A successful study case of collaboration through PI system: University of Granada and Abbott Lab.

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Agenda

- About University of Granada.
- PI System in Granada University.
- Collaboration between Granada University and Abbott Lab.
- Conclusion



University of Granada

- **Granada** is located in the South of Spain at the foot of the Sierra Nevada mountains.
- Alhambra is a UNESCO World Heritage Site and one of Spain's major tourist attractions.
- The University of Granada was officially founded in 1531 by Carlos I of Spain.

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University of Granada (UGR)

- Fourth largest university in Spain
 - 70.000 students and 3500 teachers.
- Popular university for international students (and Erasmus students).
- It is among the top five in Spain according to Shangai and Taiwan rankings.
 - High Positions in Information Science, Computer Science and Engineering, and Mathematics.



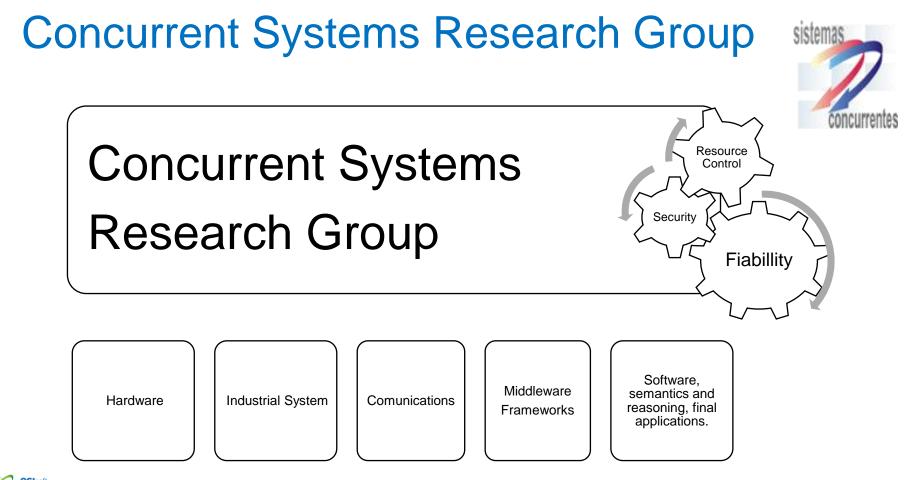


Computer & Telecommunications Engineering Campus

It is based in three pillars:

- Training: ETSIIT with 2.500 students BSc, MSc and PhD.
- Research: CITIC
- Transfer of Research Results: CETIC

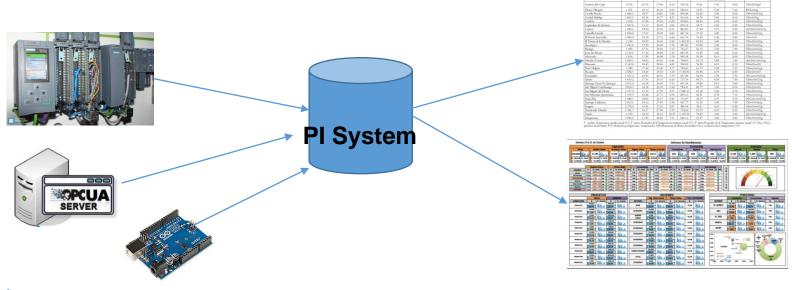




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PI System in UGR

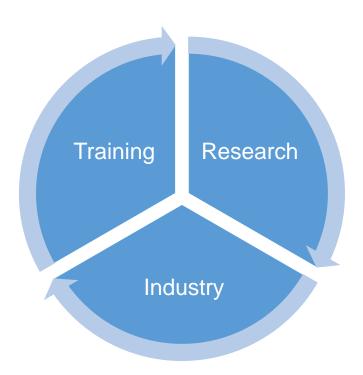
• PI System is an essential platform to centralize and historize data in industrial environments.



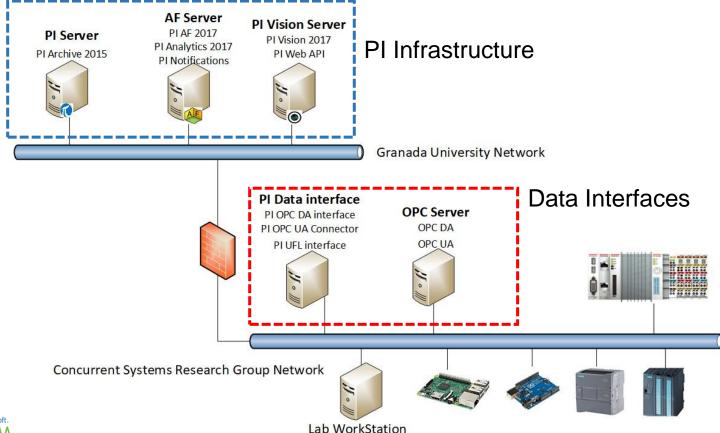
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PI System in UGR

- The collaboration between OSISoft and UGR for PI System platform is applied in the University on three dimensions:
 - Training
 - Research
 - Industry experience



PI System in UGR: The infrastructure





PI System in UGR: Training

Training of PI system infrastructure is performed at different levels to BSc and MSc students of telecommunications and computer science:

- Specific seminars about PI system infrastructure (PIVision, ...) applied to real industrial case study
- Application of PI in MSc courses of IoT and Industry 4.0.
- Preparation of BSc and MSc End Projects applied to industry problems.



PI System in UGR: Our research interests

 Mechanisms and strategies to improve integration and interoperability in industrial systems (e.g., OPC-UA, Cloud, IIOT).

• Methods and Techniques that facilitate the Modeling of industrial systems (e.g. MDE, code generation).



PI System in UGR: Our research interests

• Improvement of operational intelligence of industrial processes for the maintenance, control and supervision based on artificial intelligence (predictive methods, ...)

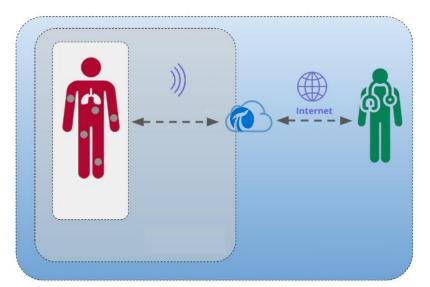
 Application to the development of continuous monitoring systems applied to health, sport and digital homes.



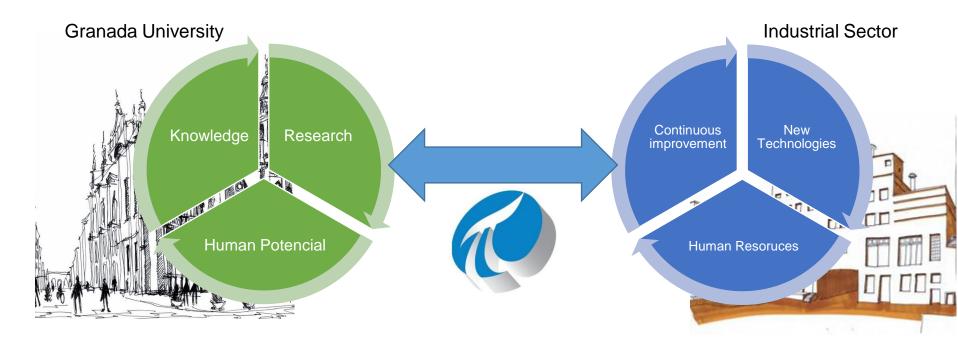
PI System in UGR: Real Application

- A continuous patient monitoring system was developed using PI for monitoring biodata signals of chronical diseases:
 - