

Stima DOA mediante approccio SVM: Analisi element failure

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Abstract

Negli ultimi anni, lo sviluppo dei sistemi di telecomunicazioni ha fatto sì che il numero di utenti che possono interagire contemporaneamente con la stessa stazione base sia elevato. E' quindi necessario sviluppare metodi efficienti che siano in grado di effettuare il tracking degli utenti desiderati. Ciò può essere effettuato mediante l'utilizzo di array di antenne in grado di posizionare il massimo del diagramma di radiazione nella direzione dell'utente desiderato e i minimi nelle direzioni degli interferenti. La stima delle direzioni d'arrivo (DOA) dei segnali incidenti sull'array gioca quindi un ruolo fondamentale.

In quest'ambito, risultati promettenti sono stati recentemente ottenuti mediante l'utilizzo di tecniche "Learning-by-Examples" (LBE), e in particolare di Support Vector Machines (SVM). Tale metodolgia permette di ottenere stime real-time delle DOA a partire dalla conoscenza delle tensioni misurate sugli elementi dell'array (e quindi della corrispondente matrice di covarianza).

La geometria dell'array riveste un ruolo fondamentale nel processo di stima. In particolare, le prestazioni possono cambiare notevolmente al variare della posizione o del numero di elementi che compongono l'array. Per applicazioni reali, va inoltre considerata la possibilità che uno o più elementi possano guastarsi. L'obiettivo del progetto è analizzare le prestazioni del metodo di stima basato su SVM al variare del numero di elementi guasti. Tali elementi potranno essere scelti in maniera random e/o deterministica.

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