

Review on Milli Meter-Wave (mmW) Imaging for Humans Bio-field

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Abstract- Increasing demands for screening personnel for concealed objects lead to additional research efforts related to suitable imaging systems and their industrial realization. In this context millimeter-wave systems are a promising approach, because the radiation does not present a health hazard to people under surveillance and readily passes through many optically opaque materials such as clothing fabrics allowing for the identification of concealed objects. Due to the extent of the human's body and the resultant required amount of 3D resolution cells with a magnitude of 15mm or less, in principle all existing and proposed systems have to deal with a huge amount of scattering data which have to be acquired and processed. For a highly resolved image principally as much information as available should be used. Interestingly electromagnetic field is associated with such activities. Psychological perception of one's environment or a person's thought process induces characteristic electrical impulses in the brain. These signals travel throughout the central, sympathetic and parasympathetic nervous system, creating the unique electromagnetic field of the organism that can radiate out of the body and is termed 'Aura' or 'Bio-energy field'. Thus, 'aura' gives the signature of the status of health prior to its manifestation in the physical body. Therefore, human health can be effectively monitored by measuring this radiation field.

Keywords- Biofield, Aura, Human Radiation, Kirlian photography.

I. INTRODUCTION

Imaging configurations which have led to experimental systems measure field distributions either in the focal plane of a lens or mirror or are of holographic type, which requires that the total scattered field including phase information has to be captured. Within first approach reconstruction is done by the lens or mirror which saves most of the extreme computational effort necessary to reconstruct the image from the holographic field. As the first approach is less flexible with respect to focusing the paper will concentrate on processing required for the holographic case.

The general holographic imaging approach can be characterized by the requirement of computer-aided reconstruction of the 3D distribution of scattering centers from the scattered field, typically measured in a monostatic configuration along a part of the surface surrounding the object or at a specific distance from the object. The surface can be according to the selected measurement configuration of different type, e.g. of planar, cylindrical or spherical shape. As the application in our case is to image person at close distance of a meter or less a cylindrical surface is the appropriate measurement surface, while the object is characterized on a Cartesian grid. It is well known that when atoms undergo any movement, be it translation, rotation or vibration, quantifiable and

measurable electromagnetic radiation is produced which is evident from acoustic and vibration spectroscopy. Like all matter, cells in our bodies are also made up of electrons, protons, neutrons and other fundamental particles which are always in a state of vibratory motion. So when these particles vibrate, an electro-magnetic radiation is emitted which results into the formation of an electromagnetic field around our body. Since everything in this universe is made up of the same constituent particles electron, protons, neutrons etc. that means everything has an aura.

Scientific research has found that this radiation field extends all around our body for about 4-5 feet (in an average healthy body) and appears to be depleted in cases of unhealthy person. The tangible features (frequency, waveform, etc.) of these radiating electro-magnetic fields are characteristic of the physiological and mental activity that generated them. The aura of a person is thus directly connected to the level of health of the person. A person is considered to be healthy in terms of physical vitality, mental clarity, and emotional wellbeing as well as highly positive spiritual energies. So a person who is healthy at all these levels has a more intense aura and vice versa in the case of an unhealthy person. The normal frequency range of (healthy) human bio-field is believed to be 62-68 MHz [8] However, the alpha band of EEG, which is associated with relaxation and meditation, comprises brain waves at 8 to 10 Hz. When electromagnetic fields in this

frequency range are applied to the human, the brain is dynamically entrained at those frequencies, and the person goes into a psycho physiological state of relaxation.

II. GENERAL THEORY OF RECONSTRUCTION

2.1 Description of Measurement Aperture and Object

The aperture sampling grid and the object coordinates are defined by $ra = (x_a, y_a, z_a) = (_a \cos 'a, _a \sin 'a, z_a)$ and $ro = (x_o, y_o, z_o) (|ro| \leq D$, with D the object dimensions), respectively, with $_a$ being the aperture radius. In the experimental setup the cylindrical aperture data are synthesized by moving a sensor to each of the required locations creating a synthetic aperture. The angular variable $'a$ describes the rotation of the sensor around the object. The variable z_a stands for the linear aperture in z -direction. The cylindrical aperture's extend is limited by $'a = 'a, \min \dots 'a, \max$ and $z_a = z_a, \min \dots z_a, \max$. The apertures lengths in both directions are determined by $L'a$ and Lz_a .

