ISSN: 2278-4632
Vol-10 Issue-5 No. 9 May 2020

ENDOSCOPY WITH THE HELP OF DIGESTABLE CAMERA

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Abstract

With the constant changes in the lifestyles of people, the health is also deteriorating day by day. With each passing day, we have developed more and more sophisticated objects for treatment of these maladies and problems. This paper deals with one such object that is a pill camera. This is a small digestible camera that can be swallowed to check the internal conditions of the body. This is mainly used for measurement and treatment of cancer, ulcers and weakness. The main theme that is dealt with in this paper in the cost reduction for large scale fabrication of PILL Camera. Another major problem to overcome is the quality. If the item is manufactured for the specific motive right at atomic level, the future of the equipment is secured.

Nanotechnology has entirely transformed the field of medication. The Pill camera has been mostly made with the aid of nanotechnology. The PILL Camera is specially designed to pass through the body without causing the body any harm. This camera follows the digestive tract, captures the images and sends the same to the recipient i.e. the person on the end, operating the camera and the computer equipment.

Keywords

Pill Camera, fabrication, nanotechnology, camera.

Introduction

It all began from rock blades and stone instruments and have reached a phase where we make such instruments with more accuracy and precision than ever. The jump in innovation is extraordinary but it is not going to halt here. With our show innovation we fabricate items by casting, processing, pounding, chipping etc. With increasing innovations, the inaccuracy is also at an all time low. We know fabricated items are made from atoms and collection of atoms i.e. molecules. Their properties largely depend on how those iotas are arrayed. The arrangement of the same carbon atoms gives both diamond and coal.

The upcoming step in fabrication of innovation is to fabricate them from atomic level and up. NANOTECHNOLOGY is used for the same. Nanotechnology is the manufacturing of anything, be it gadgets, components and like by using minuscule matter or nanometre. Objects are measured in nanometre in the field of nanotechnology. Nanometre is nothing but a billionth of a meter or millionth of a millimeter or 1/80000 of width of a human hair.

Now, envision a small, pill-sized camera that could travel through the human body taking pictures, making a difference examination and find an ailment in the body that can be only found using a surgery. This technology is no longer a gadget seen in science-fiction movies.

Fig. 1: Pill Camera

History

Control of molecules has been the topic of discussion Noble Award laureate Dr.Richard Feyngman since 1959 during yearly assembly

ISSN: 2278-4632
Vol-10 Issue-5 No. 9 May 2020

of the American Physical Society at the California organized by innovation Caltech. At that time it was not given enough importance and it wasn't given much thought until the early 80's. The concept of nanotechnology was presented by Drexler in the year 1981. he wrote about the same in his article named "The Motors of Creation". In the beginning of 1990, IBM analysts discovered that it is actually conceivable to control single particles or molecules. They located 35 Xenon iotas from the surface of nickel gem, utilizing an nuclear constrain microscope. These located molecules spelled 'IBM'.

Present Scenario

An endoscopy is a procedure in which a medical tool kit is employed to take a look at the inside organs and vessels of body. It allows specialists to scan for issues inside the body but does needs a incision on the outside of the body, just enough to insert a camera.this is not like earlier times when the internal structure could only be seen using a large gaping hole. A camera or endoscope is embedded into the body through a small hole or incision in the body like mouth etc. An endoscope is nothing but an extendable tube with a camera attached at one end. It enables the medical professional to examine the body very easily. A pair of scissors or forceps can be used to extract tissues for examination or biopsy.

Currently, the standard strategy for recognizing maladies in the insides is through endoscopic checkup. This process consists of passing a scope down in the digestive tact through the mouth. However, the only drawback offered is that this apparatus cannot traverse the entire 20 feet of digestive tract and gives only the first half of the map of the inside. With the added advantage of pill camera not only can the analysis be done on the earliest and detection of detection of diseases that were routinely missed in earlier tests, but also disarranges can be recognized at an earlier arrangement, empowering treatment some time for the recently developed complications.

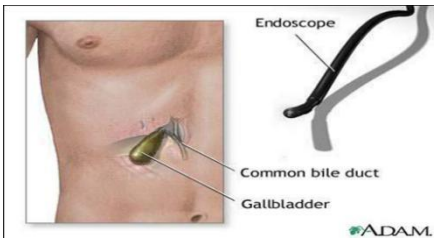

Fig.2: Endoscope

Description

The instrument comes in pill shape and consists of a camera, batteries, lights, and most importantly, a transmitter . The case has an unmistakable end that enables the camera to see the coating of the small digestive tract. Pill endoscopy comprises of a dispensable camcorder embodied into a pill like frame that is taken as a medicine with water. The remote camera captures a large number of high quality pictures inside the body as it goes through the whole length of the digestive system.

The Pill camera has a diameter of 11 mm and extends a length of 26 mm. It is capable of transmitting 50,000 shading pictures while traversing through the stomach of the patient. Video chip comprises of the Incorporated Circuit Integral metal oxide semiconductor picture sensor which is utilized to take pictures of intestine. The light is utilized for appropriate brightening in the digestive tract for taking photographs.

A small scale actuator goes about as memory to store the product code i.e. the directions. The radio wire is transmits the pictures to the collector. For the discovery of dependable and correct or accurate data, container ought to have the capacity to transfer any biomedical signs. This include but not limited to temperature, weight, pH balance etc. This is done by suing SoC.

