

USU Data Science & Statistics Seminar



A network flow mixed integer approach to resource allocation for satellite constellation imaging missions

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Abstract: Satellite constellations have been conducting operations in space since the early 1960s when the CORONA mission became operational. Since then, a number of additional constellations have been flown for a diverse number of applications. While many of the individual satellites are shrinking in mass, volume, and cost, the constellations continue to grow in numbers, capability, and sophistication, requiring increased levels of automation to properly cooperate in accomplishing their objectives. As these numbers grow, the problem complexity compounds due to the spatial and temporal dependencies present within the constellation's operational environment, as well as from the limitations of individual satellites such as slew agility and memory resources available during flight. This presentation will explore a network flow formulation to coordinate the constellation in an earth imaging mission. An optimal mixed-integer formulation and suboptimal greedy graph search are compared and simplifications presented using a graph theoretic approach.

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