Session Name-Disruptive Innovations for Utilities

Topic- Augmented reality and other Digital Transformation and their applications in Power Transmission

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Introduction

- Aera of Power transmission is having many activities which needs digital transformation for higher productivity, reliability, availability, increased performance, and reduced operating costs.
- To explore digital transformation in power transmission we did pilot project on a Digital safety Helmet having camera and micro screen. In this paper we will share the used cases of this device used for remote assistance through camera and micro screen with other features.
- In this paper we will also discuss that how we can utilize AR, VR, IOT, AI, Robotics and other digital transformation in Power transmission division to improve overall performance of the system.

Context

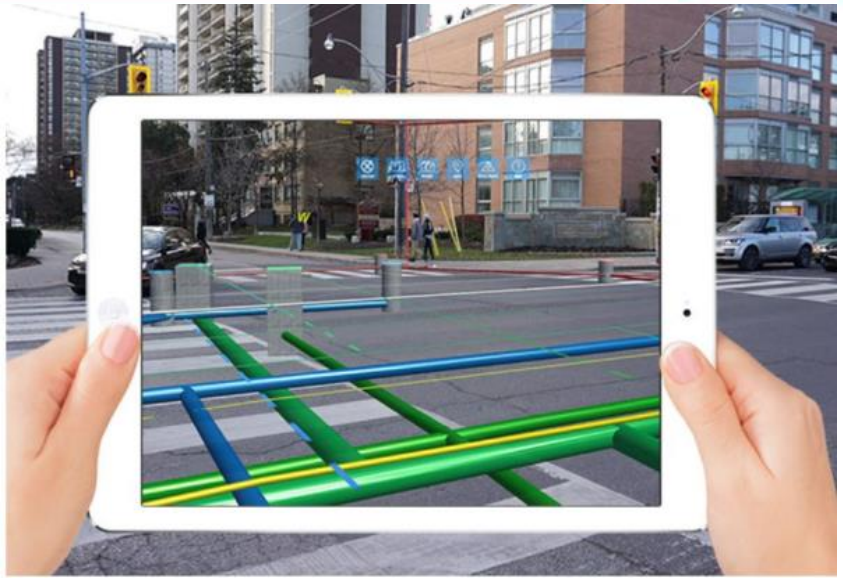
- Realwear Device- We did a pilot project with the One of voice operated device which is AI and IOT based . This device is mounted on safety helmet as shown in images. This device is having a micro screen targeting to one of the eye and while we look into this screen this is like looking tablet screen from one of the eye. This device is also having camera which can be controlled remotely. This device work on android platform and application like teams , drive etc. can be downloaded and used.

Relevance

- Considering the growth in power network it is necessary to speed up the maintenance and repair activities for uninterrupted power supply.
- To ensure this we need to adopt new applications which are combinations of AR, VR, IOT, AI, Robotics and other technologies. Such applications can help in great way for higher productivity, reliability, availability, increased performance, and reduced operating costs.
- Currently many such applications are available and being used and helping in overall power system performance.

Brief Idea about digital technologies

- **Augmented Reality(AR)**can be defined as a live, direct or indirect view of a physical, real-world environment whose elements are augmented or overlaid by computer-generated sensory input such as sound, video, graphics or GPS data.
- **Virtual Reality (VR)** is a computer-generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings. This environment is perceived through a device known as a Virtual Reality headset or helmet
- **Internet of Things (IOT**) is a network that connects uniquely identifiable 'Things' to the Internet like the 'Things' have sensing/actuation and potential programmability capabilities.
- **Artificial Intelligence** having machine learning technologies and sophisticated algorithms that help machines and computers work smarter and more effectively.
- **Robotics** is design, construction, and use of machines (robots) to perform tasks done traditionally by human beings. Robots are widely used in such industries as automobile manufacture to perform simple repetitive tasks, and in industries where work must be performed in environments hazardous to humans.

