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Simple device to thinking eye: Journey of CCTV cameras

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Abstract
CCTV (Close Circuit Television) has gone through various substantial changes since their inception in 1920's. The future of these devices are very bright as there are almost indispensable in various sector Like Work Places, home, Market Places. The objective of this survey paper is get details of these devices since their inception till the date. The author of paper has tried to collect the technological, structural and required details of the earlier used devices. As the history and background details are important to understand before planning and future outcomes about these devices.

Keywords: Thinking eye, CCTV, Journey of cameras

Introduction
1st Generation CCTV Cameras
Inception of CCTV
In 1920's the cameras take a further step from picture clicking industry to surveillance industry. The journey started from Russia, where these devices are used to ensure the safety and security on the motion film production set. At that time cameras were really large and they need a lot of manpower to operate them. The first evidence of CCTV cameras can in seen 1923's picture "The Ten Commandments" where these cameras are used to control a monitor the activities of thousands of extras that were participating in the film production through large monitor devices. When there use in the motion picture set was successful then they were used in the production set to manage large population and TV production sets also. The other use of such CCTV cameras can also be seen in the Russia during World War II where these cameras were utilized for watch people entering in Russian states and rocket launches. Where complete launch process can be seen through CCTV. With time they become smart and size was also reduced.

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Fig 1 [Source: []: Cameras during 1920's

Fig 2: Source []: First time security Cameras were used

Objective
The objective behind this technology was safety and security by doing a remote monitoring so that required actions can be taken.

Technology
Initially these cameras were really big in size and requires a lot of manpower and electricity supply to run these devices. CRT (Cathode Ray Tubes) were used to capture pictures and these pictures were transmitted through wires to the terminal where they can be viewed in a real time. CRT tubes were mounted on a Swivel so that position & location can be changed as per requirements.

2nd Generation CCTV Cameras
Although there is no demarcation literally mention in any literature but the when these devices are used for the video surveillance then we call that now the devices are entered in the 2nd generation.

Inception
Video surveillance cameras were first developed in 1940's in USA. The inception company of such devices were Vericon.

Technology
These devices were bit advanced as compare to your 1st generation devices. During this era camera and monitor were connected through coaxial cable. At this time Vacuum tubes were for capturing and transmitting pictures. Monitors are used to view pictures or we must say videos.
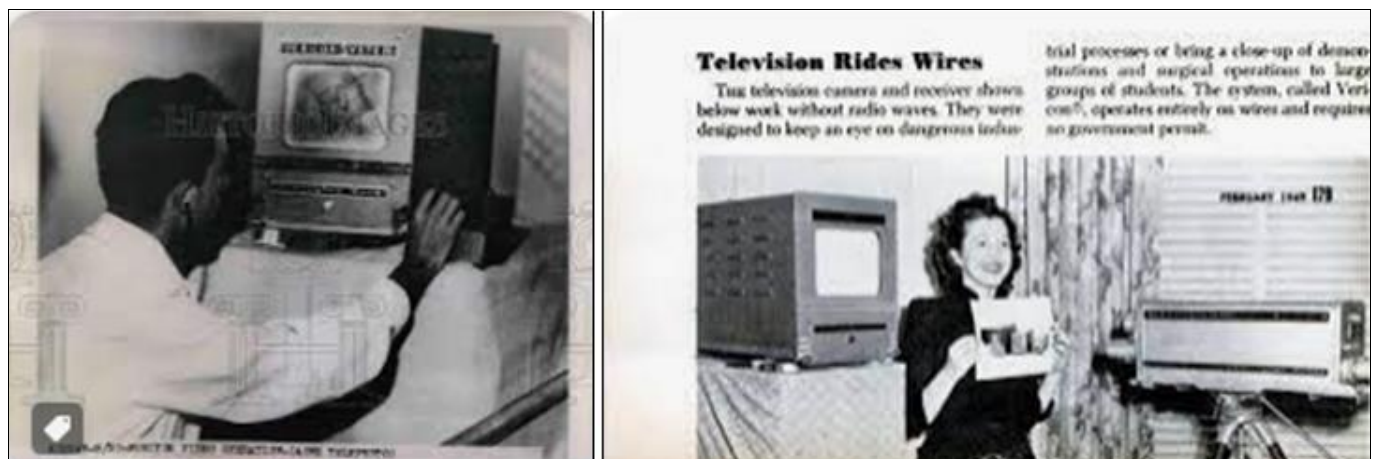

