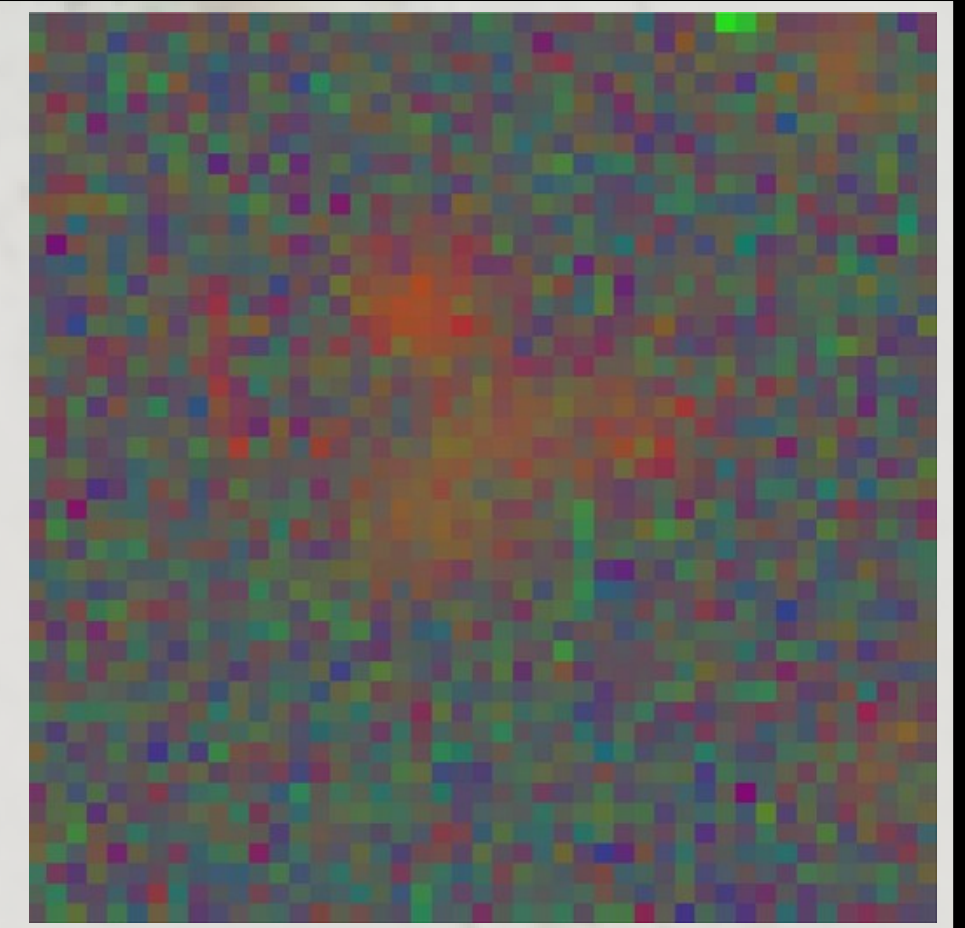




DeepGraviLens: a multi-modal architecture for classifying gravitational lensing data

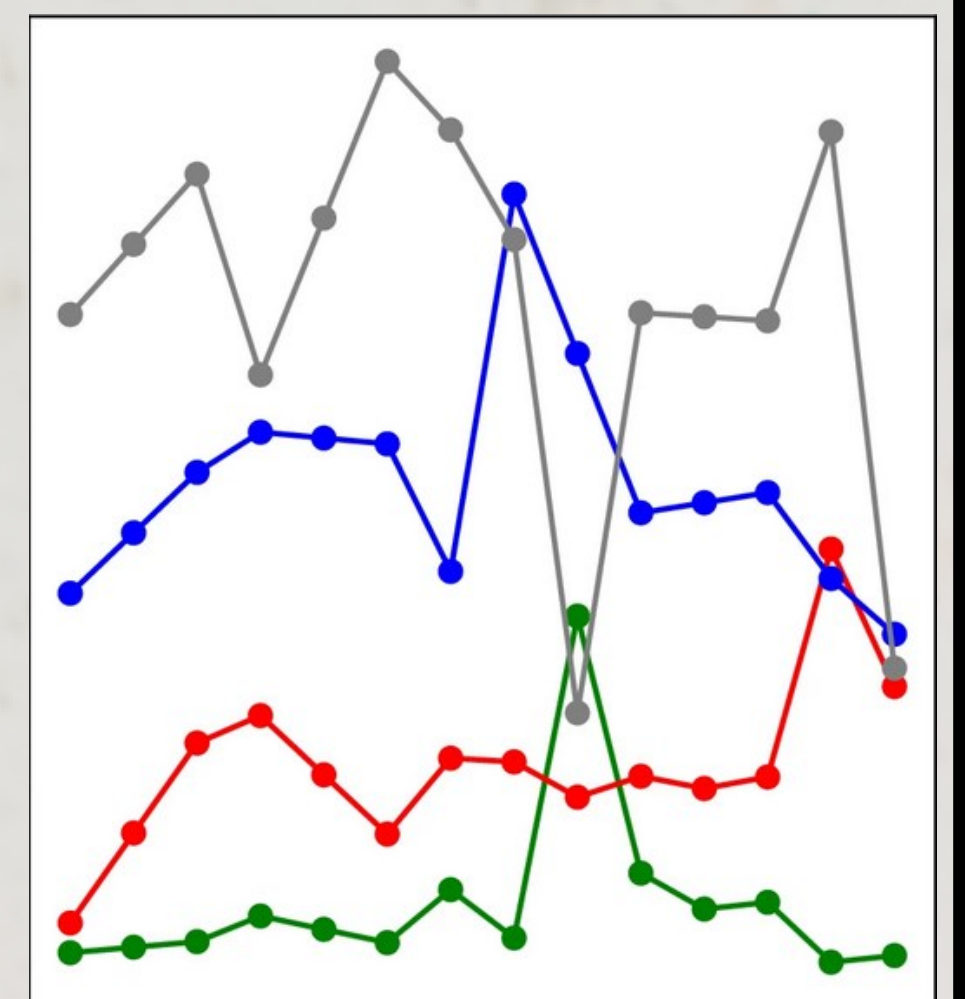
Goal: finding gravitational lenses of transients

