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Mobile communication Systems with application to Smart Antenna

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Abstract

A singular technique to realize a smart antenna has been offered. The traits of clever antenna have also been described. The performances of the simulated clever antenna have been studied. Clever antenna era gives range extension, extended data price, higher community capability and higher carrier pleasant.

Key-words: *Smart antenna, Mobile communication, &Radiation pattern*

Introduction

The wide variety of remote sensors used in ITs applications (loops, probe vehicles, radar, cameras, etc.) is not as accurate as a stationary analyzer transportation system [1].Broadband wireless systems play an increasingly important role in Intelligent Transportation Systems (ITS) by providing high speed wireless links between many ITS subsystems [2]. Smart antennas can greatly enhance the performance of wireless systems and fulfill the requirement of improving coverage range, capacity, data rate and quality of service [3]. Responsibility lies with the ITS designer to understand the working of a particular smart antenna before it is used for the intended operating environment. In the following sections we will discuss types and working of smart antennas and how they are used in Intelligent Transportation Systems.

Basics smart antenna:

The term clever antenna is used within the wi-fi industry to symbolize many sign processing technologies that use more than one antennas on one or both ends of the wi-fi conversation link. Clever antennas have advanced abilities.It can also provide array to increase range, diversity gain to improve performance under fading, and interference cancellation capabilities to increase capacity and to improve the quality of the wireless link (3) Smart antennas can also be used to increase data rate, through delivery of higher SINR (Signal to Noise plus Interference Ratio) to the user or through spatial multiplexing. The smart antenna which combines the signals from the multiple antennas to maximize SINR (Signal to Interference plus Noise ratio).

Fully adaptive array not only gets the maximum diversity gain and array gain, but also cancels the interferences caused by different antenna elements. Due to its superior interference cancellation capability, fully adaptive array can reduce the frequency reuse of cellular wireless systems effectively increasing network capacity [4]. With fully adaptive array, spatial channels (two or more users sharing the same conventional channel), also known as Spatial Division Multiple Access can be implemented in the same cell, further increasing spectral efficiency.

Smart Antenna for vehicle communication

Road to vehicle communication system in ITS (Intelligent Transport Systems) are one of the important media, which can offer traffic safety and navigation information to drivers as well as entertainment information Fig (1) shows the schematic drawing of a road to vehicle communication scenario.

To offer Internet access service or a download service for large volume data files, long range communication is required. When constructing such a long-range communication Zone (for example: several km's length) the following points should be taken into account:

(i) Several services that have different communication systems of frequency bands will coexist in the same ITS communication network and new services will be introduced one after another.

(ii) The amount of communication traffic will change according to the continuous change in transportation traffic. Especially, communication traffic will drastically increase during traffic jams.

(iii) Frequent handover will occur between adjacent. Spot zones due to the high speed of vehicles.

Regarding to (i) above, the Radio on Fiber (ROF) communication system [5] Which conveys Radio Frequency (RF) signals through optical fibers, would be one of the key solutions to this. On the other hand, for (ii) and (iii) it is requested to construct an effective network that allows making efficient use of limited resources (frequency ha-lids) and creates smooth communication is a continuous Zone. To meet these requirements, several technologies should be developed: that is, forecast of communication traffic according to transportation traffic, resource management technology, radio zone control technology and so on. In particular, to control a radio zone

adaptively requires a roadside antenna to have too complex function of beam shaping and beam scanning. Therefore, it is important to develop such a smart antenna with a simple antenna configuration.

Beam Control:

Vehicle communication system proven in desk i, those features are supposed to meet for designing a beam control array antenna. The most radio zone duration assigned to a roadside antenna is 100m, considering the predicted radio area for non-stop street to vehicle communication structures. The most area division variety and the input/output port variety have been decided at least figure, a good way to evaluate characteristics of the area department and zone shift functions experimentally. As the most radio region division wide variety became decided to be 4, the required beam styles for a beam control array antenna to realise both zone department and region shift demonstration could be ten patterns. Fig (1)

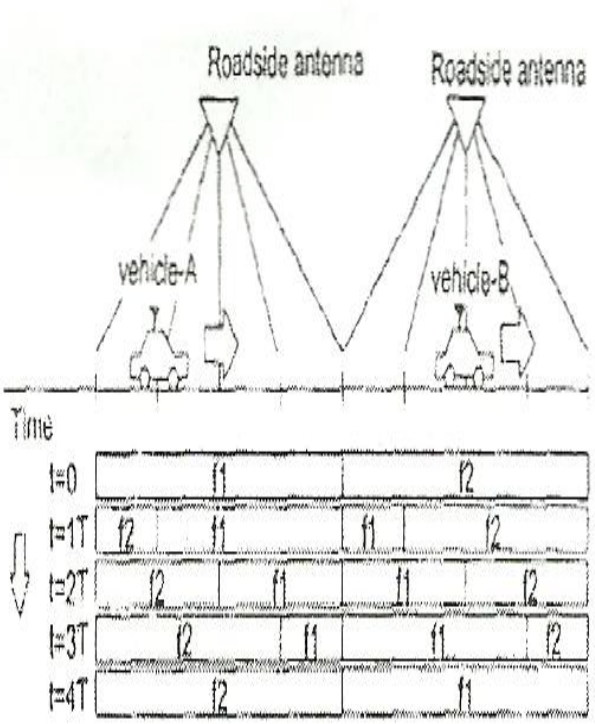

Fig.1 Schematic drawing of adaptive zone

TABLE-1

Parameters For Model Communication System

ITEM	VALUES
FREQUENCY BAND	5.8 GHz BAND
MAXIMUM ZONE LENGTH	100m

MAXIMUM ZONE DIVISION	4
MAXIMUM ZONE LENGTH	25m
I/O PORT NUMBER	2
ANTENNA HEIGHT	8m (Roadside) 1.5 m(vehicle
REQURIED BEAM PATTERN	10

Conclusion

Smart antennas can greatly decorate the overall performance of wireless verbal exchange systems used in its. Clever antenna technology affords variety extension, multiplied records price, higher network ability and better service fine. However, smart antenna represents many exclusive approaches of the usage of multiple antennas on one or both ends of the wi-fi hyperlink. It's far important to understand the differences in overall performance amongst these clever antenna sorts. Moreover the paper suggests that the antenna can exchange the radiation pattern, via adjusting handiest the burden of element beams used for avenue communique, which ends up in simplifying and rushing up the beam manage procedure.

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