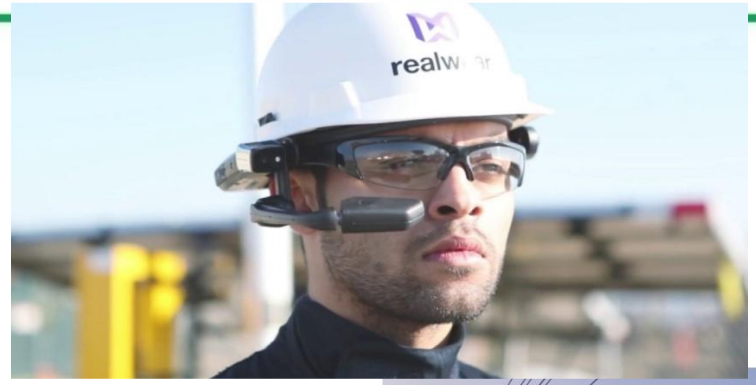


Used Cases of Realwear Device

As shown in previous slides We have done a pilot project with the One of digital helmet below are the used caes

A. **Remote supervision of 110 /220 KV Cable Termination work at towers-** Jointers wear this device with helmet and whatever they do everything goes live through the camera attached to this device to Engineers laptop helping in remote supervision.

B. **Inspection of 110 /220 KV Cable Terminations and Insulators-** Generally field staff goes at top and he takes his call to confirm the failure while checking termination and insulators at tower and even it becomes very difficult for him to take photos at height as per Engineer's requirement. If field staff wear this device and as he looks anything and he moves his face, then camera also moves so whatever he inspect is visible to Engineer and he can remotely click the photo also. So, this help in accurate, easy and fast inspection of terminations and insulators at towers.



Use Case/Case Study(If Any)

C. Inspection of Power Transformer Cable compartment etc, at height

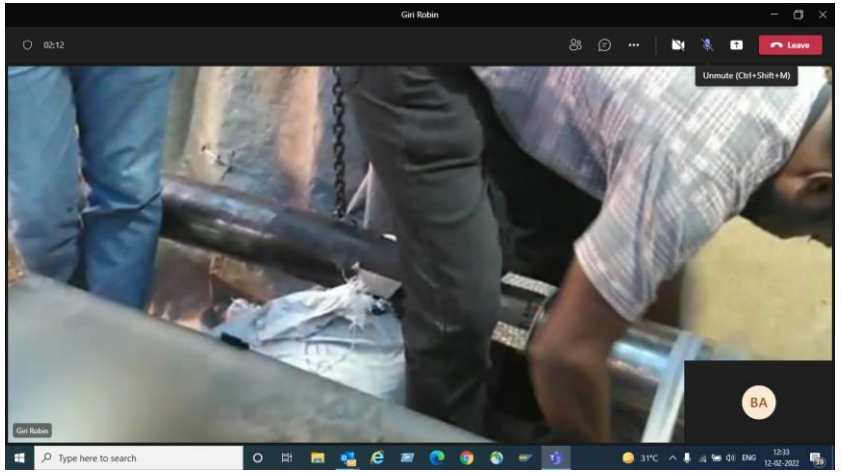
D. Assistance in EHV/HV Cable testing , repair and safeguarding activities

E. Assistance in Remote operations of Switchgear and RMUS.

F. Assistance in Switchgear maintenance activities.

G. Sharing of drawings , documents from cloud for maintenance and various other works.

H. Filling forms in Mobile apps



OTHER APPLICATIONS OF AR,VR,IOT,AI IN POWER TRANSMISSION

A. GIS network can be seen in 3 D in VR (Virtual Reality) by superimposing on physical roads In AR (Augmented Reality).

B. Live AR video conference at site between supervisor and officer.

C. Cable jointing assistance.

D. Cable fault testing assistance through AR device like Google Glass.

E. Automatic cable Drawing updating- Images can be captured in 3 D.

F. Safeguarding of Cables from Damages as AR based routes will be visible through glass

G. Training to new Trainees, Supervisors, Contactors.(VR devices can help)

H. Geofencing for safety. Field workers wear geofencing-enabled sensors that continuously track workers' location and health

I. Accessing documents from site- Wearing Digital device site person can operate his PC.

J. Fast restoration of power supply- Fast Cable testing and repair will help in fast restoration

K. Inventory management- Augmented reality based glasses can help to find and arrange the goods quickly

Key Takeaways/ Recommendations

- Thus we have seen that AR, VR, IOT, AI , Robotics and other digital technologies can help in great way in various operation , repair, maintenance, inspection activities in Power transmission business.
- These digital transformation will help for higher productivity, reliability, availability, increased performance, and reduced operating costs

Thank You

For discussions/suggestions/queries email: www.indiasmartgrid.org
www.isgw.in
Links/References (If any)

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