Fig 3: [Source: []] Vericon TV1 used in 1940's

CCTV as surveillance Cameras
Till 1960 cameras were used for security and safety, but there was no concept of surveillance. First time in 1966, a nurse staying in Queens, New York, America came up with an idea to use cameras and monitors as a surveillance device. The idea behind is to ensure herself and neighborhood's safety. She worked on the idea where cameras were placed on peepholes and she can monitor the activities going on outside her house or locality. A single camera is connected with 3-4 peep holes and keep on moving between holes. Monitor is connected with the camera through wires. This device is a two way communication device through which she can talk with person standing outside without opening the door (from her bed room only). It has one more feature, it can call police station in case of emergency. With this invention culture of home security cameras started.
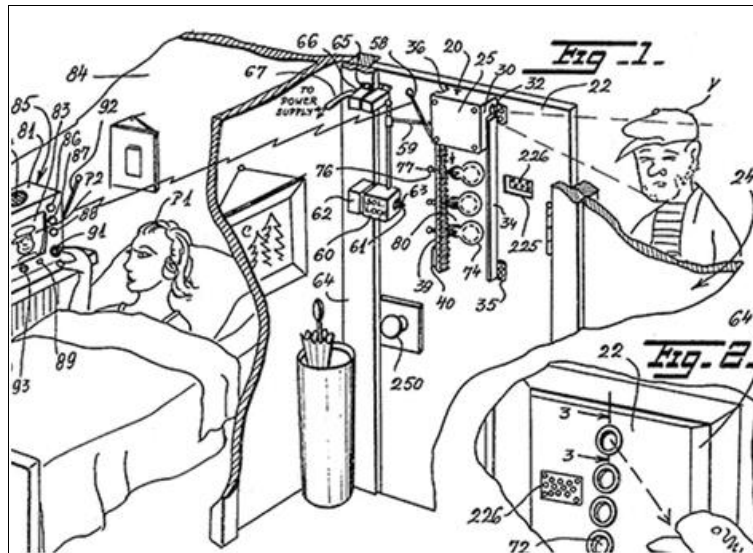
Fig 4: [Source:]: First Home security Camera

Contemporary (Digital age Security Cameras) CCTV Cameras: Since the inception of CCTV cameras for surveillance, there are many changes that occurs in these devices and current devices are very advance as compare to their ancestors. The changes are in terms of

Technology
From analog to digital cameras. With this changes, many problems were solved we get better resolution, better images, images or video clips can be saved transmitted and easily processed. With the use of Internet protocol in the cameras, now there images/ videos can be transmitted into distinct locations and no need to connect them with wires. They can be accessed remotely from anywhere. They can be accessed from computers or mobiles. First IP camera was commercially available in 1996 and a product of AxisNetEye 200.

Fig 5: [Source: []] IP home surveillance Cameras

Video Analysis
Another important aspect that makes a drastic change in this industry was video analysis. Through video analysis in the real time potential threat to the security can be analyzed within fraction of seconds. Keeping this advancement in mind, which was need of the era, certain significant changes need to done in terms hardware like: size of storage device, saving, managing and processing storage footages.

Conclusion and Future
From a huge device captures and transmits images to smart compactable device that can detect and process images and

videos. In the future there is a lot of scope for implementing Artificial intelligence algorithms in these devices and make them more compatible in future.

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