III. EXPERIMENTAL RESULTS

1. Measurement Setup and Data Acquisition:

The data acquisition was done with a Millimeter-Wave Linear Stepped Frequency Radar system (SFMCW) principally usable within the complete Wave guide band, i.e. 75GHz . . . 110GHz. The cylindrical synthetic aperture was covered by sensor rotation about the z -axis and by a linear movement in the same direction. The TX power used was about 0 dBm. The frequency range was chosen to 90GHz to 100GHz including 201 frequency samples. These parameters lead to a range resolution of 1.5 cm and a range unambiguity of 3m well suitable for the application. The extent of the synthetic aperture was chosen to: $Lz_a = 0.2m$, with $nz_a = 101$ discretization steps and $L'a = 60^\circ$, with $n'a = 201$ angular increments as described by Fig. 1.



Fig 1. Data Acquisition.

2. Imaging Results:

The section shows exemplary results obtained with the SFMCW system and applying the imaging algorithm described previously. The application of the 3D cylindrical reconstruction algorithm described took about seven minutes on a conventional 2GHz Pentium IV PC using MATLAB®. Most of the computation time was spent for

the interpolation needed for the Stott Mapping. Further dramatically improvements in computation time can be achieved by using precompiled interpolation matrices and switching to specialized computational hardware like DSPs or FPGAs.

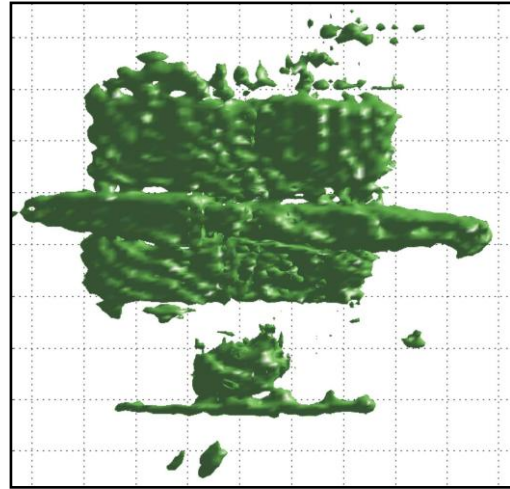


Fig 2. Setup and the images obtained for a metallic gun.

Imaging a PVC torso packed with several items and covered with a pullover Fig. 2 shows the setup and the images obtained for a metallic gun.

- Photo of the Object
- Iso-Surface Image

The figures indicate that objects of interest can be imaged with resolution sufficient for identification even if hidden below some textile material. The data are principally suitable for 3D display but the display algorithms have still to be adopted for the proper indication of objects in front of the human body.

There may be two pathways of health restoration. First is the conventional one where all the medicines and treatments are aimed to treat the physical body and as the physical body recovers, the aura follows and restores to its healthy state. Complete restoration of health is not possible until the aura becomes healthy. A second and a faster method may be to heal the „energy body“ itself with the help of some radiation assisting devices, and the physical body will quickly follow the changes to restore health

3. Kirlian photography:

The Scientific research on capturing this subtle energy field through electronic instruments was started by Semyon Kirlian. The captured image is known as Kirlian image which is the result of a gas discharge, "fluorescence" or glow that appears around the edge of a subject after it is placed in a high-intensity electrical field. Kirlian image is produced on the photographic plate when an object on a photographic plate is connected to a high-voltage source.

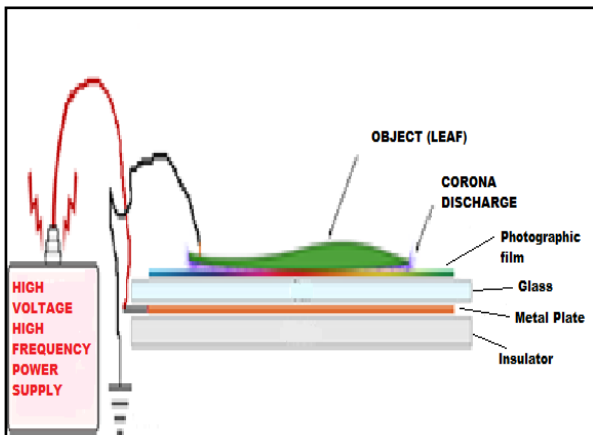


Fig 3. Typical Kirlian photography setup for non-alive objects.

