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Deep Learning-Based Visual-Binary Source Detection in Stamp Images from Multiple Surveys

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We present a deep-learning approach for detecting visual-binary sources within 2.5 arcsecs in stamp images from various surveys. The aim is to develop a robust model that identifies the presence or absence of visual-binary sources. The process involves several stages including data preparation, model selection, training, evaluation, and deployment. Stamp images from multiple surveys are annotated with binary labels, indicating the presence or absence of the visual-binary sources. A deep learning model, chosen from state-of-the-art object detection architectures, is trained to learn distinctive features of binary sources. Hyperparameter tuning and validation are performed to optimize model performance. The trained model is evaluated on a separate testing dataset to assess its generalization ability. Once deployed, the model is utilized to detect visual-binary sources in stamp images from different surveys. Post-deployment monitoring ensures the model's effectiveness in real-world scenarios, with ongoing iterations for continuous improvement. Through this approach, we aim to provide a reliable and efficient solution for visual-binary source detection across diverse survey datasets, facilitating scientific research and analysis in astronomy and related fields.

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