Syllabus subtopic: Science and Technology- Developments and their Applications and Effects in Everyday Life.

Prelims and Mains focus: about the utility of thermal imaging systems in virus detection; about coronavirus outbreak

News: The aviation ministry has asked airport authorities to screen travellers flying in from China to stop the coronavirus outbreak from spreading to India.

- So far, seven Indian airports have set up thermal scanners at immigration counters.

Growth rates of thermal imaging systems

The growth potential of thermal imaging systems is the highest in the US and Canada, while India is seen offering moderate opportunities.

How do thermal scanners work?

- All live objects emit infrared energy or heat. Unlike regular cameras that record light reflected by objects, thermal cameras use heat sensors that can record heat generated by the body of a person or an object to create a 2D image with differing temperature levels.

- When a person stands before the cameras, on the computer screens the hotter objects are highlighted with a different colour palette than the rest. These cameras can be calibrated to detect abnormal body temperatures such as over 101 degrees. Every pixel of the image has a temperature associated with it, so a higher resolution camera scan offers more detailed images.

When did airports start using them?
This isn’t the first time thermal scanning is being used to screen higher body temperature related to infections that can cause an epidemic. During the 2002-03 outbreak of SARS virus, airports in Singapore and China deployed them and have been using them since. Mumbai was one of the first Indian airports to use them during the swine flu outbreak in 2009.

During the 2014 Ebola outbreak in West Africa, many countries including India used the cameras. India is said to have these cameras at its major international airports. Heat scanners at Nigerian airports was one of the reasons the African country remained Ebola-free.

Why are thermal scanners used to screen coronavirus?

- International airports have very high footfalls. Checking every passenger’s body temperature using thermometers can be a logistics nightmare and lead to delays at immigration counters.
- Thermal cameras can scan large crowds and spot people with higher temperature than the rest. Once authorities identify possible vectors, they can segregate them for further screening.

How effective are thermal scanners?

- Thermal cameras are effective only to the point of telling who has a higher body temperature or is running a high fever. It may not mean the person is infected with coronavirus. Additional screening systems are needed for that.
- Studying thermal images is not as simple as observing a camera image. It requires training and understanding of thermal colours and their patterns. As far as their effect on the human body is concerned, these cameras are safe and discreet. There is no proven risk of any form of radiation.

Where else are these scanners used?

- Thermal imaging tech is widely used by law enforcement agencies and militaries across the world. It was first used during the Korean War in
1950-53 to detect enemy soldiers in the dark. Firefighters in the US are known to use them to find people through dense smoke.

- In 2019, police in Minneapolis used them to detect and nab a gang of car thieves in the dark.

- Companies in the manufacturing and automotive sectors also use thermal cameras to check machines and equipment that might be at risk of catching fire.