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| **Dual-Stream Reconstruction Error-Based Face Forgery Detection via Spatial Center Masking and Wavelet Diffusion​** | | |  |
| Aaa Surname1\*, Bbb B. Surname2, Ccc C.C. Surname3 | | |  |
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| https://doi.org/10.18280/ts.xxxxxx |  | **ABSTRACT** | |
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| **Received:**  **Revised:**  **Accepted:**  **Available online:** |  | Deepfake detection still suffers from generalization issues, and the advancement of generative models—particularly diffusion models—poses new challenges. To address this, we propose a dual-stream reconstruction error method based on spatial center masking and wavelet diffusion, which significantly improves detail reconstruction and computational efficiency through two complementary mechanisms. In the spatial domain, center-masked reconstruction forces the model to focus on local detail generation by computing pixel-level errors between original and reconstructed images in masked regions, enhancing sensitivity to fine discrepancies. In the frequency domain, wavelet diffusion explicitly optimizes texture recovery through high-frequency subband residual reconstruction. Compared to traditional global diffusion, these methods reduce computational costs by 60% and 75%, respectively, while dual-stream error supervision enables the detector to achieve both spatial locality awareness and frequency-domain texture fidelity, significantly boosting detail error detection without compromising inference efficiency.​ | |
| ***Keywords:***  Deepfake detection*,* Diffusion model*,* reconstruction error  *(no more than 8 keywords)* |  |

# Introduction

Throughout the main text, please follow these prescribed settings: 1) the font is mostly Times New Roman; 2) almost all the words are typed in 10 points; 3) each line throughout the paper is single-spaced; 4) in most cases, 10 pts spacing shall be left above and below any heading, title, caption, formula equation, figure and table.

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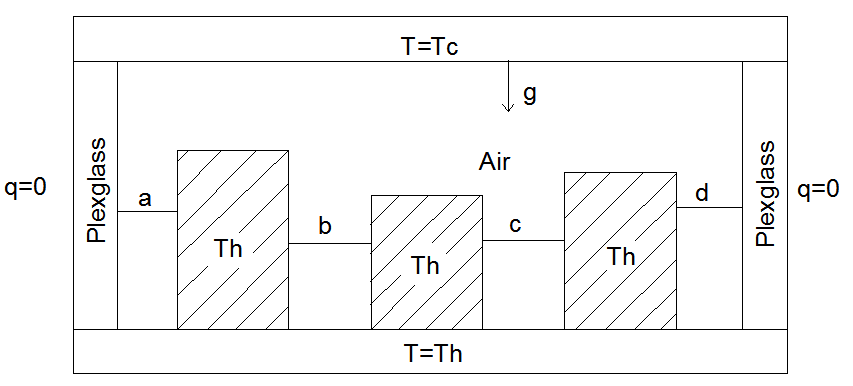
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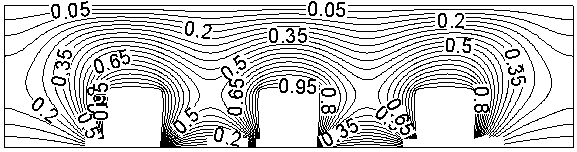
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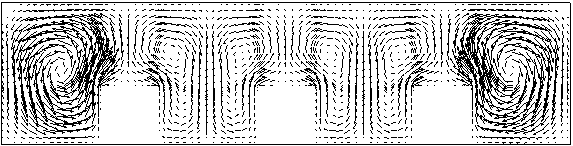
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**Figure 1.** Cavity geometry



(a) Temperature field



(b) Velocity vector field

**Figure 2.** Three heat sources

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5. Bentley, R.E. (1998). Handbook of Temperature Measurement Vol. 3: The Theory and Practice of Thermoelectric Thermometry. Springer Science & Business Media.
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7. SIMUL8 Corporation. SIMUL8 – Process Simulation Software. http://www.simul8.com/, accessed on Jan. 17, 2015.
8. Reber, E.E., Michell, R.L., Carter, C.J. (1988). Oxygen absorption in the earth’s atmosphere. Technical Report TR-0200 (4230-46)-3. Aerospace Corporation, Los Angeles, California, USA.
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**NOMENCLATURE**

|  |  |  |
| --- | --- | --- |
| B | dimensionless heat source length | |
| CP | specific heat, J. kg-1. K-1 | |
| g  k | gravitational acceleration, m.s-2  thermal conductivity, W.m-1. K-1 | |
| Nu | local Nusselt number along the heat source | |
| **Greek symbols** | |
| α | thermal diffusivity, m2. s-1 |
| β | thermal expansion coefficient, K-1 |
| φ | solid volume fraction |
| Ɵ | dimensionless temperature |
| µ | dynamic viscosity, kg. m-1.s-1 |
| **Subscripts** | |
| p | nanoparticle |
| f | fluid (pure water) |
| nf | nanofluid |

**APPENDIX**

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