A system to avoid train mishaps

The model sends timely information to the train driver regarding signals, boards, approaching trains etc.

It is widely known that 99% of the accidents that occur are caused by human error. They can be attributed to human negligence as well as some natural atrocities. Fog is a natural phenomenon that majorly hits the northern region of India and throws all safety precautions taken by the Indian Railways haywire.

Two engineering students – Gaurav Upadhyay and Hitendra Singh Rathore of B.Tech 3rd year (Electrical Engg.) of Poornima Group of Colleges, Jaipur (PGC) have designed a warning system to counter this problem. The model named as 'Railway Engine Signal Display System' will help avert train accidents as well as time delays by providing timely information to the train driver so that he can act promptly. It also has an automatic system which can carry out emergency actions when required if the driver fails to acknowledge the received signal so that the train can be safely stopped before causing a disaster.

The system uses RFID (Radio Frequency Identification) technology for transmitting all possible signals- be it colour light signals, caution orders, speed limit etc. in which 'rail side equipment' i.e. RFID tags are used near the signal poles that transmit required data to similar receiving equipment i.e. RFID reader installed on the train engine which would in turn display it on a screen. Since the response time required for this purpose should be very less so active RFID tags are used in this system.

If the train driver fails to acknowledge the signal then the system automatically activates the braking mechanism. This system has an added advantage of external control of the railway engine in emergency conditions by using an emergency RFID tag to stop the train like if there is a rail fracture then the portable RFID tag can be placed before the fracture point so as to automatically stop the train. This system of external control is also helpful in designing a system to protect the railway personnel doing maintenance of the railway track.

The students have designed the entire model on the existing circuitry of the Indian Railways so that if their system is implemented practically, the LED signals will just be replaced by RFID tags with the same connecting wires.

This system will not only provide more safety and more control as the system would automatically take necessary actions but also more efficiency as there will be no time delays even in dense fog as the train driver will receive all signals inside his cabin thus permitting him with total control of the situation.

The students had taken winter training in Traction Department in the Indian Railways when this idea occurred to them that the unnecessary train delays which happen during fog can be avoided. They searched for the best technology for this wireless transmission and their research yielded that RFID technology is best for communication between signal and engine at such high speed.