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Benchmarking Convolutional Neural Network on LSST-Like Strong-Lensing Simulations

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ABSTRACT

Add abstract here.

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1. INTRODUCTION

Gravitational lensing takes place when a massive object (such as a galaxy cluster) warps the fabric of space-time, causing light rays to bend, distort, and magnify much like an optical lens. Einstein was the first to describe this prediction in his general theory of relativity, which puts together space and time into a single four-dimensional space-time, whose curvature manifests as gravity. Within this framework, light travels along curved geodesics through the warped space-time, producing magnified and warped images of background sources.

Today's large-scale sky surveys, such as LSST, Euclid, and WFIRST, will generate petabytes of imaging data, making manual lens identification impractical and prone to errors. Deep convolutional neural networks provide an automated, scalable solution to detect and classify strong-lensing events (**?**).

2. DEEP LEARNING FRAMEWORK

3. METHODOLOGY

3.1. *Lens Simulation*

3.2. *Data Preprocessing and Normalization*

3.3. *Architecture of* `LensNet`

3.4. *Training Procedure*

4. VALIDATION PERFORMANCE

5. DISCUSSION

6. FUTURE WORK

7. CONCLUSION

8. ACKNOWLEDGEMENTS

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