- **Why:** transients are **time-dependent** \Rightarrow images and time series to capture their **evolution**
- **Tools:** **ensemble** of **multi-modal** neural networks for multi-class classification (no lens, galaxy-galaxy lens, lensed SNIa, lensed SNCC)
- **Results:** better **accuracy** (up to **+11%**), successful testing on real data
- **Ongoing work:** fine-grained classification, redshift estimation

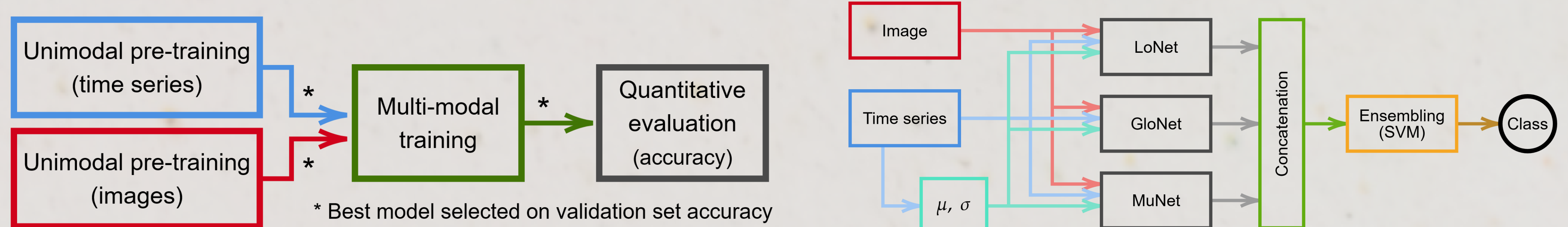


Datasets

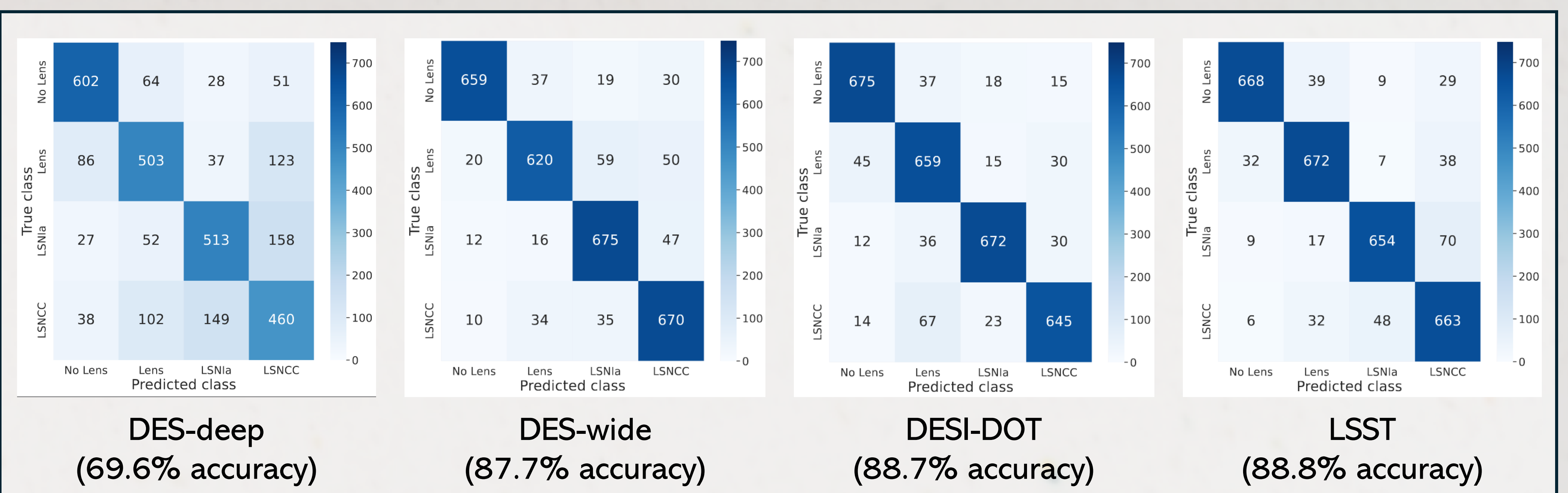
4 datasets (DESI-DOT, LSST, DES-deep, DES-wide)	4 classes (no lens, galaxy-galaxy lens, lensed SNIa, lensed SNCC)	20,000 simulated observations per dataset	Test on 3,000 simulated observations and real observations
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Method



Results



Conclusions

- **Multimodality** is useful (up to **+7.3%** accuracy wrt single modality)
- Subnetworks are **complementary** (\Rightarrow **ensembling** improves accuracy up to **+12%**)
- Overall **improvement** wrt state of the art (**+11%** accuracy)
- Successful test on 3 **real** gravitational lenses
- Ongoing work on multi-output regression:
 - Redshift estimation
 - Finer-grained classification