

**Title: Using IaaS to deploy novel ANN for Asset Management of Rotating Equipment on Sites Across the Globe  
(Industry Vertical Use Case of Data Science and Big Data)**

Name: Saeed Nusri

Affiliation: ATCO Electricity Global Business Unit & Nanoprecise Sci Corp

**INTRODUCTION:**

With IaaS platforms like AWS readily available, it has become increasingly easy to deploy IoT platforms with prognostic capabilities. This availability has allowed a myriad of startups to easily enter and compete in the tech space with cutting edge and scalable machine learning technologies for a variety of applications. Some of these applications include asset management and condition monitoring of industrial equipment, which is a multi-billion dollar industry.

This presentation focuses on showing how IaaS can be leveraged to deploy novel neural net models on a commercial level that can detect faults and predict remaining useful life of equipment using IoT sensors.

**AIM:**

To predict health of industrial assets across the globe by deploying IoT sensors and novel neural nets on IaaS that be scaled for over a million sensors

**METHODOLOGY:**

In-house designed sensors are placed on client sites that send vibrational, temperature and humidity data to AWS DynamoDB through IoT data pipeline. Using EMR hadoop cluster, data is transferred to S3, where it is pulled by the machine image and processed through a variety of digital preprocessing techniques. Features are extracted from the processed data before being fed into two trained neural networks. The first ANN runs diagnosis to detect the fault in the equipment while the second one predicts the remaining useful life (RUL) through novel prognostic techniques. Diagnostic and prognostic metrics are deployed on dashboard that is client site specific. The dashboard can be accessed through either an online portal or iOS/Android app.

**RESULTS:**

The artificial neural networks were tested to have an accuracy of over 97% in predicting fault in equipment and over 90 % in predicting RUL. Over 100 sensors were deployed in a successful pilot study that spanned on client sites located across the world. The current system can be scaled to over a million sensors.

## **CONCLUSIONS:**

Access to IaaS entities like AWS and Azure have allowed convenient scalable industrial application for novel machine learning models. Also, existing condition monitoring solutions in asset management industry lack prognostic capabilities, leaving very high scope for applying machine learning models and scaling up for a large client base through IaaS.

## **KEYWORDS:**

Infrastructure as a Service, Platform as a Service, Machine Learning, Data Science, Artificial Neural Networks, Internet of Things

## **BIOGRAPHY:**

**Saeed Nusri has double major in science and engineering and has completed his Master's from University of Alberta. He has worked with several startups in the area of e-commerce, engineering operations, and asset management and has deployed commercial AI technologies that have positively impacted multi million dollars investments. As the first data scientist in ATCO Group, he is currently leading analytics in the Global Electricity Business Unit Innovation team. Some of his current work involves leveraging machine learning algorithms in the space of asset management, load forecasting for smart grids, outage managements systems and energy trading.**