4. Poly contrast Interference Photography:

Poly contrast Interference Photography or PIP visualizes patterns of light radiating from biological organisms and inanimate objects. In the late 1980s, using micro-chip technology, Harry Oldfield developed a scanner which could provide a real time, moving image of the energy field. This system became known as Poly contrast Interference Photography or PIP. Oldfield thought that the human energy field might possibly interfere with photons both ways when the incident ray travelled towards the object and when the reflected ray bounced off the object ([28]-[30]). Oldfield devised a computer program which would analyse the radiation intensities of different frequencies being reflected from the person or object being scanned. To see the body's energy field with PIP, ideally the person should be in a room with full spectrum lighting at a controlled output, standing against a white backdrop. A specialized video camera takes photographs using various filters that get analyzed by special PIP software. PIP examines photon (light) interference and its changes in and around the body.

This interference is generated when wide spectrum radiation falls on the energy field. Depending on the density of the energy in the energy field, various colour shades are generated (the word „colour“ here is only indicative of various different frequencies). These colour shades are tested by the computer program. The PIP software program allocates a number to each specific grade or frequency of radiation and then recodes every number into the visible light range so that we can see it, otherwise the interference pattern is invisible. PIP uses software on a PC with a video feed and takes a scan of bio-energy and light energy interference. An image is generated live on a monitor where signals from the video camera are graded into clearly visible colours. The computer screen then displays a picture of the energy field from and around the body. The PIP system shows up many patterns and colours which a trained eye can relate to a person's energy balance and well-being. Although some of these things are expected to be connected to health, the

system in the present state of affairs does not take the place of conventional medical examination or diagnosis further research is required in this field to use PIP as a diagnostic tool.

5. Resonance Field Imaging:

RFI measures Bio energy field generated around living beings and identifies the type and the function of these bio-energy fields. It generates the psychological profile of the living beings and expresses the effect of psychology on the human health. Thus, physicians can explore the bio-energy field image to make „Psychological Level Interpretations“ and „Health Level Interpretations“ and take appropriate professional decisions. Resonance Field Imaging involves the use of an Electro-Magnetic Field sensing device to scan a body, object, or environment.

It is an experimental electromagnetic measurement and imaging process similar to NMR imaging technique. RFI needs an RF digital frequency counter with an antenna tunable over a wide range of frequencies (much lower than required for MRI) which is pointed at each part of the radiation field. A sensor gives the information of the resonant frequency in the standard specific unit. The RFI technology provides objective data and informative interpretation for radiation field and identifies the type and function of bio-energies present in specific regions in the human brain. Data obtained can be used to generate full bio energy charts of the individuals with the help of a software program.

V. CONCLUSIONS

For the imaging of humans in a millimeter wave setup using SFMCW Radar inverse scattering reconstruction has been adapted to a cylindrical aperture geometry requiring a sequence of Fourier transforms. Reconstruction time takes still minutes but can be further improved by advanced interpolation and computational hardware techniques. Experimentally radar data on a cylindrical grid and processed by the 3D cylindrical reconstruction algorithm lead to suitable images also of hidden objects. Everything and everyone in the world has a radiation field, i.e. „Energy body“ or Aura.

Human Aura provides the unique signatures of the person's physical, mental, emotional and spiritual state. It appears that any changes in the status of person's health be it physical, mental, emotional or spiritual, changes his aura field dramatically and quickly. Hence complete healing of a patient will be when the distortions/deviations in his „energy body“ disappear along with the physical symptoms of the ailment. With the later as a future goal, the need is to (i) record the human radiation field scientifically, and then (ii) identify the signatures of various physiological and psychological conditions in this radiation field. The three techniques discussed here for recording the Bio-field are based on different

phenomenon, i.e., fluorescence, interference, and resonance. Of these RFI involves least cost and seems to be most promising.

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