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As an early career researcher, many of the important innovations in computing that I have witnessed have arrived hand-in-hand with my learning of the field. As such, I see polar remote sensing growing very quickly from increased computational capacity as well as my own increased understanding. From this lens, I think some of the most important advances in computing facilitating polar remote sensing are:

**Increased capacity in everything:** Download speed (wired, wireless, and from remote sensors), storage space, memory, etc. The ability to collect, transmit, store, and use larger datasets has been transformational. On a very small scale, I don't have to tile a Landsat scene before processing it in MATLAB. On a larger scale, Landsat 8 collects orders of magnitude more data than its predecessors. The growth in the capacity of consumer computers, (non-)commercial software, and network infrastructure to handle larger volumes, higher precision, and faster speed enables more and better science than before.

**Cloud-based processing:** The ability to access centrally-held datasets and run jobs using cloud-based services has reduced the need for researchers and institutions to have to handle computing infrastructure. I can let Google/ Amazon do that, while I focus my time on the data, processing, and conclusions instead. This has transformational power – using the entire Landsat record is not something I could do on my own before, but now I can.

**High-quality free software:** The ability to perform high-quality, complex analysis at low cost and with community support is key to enabling the research that I do. The fact that there are now free alternatives where there only used to be expensive commercial solutions lets me try out new things, pushes forward the ability of the entire community to use advanced tools, enhances customizability, and use more complex tools in teaching. When funding is available for a core developer group, this becomes even more powerful.

From my limited understanding of computer science, challenges/suggestions that would benefit from innovations in intelligent and information systems research include:

**Simplification of (semi-)intelligent classification algorithms:** I have seen many papers using neural networks or other similarly complex classification techniques (VS. clustering algorithms or decision trees). However, these are largely non-starters because of the (perceived) complexity of implementing any of these approaches. Making these tools simpler would allow for more nuanced application by a wider variety of researchers.

**Intelligent data cleaning:** Cleaning up data, removing up noise, identifying spurious measurements – this is key in processing actual field data or observations. But doing it often takes testing out a lot of different strategies, parameters, etc. The results of what is "most successful" ARE often just determined by an "expert" anyway. Being able to reliably automate data cleaning would be both more efficient and more reproducible.

**Natural language pre-processing:** Bringing datasets together into the same format/grid/timesteps so that real analysis can begin takes a lot of time in its own right. The ability to give natural language (or easy input) requests for gridding/extent/ timeframe/etc. of a new dataset and have this sort of processing automated would save a lot of research hours. An easy tool like this would also create reliable standards for the community to use, thus making research intercomparison easier, too.