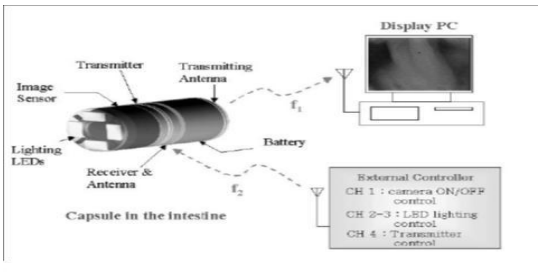

Fig. 3: Conception diagram of Capsule

ISSN: 2278-4632
Vol-10 Issue-5 No. 9 May 2020

Working

The pill is marginally larger in size than a typical capsule. The patient swallows the capsule and the characteristic waves of the stomach related tract flow it forward through the stomach, into little digestive system, through the huge digestive tract, and at that point leave the body through stool. It takes pictures as it traverses through stomach related tract and takes 2 pictures per second. The capsule transmits the pictures to a recorder, which is worn as a belt around the patient's midsection while going almost his or her day as regular. The doctor at that point exchanges the put away information to a computer for preparing and examination. The total journey takes about eight hours and after it has completed its course it comes out of body in the form of excreta.

Ponder comes about appeared that the camera pill was secure, without any side impacts, and was able to distinguish variations from the norm in the little digestive system, counting parts that cannot be come to by the endoscope The most modest endoscope however takes 32 MP pictures per second and transmits them wirelessly.

Within 8 hours of popping this pill, specialists can inspect a high-resolution video of the guts for tumours and other issues, all thanks to a modern turning camera that captures pictures in 360 degrees. The Sayaka endoscope was created in the Japanese RF Framework Lab and it entered clinical trials recently. The patient swallows the capsule, and the stomach starts its voyage. Over the next eight hours, the pill voyages latently down the throat and through generally 20 to 25 feet of digestion tracts, where it will capture up to 870,000 pictures. The patient feels nothing.

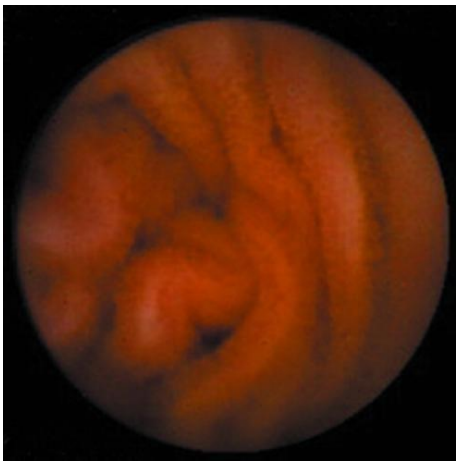

Fig 4 : Image captured by Pill camera

Power Up

The Sayaka does not require an engine to traverse the intestines, but it does require 50 process watts to operate the computer, lights and most importantly, the camera. Batteries should be bulky so cam can make headway on its own with the help of gravity. A belt worn by the understanding contains a coil that ceaselessly transmits control.

Image Capturing

Florescent and white LED's enlightens the insides and the camera captures about 30 two megapixels images per second. This is about twice the resolution of other cameras.

Close Up Spins

Earlier the cameras were positioned at one end as they could get clear-cut images of the tissue walls. Sayaka is the first Pill camera to place its camera on the side and use a 360 degree turning camera to take the direct images of the tissue walls. As the external capsule proceeds through the intestine, the electromagnetic interior of the pill switches extremity. This causes a constant magnet to turn the internal capsule and the camera turns 30 degrees per seconds. It completes a full rotation in 12 seconds. This time is enough for rehashed close-ups as the capsule takes almost two minutes to travel one inch.

Offload Data

A better and optimised way to send away all the images is to make in a video of them and

ISSN: 2278-4632
Vol-10 Issue-5 No. 9 May 2020

send it directly to the connected belt. There they are spread out to SD Card.

Video Delivery

Specialists insert the SD card into a workstation and computer program compiles thousands of pictures into a level outline of the digestion tracts that can be extended up to 1,175 megapixels. The videos can be replayed again and again and the diseases can be amplified up to 75 times.

Exiting the Body

Priced at around $100, the cam is quite disposable. The patient can easily pass the body via stool. Here is an image of the exterior capsule of the Pill and the turning camera itself.

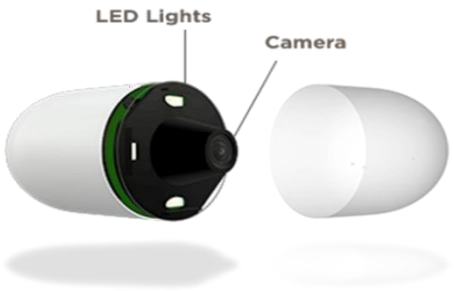

Fig.5: Pill camera

Advantages

- The largest impact of the camera is on the medical industry.
- Nano robots can be taught to execute fragile surgeries.
- The aging process can be reversed or slowed with the help of this pill.
- The size of components can be shrink-ed easily using this.
- Nanotechnology has a beneficial impact on the environment.

Drawbacks

The pill presents some of the following medical risks:

- Victims with gastrointestinal structures or narrowing are not ideal applicant for this method as they may face an obstacle. It may also be the case that the camera could not navigate openly interior stomach related framework, which may cause the tests to be uncertain.
- In the event that there is a fractional hindrance in the little digestive tract, the hazards that the pill will be stuck and a victim who came for routine checkups can end up with a intestinal obstacle.
- It can be inconceivable to control the camera conduct, counting the on/off control capacities and compelling enlightenments interior the intestine.

Fig.6: Camera inside a Pill

Conclusion

Despite of the fact that nanotechnology has not yet advanced to its full capabilities, but has started making an impact on the human life wholeheartedly.the future can be seen with more and more objects being manufactured using nanotechnology. Researchers anticipate that this is just the beginning of Nanotechnology. They say that in coming decades, not only can the organs be manufactured using nanotechnology, but can be taken care after with the help of same. No doubt, Nanotechnology will aid the mankind in every aspect but it will also control the future.

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ISSN: 2278-4632
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