Project Proposal: National Hockey League Network Analysis

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1. **Nodes and Links**

   Nodes: Individual players
   Links: The link between players if they have been deployed together for a significant (>600 minutes in a season) time at 5-on-5. Additionally, the network will likely be a directed multigraph, to accommodate for potentially asymmetric effects that players may have on each other for a variety of different performance metrics.

2. **Dataset**

   Data is extracted from https://moneypuck.com/data.htm. It includes players as well as every line combination with significant sample (>600 minutes) on a season-by-season basis. This information in turn comes from the NHL API but is in a slightly pre-processed format to make the information more available.

3. **Expected size of the network**

   Estimated number of nodes: ~2000. 1000 players played in the NHL last year. Since the number of teams has been relatively stable and each draft brings in about 100 new players each year, over a 10-year period we can estimate to have around 2000 nodes.
   Estimated number of edges: 10000+. Each player plays with at least 1 partner, often more each season.

4. **Questions we plan to ask and why we care?**

   - What players are the most/least effective at increasing the effectiveness of their linemates?
   - Are there players that notably affect linemates in specific metrics such as defensive or offensive play?
   - Are there potentially more effective player deployments that synergize more effectively?
   - Can a player's synergistic effects with other players be inflating/deflating their contract value?

   Sports leagues are hyper competitive and feature large amounts of generated value for ownership groups and local communities. It is consistently shown that more successful teams competitively have immediate financial successes as well. The current state of hockey analytics is largely focused on individual contributions. We hope to contribute a formal quantification of this currently subjective effect with the effects that players can have on each other.