Title: Antenna Array Design and Processing for Super-resolution Imaging Radar

This invention generally relates to antenna array design, including both 1D and 2D arrays, and angle estimation method in super-resolution imaging radar systems that requires less array elements, less computation complexity and yet higher resolution.

In this patent, novel array design and signal processing methods are presented in order to achieve 2D high resolution with compact array form factor, less antenna elements and efficient computation. The array configuration invented in this patent is a hybrid sparse and dense array and each of them has uniform array structure so that efficient computation can be exploited.

This invention presents a new sparse array design and signal processing method to achieve high resolution 2D DOA estimation in radar. The invention designs hybrid sparse array in azimuth and elevation so that high resolution can be achieved with less number of antenna elements. Meanwhile, the unique array design is paired with efficient signal processing algorithm that estimates the azimuth and elevation without ambiguity. In short, this invention codesigns the array configuration and the signal processing algorithm to meet the requirements on high resolution performance and low complexity for 2D DOA estimation.

No suitable figure