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A Review: WI-VI Technology and Its Application in Cell Phones

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Abstract: *The wireless vision act as real time executor for all the fantacies of comics, sci-fi-movies etc..Wi-vi is believed to be a connecting technology that serve as a communication medium between itself and human behind a wall. Wi-fi is cheapest technology which is going to be one of the features of every smart electronic gadgets in future. Wi-vi allows to communicate by combination of gestures and messaging through the help of wi-fi signals. WI-FI signals enable human to interact with web remotely. They have feasibility to carry an information from the transmitter to receiver. This feature of wi-fi acts as a key aspect for wi-vi. This paper investigates the capability of utilizing Wi Fi signals for detecting movement of people behind the walls and doors by introducing a new technique called Wi-vi (wireless vision). This paper will also focus on having Wi-vi technology build in cellphones to give more power to human, thereby reducing the cost of individual Wi-vi system and devices*

I. Introduction

This paper gives complete idea of uses of a Wi-vi. The Term "Wi-vi" is thus combination of "Wi-fi" and "vision" which coins to the term "wireless vision". It is a promising technology that enable us to see through walls using Wi-Fi signals. It is used to keep track of moving objects by capturing the reflections of its own transmitted signals from moving object behind the wall or door. By capturing all these reflections, we have the possibility to image those objects. The major benefit of Wi-vi is, it does not require access to any device on the other side of wall. Therefore it tends to be a challenging task to construct a device that captures such reflections, because the signal power get reduced after penetrating in and out of wall. Wireless vision is going to have the huge depth and a wide breadth in a wireless world. We live in wireless world, unshackled by physical barriers, wireless communications like wi-vi enable agility and productivity in new ways.

II. Working of WI_VI:

Wi-vi begins its work by sending a wi-fi signal through any kind of barriers (closed doors or walls)and measures the shape and type of the object by measuring the way how the wi-fi signals are bounded back.Everytime when wi-fi signals hit the moving objects ,size and shape of the object leaves some effect on signals that prove to be helpful in recognition of the shape and kind of object.It demonstrates the use of interfaces which rely on using reflections of a transmitted RF signal. It make use of MIMO to nullify static object and targets motion of objects which is treated as antenna and resulting RF signal is tracked. Hand held devices like cellphones can also be built with the Wi-vi technology, this will open up a lot of uses for it. Army can also be benefited from the portable tool Wi-vi.

TRACKING HUMAN:

Tracking moving objects or human is the foremost objective of wi-vi technology.The inverse ISAR technique tracks movement of objects by making use of as single antenna and capture the signals. As the target moves, the received signal get sampled at different locations. Due to channel reciprocity the successive time samples received by Wi-vi will receive in time at what antenna array will receive in space.

ISAR:

The foremost step of Wi-vi is tracking the human motion which is possible with the technique inverse synthetic aperture radar- ISAR. ISAR consists of an antenna capturing the signals while the target is being moved. They capture the spatial locations of target which is moving.

MULTIPLE HUMAN DETECTION:

Wi-vi technology uses only a single antenna to track moving a objects. We can say that human is not just a single object human body has different object that can be correlated in a single point. At certain situations tracking multiple humans becomes a complicated one

ROLE OF WI-VI IN COMMUNICATIONS:

Wi-vi helps in sending messages to computer, for that human has to carry a wireless devices with him. Wi-vi enables human to communicate any message or command to receiver using simple gestures. The gestures are designated by Wi-vi as 0 and 1 bit

GESTURE ENCODING:

Encoding can be done from 0 and 1 bits.The human acts as initial state of gesture.0 bit indicates a step forward by step backward,1 bit indicates a step backward by step forward.

GESTURE DECODING:

