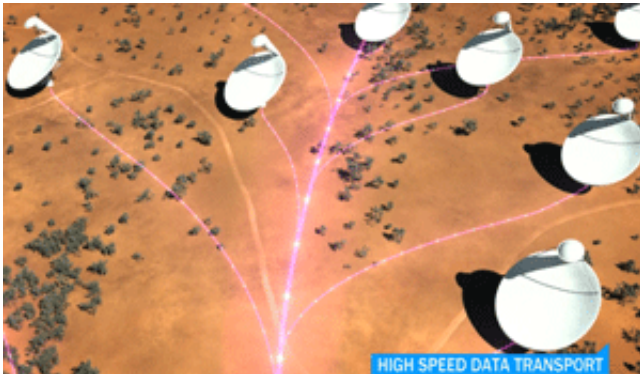


# Computers beat brainpower when it comes to counting stars

16 April 2014



A team of University of Sydney astronomers has developed a new way to automatically classify huge numbers of astronomical objects, and to discover new, exotic ones almost as soon as they happen.

Massive torrents of [raw data](#) are now collected by telescopes on a daily basis creating an urgent need to massively accelerate the reliable classification of millions of [stars and galaxies](#), and to quickly highlight objects that might be [new discoveries](#) or that have unusual properties.

"Next generation telescopes like the Square Kilometre Array will produce enough raw data to fill up 15 million iPods every day," said Kitty Lo, lead author of the research just published in *The Astrophysical Journal*.

"It will be too much for humans to sift through, and this is where computer classification comes in," said Ms. Lo.

Ms. Lo completed the research as part of her PhD thesis at the ARC Center of Excellence for All-sky Astrophysics (CAASTRO) at the University of Sydney.

"We were particularly interested in finding objects that suddenly appear and then disappear," said co-author Dr. Tara Murphy, from the University's School of Physics.

These transient sources can represent entirely new phenomena, but can easily get buried in the many thousands of gigabytes of data generated by modern observatories. Astronomers need to find them as soon as they happen, so they can be studied with other telescopes before they fade away.

"Using a catalogue of known objects with existing classifications, we trained our software to recognize the flaring and bursting patterns of more than 800 objects, and to sort them into classes such as black holes, binary stars and supernova explosions," said Dr. Murphy.

The researchers then put their software to the test, confronting it with 400 new objects that needed to be identified and classified.

"Computer classification tends to be much better than humans at finding subtle patterns in data sets, especially if there are many similar categories," said Ms. Lo.

"Our software performed extremely well and matched the manual analysis in almost all cases. And crucially, it was much faster than any human ever could be."

Not only did their software catalogue stars and galaxies extremely accurately and efficiently, it also singled out a number of strange objects that could not be classified and which could hold the key to new discoveries.

Detailed study of unusual objects will still remain the task of the human researcher. However, automatic classification can now let astronomers find exciting events as they happen.

**More information:** Paper: Kitty K. Lo, Sean Farrell, Tara Murphy, Bryan M. Gaensler "Automatic classification of time-variable X-ray sources", published in the *Astrophysical Journal* 786 [dx.doi.org/10.1088/0004-637X/786/1/20](https://doi.org/10.1088/0004-637X/786/1/20)

Provided by University of Sydney

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