TOUCH IOT WITH SAP LEONARDO

PROTOTYPE CHALLENGE

TEMPLATE FOR
SUBMISSION REQUIREMENTS

Template Description
This is a template that can be used for the Prototype Challenge included as part of the openSAP course “Touch IoT with SAP Leonardo.”
Capital goods as the name states are capital intensive and are extremely expensive, hence there is an obvious need to ensure its appropriate and optimum maintenance, therefore with this IoT prototype, I will try to address the operational issues of the relevant stakeholders who are responsible to ensure the optimal maintenance of the Fixed assets of their organization.

I am going to take an example of a Gas Turbine here where its objective is to generate the energy (electricity) based on Air, natural gas and other fuels, however in the whole process there are various stages from drawing air in, compressing it, injecting fuels, spin turbine blades, gas generation, drive shaft, rotate generator, create magnetic field & electrons and eventually electric energy. Throughout the process at every stage there has to be appropriate monitoring expected by subsequent relevant actions, in order to do so we would install relevant types of sensors at important stages (for e.g. temperature sensor in combustion stage) to monitor and control the measurements and necessary actions thereafter.

The implementation of this IoT prototype would serve the following benefits to the Energy and Natural Resources (ENR) industry esp. for Power Generation (Air/Gas, Wind, Steam, Hydro etc.) and thereby to the market leaders like GE, National Grid, E.ON, EDF, Duke Energy etc.

- Establishing an end to end connected world of energy generation process throughout the value chain (for e.g. Gas turbines with Steam turbines) which produces more energy than in an isolated process.
- Improve and optimize the entire energy generation process (for e.g. ensuring accuracy, security, perpetual monitoring & controlling etc.) and thereby a) produce more energy efficiently and reduce costs.
- Reducing the wear and tear of the Asset and increasing its longevity.
- Control & Reduction of the Fixed Assets Depreciation (WDV method based on variable usage) postings to the Core Fixed Asset & FICO modules in SAP ERP on real time basis.
Persona

Explain the needs, goals, and pain points addressed

LISA
Air Compression Supervisor

“My primary objective is to ensure that the average level of Air compression should be close to the optimum benchmarks”

About
• 35, married, 12 years of power plant experience.
• The person who makes the energy consumption decisions, I have to keep the balance between improving the energy efficiency and our working comfort.
• Results from my output would be the inputs to the Fuel Injection manager

Responsibilities
• Study about the air compression levels from the ideally run power generators.
• Set the benchmark on a periodic basis.

Main Goals
• The person who makes the air compression decision, I have to tune the compression levels.

Needs
• Need to have a view of the optimum or a benchmark level to follow
• Insights on How and when to tune the compression levels

Pain Points
• No visibility of the benchmarks figures
• No system to monitor the current levels on a real time basis
• Insights are only after the process is carried out.
TOM
Fuel Injection Manager

“My job is to monitor the fuel levels and adjust the release frequency to ensure a proper mix in the combustion.”

About
- 42, married, 16 years of power plant experience.
- Fuel inventory and release strategy.
- Results from my output would be the inputs to the drive shaft manager

Responsibilities
- Fuel sources and other by-products
- Check the fuel levels and inventory
- Release frequency.

Main Goals
- Fuel is never short in the combustion process

Needs
- Need to have a view of the optimum or a benchmark level to follow
- Insights on How and when to tune the fuel levels

Pain Points
- No visibility of the benchmarks figures
- No system to monitor the current levels on a real time basis
- Insights are only after the process is carried out.
RICHARD
Drive Shaft Supervisor

“I have quite a bit of tasks as I have to oversee temperature and accordingly the min RPMs of turbine blades”

About
• 34, married, 6 years of power plant experience.
• Temperature & min RPM of blades and drive shaft.
• Results from my output would be the inputs to the Generator Supervisor

Responsibilities
• Ensure min temperature levels
• Ensure min RPM of the blades
• Drive shaft

Main Goals
• Efficient Power generation by ensuring the max RPMs of the blade and drive shaft

Needs
• Visibility on the RPMs on real time basis
• Drive shaft switch (Y./N)

Pain Points
• No visibility of the Drive shaft activation
• No system to monitor the current RPMs on a real time basis
• Insights are only after the process is carried out.
TINA
Generator Supervisor

“I conclude more or less the entire process with the final results of electricity generation”

About
- 29, single, 6 years of power plant experience.
- Supervising the magnetic field.
- Results from my output would generate the electric energy which may serve as inputs to another power generator turbine (for e.g. Steam turbine)

Responsibilities
- Check rotation of coils on magnet with maximum possible RPMs

Main Goals
- Electric energy is generated with the help of electrons through power of magnetic field

Needs
- Need to have a view of the optimum or a benchmark RPM level to follow

Pain Points
- No visibility of the RPM figures
- No system to monitor the current levels on a real time basis
- Insights are only after the process is carried out.
As a **Air Compression Supervisor**

I need a way to **constantly observe the air compression levels**

so that I can to **tune the air flow based on the control range/bandwidths with upper and lower limits.**
Point of

As a Fuel Injection Manager

I need a way to check the quantity of fuel to be maintained and its release frequency to inject in for combustion.

so that the mixture of the compressed air and fuel is always at optimum level to ensure the efficiency in next steps of drive shaft movement.
Point of

As a ___Drive Shaft Supervisor_____

I need a way to a) check the temperature of the gas from the ignited mixture b) to check the turbine blades rpm

so that a) I can ensure to initiate the movement of the turbine blades and maintain at a minimum spin level of 3000 rpm b) it should cause a drive shaft.
Point of

As a ___Generator Supervisor_____

I need a way to ensure the rotation of the generator with its minimum required speed.

so that the attached magnet with copper coils create a magnetic field and generate electrons to generate the electric energy.
UX Journey
Describe Actions, Mindset, Feelings and Touchpoints
### User Experience Journey – 1) Checking the Air compression level

<table>
<thead>
<tr>
<th>ACTIONS</th>
<th>Open the excel of manually logged in daily compression levels</th>
<th>Check the updated average of the compression levels</th>
<th>Setup a benchmark level manually for today</th>
<th>Switch on the air flow in the turbine</th>
<th>Observe the analog device manually which observes the levels</th>
<th>Note down the levels manually and update the same in the excel at the EOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINDSET</td>
<td>Daily task</td>
<td>Why manually?</td>
<td>No Algorithm or data to set a benchmark on</td>
<td>Finally let machine do something now</td>
<td>Have to manually compare and check with benchmark</td>
<td>Finally the task is done!</td>
</tr>
<tr>
<td>FEELING</td>
<td>😊</td>
<td></td>
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</tbody>
</table>
Prototype screens for an IoT application to solve your PoV

You can use this space to insert your mockup(s):

STAGE#1 – Air compression levels

[Diagram of air compression levels with data and graphs]
STAGE #2 – FUEL INJECTION
STAGE # 3 – DRIVE SHAFT
STAGE # 4 – GENERATOR (ROTATION)
STAGE # 5 ELECTRON (ELECTRIC ENERGY) GENERATION