**Paper: Counter-Jamming Using Mixed Mechanical and Software Interference Cancellation**

**Summary**:

This paper talks about the design, prototyping and evaluations of a system built for cancelling jammers significantly more powerful than transmitting node. The system used operates in two stages, one being a two-element dynamically reconfiguring antenna which can be mechanically steered and weakens jammer signal by unto 28dB and the other part being digital jamming cancellation that further eliminates jamming signal using a single element antenna to develop MIMO like interference cancellation techniques, that don’t rely on training sequences and result in reliable communication by reducing overall jammer impact by 48dB. This system is dependent on the performance of the configuration algorithm and digital interference calculation algorithm.

**Strengths**:

1. The proposed system is independent of prior knowledge of preamble, training sequence or jammer location and jamming power, this makes a considerable increase in robustness and flexibility since it can detect and mitigate jamming signals without relying on specific signal properties or assumptions, without the need for customization or tuning to specific jammer types or signal properties. This can save time and resources in deploying and maintaining anti-jamming solutions.
2. The use of a two-element antenna allows for greater flexibility in the antenna design and provides redundancy in case one of the elements fails since each part is providing some amount of original signal.
3. By not relying on training sequences, the system is better able to handle rapidly changing interference conditions and adapt to new types of jamming signals.

**Weakness**:

1. The main assumption of the proposed system working is based on the fact that jamming is taking place in presence of a single antenna/jammer, which doesn’t change position when jamming. The system isn’t evaluated in case a combination of multiple antennas for jamming are used.
2. The current fast algorithm for unknown node locations does not take into account any prior knowledge or information about the search space. Incorporating prior knowledge, such as the expected range or distribution of the node locations in search space can help reduce the search space and improve the efficiency and accuracy of the algorithm.
3. The digital interference calculation for a variable power jammer depends on the fact that antenna configurations are constant throughout the collision period. In case of outdoor environment, factors like wind, vibrations or misalignments from installations can affect the steerable antennas, even a slight change in either of their orientation would result in a totally different range of Lmin, Lmax and angle boundaries.