

# Industrial Visit Report : UniConverge Technologies Pvt Ltd

## Introduction

As part of PMKVY 4.0 initiative, students under the Embedded Full Stack IoT Analyst Program at Ajay Kumar Garg Engineering College had the privilege of visiting UniConverge Technologies Pvt Ltd, a Noida based pioneering technology company focused on cutting-edge solutions. The visit aimed to expose students to real-world industrial applications and advancements in the field of IOT.

## Company Overview

UniConverge Technologies Pvt Ltd, known for their expertise in LORA WAN technology, is committed to developing innovative solutions for various industries.

During the visit, the company introduced some of the real-life and ongoing projects as well as the use of different technologies in the field of IOT. Some of the major focuses are as follows :

### 1. Smart Street Light (LoRaWAN-based) :

UniConverge Technologies presented their cutting-edge Smart Street Light system, which utilizes LoRaWAN technology for seamless communication and control. Key takeaways include:

- Implementation of LoRaWAN, a low-power, long-range communication technology.
- Utilization of Frequency Shift Keying (FSK) modulation for data transmission.
- Individual dimming control for energy efficiency and extended lamp lifespan.
- Integration of Distributed Control Systems (DCS) to manage failures and downtime.
- Simplified troubleshooting mechanisms for effective maintenance.
- Deployment of high-efficiency LEDs with a capacity of up to 80W.

### 2. Predictive Maintenance Techniques :

The company showcased their predictive maintenance approach for prolonging the lifespan of machinery. Some of the notable aspects include :

- Utilization of vibration sensors with Bluetooth connectivity for data transmission.
- Dynamic RPM adjustment through frequency modification while keeping voltage constant.
- Application of Fast Fourier Transform (FFT) on motor vibration data.
- Deployment of 3-axis accelerometers and gyroscopes for comprehensive parameter monitoring.
- Versatility in applying this methodology to various types of motors.

### 3. Industrial Monitoring and Control :

UniConverge Technologies demonstrated their prowess in industrial monitoring with advanced technologies such as :

- Use of MODBUS TCP and MQTT protocols for efficient data communication.
- Integration of proximity sensors for speed assessment.
- Replacement of conventional switch gears with Human-Machine Interface (HMI) systems for dynamic control.
- Deployment of Intel NUC servers and powerful Linux machines for robust data processing.
- Adoption of RS485 and RS32 communication protocols.
- Utilization of dynamic braking through electromagnetic fields.

Some other projects included the **Smart Irrigation System** and **The Ultrasonic Water Meter** etc.

UniConverge Technologies also employs a variety of technologies in their solutions, including:

- React for front-end development whereas java for backend development.
- SQL and time-series databases for efficient data management.
- MQTT and HTTP for data communication.
- Linux-based solutions for embedded systems development, **etc.**

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