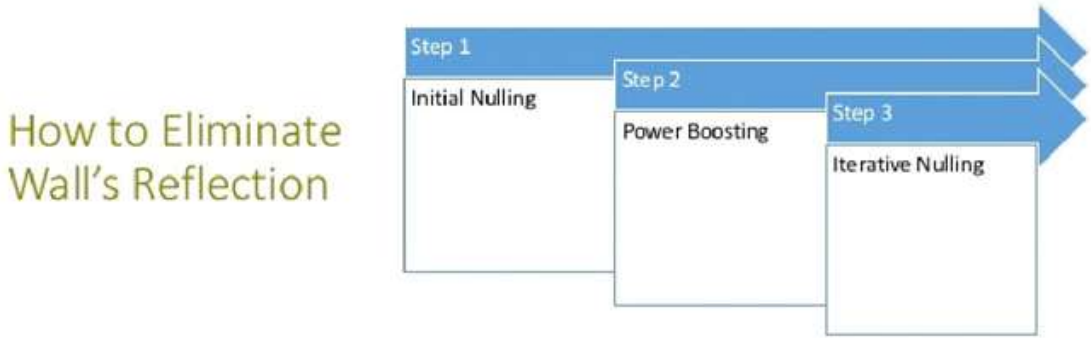
Wi-vi takes input, Wi-vi applies two matched filters one for step forward other for step backward Wi-vi applies matched filter to signal and adds up output.Spatial angle is positive When human moves towards Wi-vi. Spatial angle is negative when human moves away from Wi-vi.

WI-VI OVERVIEW:

It uses Wi-Fi hardware and Wi-Fi OFDM signals in ISM band. It has 3 antennas, 2 antenna help in transmission while other help in reception. There are directional antennas which help to focus.

HOW TO ELIMINATE FLASH: Flash can be removed by;

I. Wivi eliminates flash(reflection of wall)to get the effecient result.
II. Removing the reflected signal received by stationary object By using nulling algorithm in Wi-vi which provides a 42db reduction in signal power thereby removing the flash effect
III. Nulling can be done for objects moving behind the wall and front of wall.



NULLING MIMO: to remove flash

INITIAL NULLING: Channel Estimation
Tx ant. 1 sends x; Rx receives y; hˆ1 ←y/x

Tx ant. 2 sends x; Rx receives y; hˆ2 ←y/x pre-coding: p ←−hˆ1/hˆ2

POWER BOOSTING:
Tx antennas boost power

Tx ant. 1 transmits x, Tx ant. 2 transmits px concurrently

ITERATIVE NULLING:
i ←0 repeat
Rx receives y; hres ←y/x
if i even then

hˆ1 ←hres + hˆ1

hˆ2 ←(1 − hres/hˆ1)hˆ2 p ←−hˆ1/hˆ2
Tx antennas transmit concurrently i ←i + 1
until Converges

Wi-vi eliminates flash using MIMO nulling.It limits itself to the size of 20 MHZ. Higher performance of wireless network act as a foundation for mobile business-providing employees to communicate, collaborate everywhere every time.

IMPLEMENTATION OF WI-VI IN MOBILE PHONES:

"Smart phone"-as the name indicates is smart by nature,clever by default and extraordinarily active.Smart phone has always proved to be one step ahead of our expectations. "wi-vi"-the wireless vision technology act as a realtime executor for all the fantasies of comic books,sci-fi movies etc…The succesfull merging of wi-vi technology with our "smart phones" will prove to be a better result for upcoming future.This will serve as a tool for our environmental protection,human safety purpose,monitoring people and will be helpful for army.For a human to communicate with computer wirelessly they should carry a wireless device which is irrelvent in some unavoidable situations.Humans can communicate through the gestures by installing the Wi-vi technology in our mobile phones,which will prove to be helpful in emergency situations.Installation of wi-vi technology in our smart phones will prove to reduce the cost for building the separate wi-vi device and the main advantage of having wi-vi featured cell phones is in the situation of danger people can easily safeguard themselves and report it to police.We could create a smarter environment by the help of smart sensing which is the key feature of Wi-vi low power, low cost, low band width and accessible to every one.

ADVANTAGE:

1)Emergency responders can make use of it
2)It Can be used for gaming purpose
3)Intruder detection and even monitoring children/elder for personal security
4)It also enables to send and receives the messages
5) It enables endusers to get convenient, with high speed, access, thereby maintaining a peace of mind.
6)Causes extension of human vision beyond visible electromagnetic range, allowing to detect object.

IV. Conclusion and Future Work

"Seeing through walls is not yet the stuff of superheroes, it is becoming a reality in our day to day life with wireless vision technology". Wi-vi is tend to be the technology that is affordable, cheap and simple. It can be easily accessible for any kind of public. It can be therefore termed as modern evolution for communication that provides safety in problems, alert during the danger, make as smart from its features gives as the ability to defend the problems. Wi-vi is the technology with full power and its belived to become more powerful in future with virtual reality.

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