% at 1% FAR

*TAR–True Acceptance Rate # FAR–False Acceptance Rate

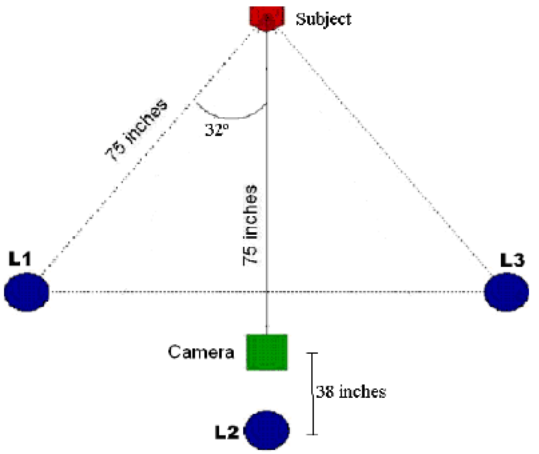

Fig. 1. Studio setup for capturing face images indoor. Three light sources L1, L2, L3 were used in conjunction with normal office lights.

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   2..1 A subentry
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- A bulleted list item
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$$S'_{\mathrm{pg}} = \frac{S_{\mathrm{pg}} - \min(S_{\mathrm{pG}})}{\max(S_{\mathrm{pG}} - \min(S_{\mathrm{pG}})} \tag{1}$$

In mathematical expressions in running text "/" should be used for division (not a horizontal line).

Acknowledgments

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Supplementary Material

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