This is my title and I like it

Student A and Student B

Problem

Figure: Visualization of protein-protein interaction (left) and brain connectome networks (right). *Credit: ANAP Tutorial and Pew-Thian Yap*

Complexity Hierarchy

Reduce computational complexity by introducing a parameter

- *Natural parameter*: Size of solution (e.g. a clique of size k)
- *Structural parameter*: Graph invariant (e.g. treewidth k)

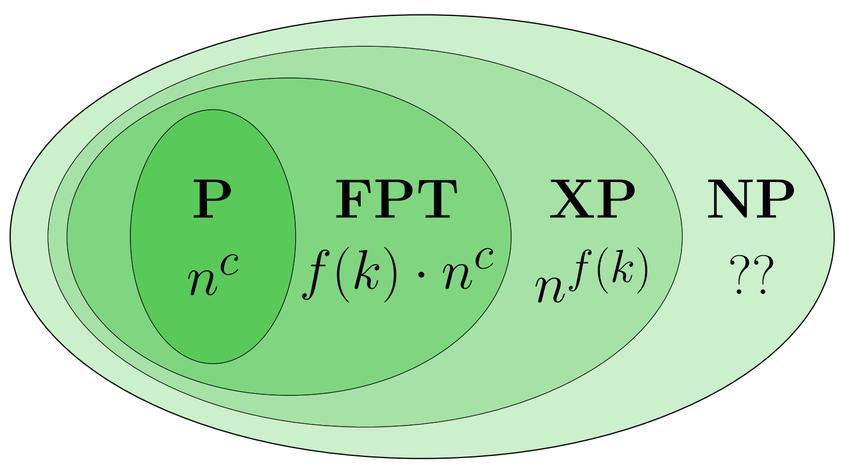

Figure: Relationship between various complexity classes. It is unknown whether there are problems in NP that do not admit any polynomial time algorithm.

Related Work

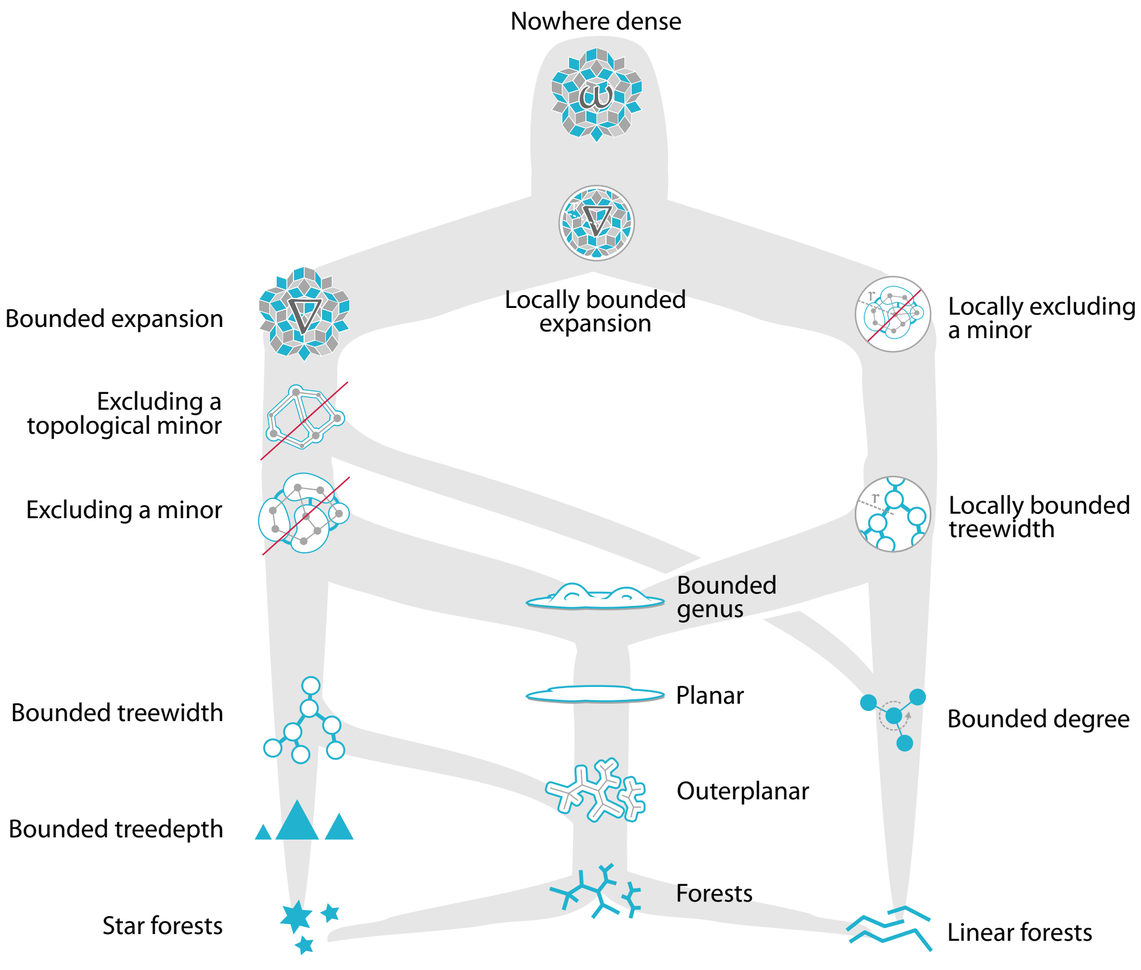

Figure: Sparse graph hierarchy. Each class admits parameterized algorithms that exploit its structural properties. *Credit: Felix Reidl*

Research Ideas

Great Ideas!

Diverse set of FPT techniques, including:

- **Kernelization:** Transform instance into a smaller, equivalent instance of size $f(k)$ in polynomial time
- **Randomization:** Random branching will give correct solution with high probability after $f(k)$ trials
- **Iterative Compression:** Starting with a solution of size $k+1$, quickly find a solution of size k or smaller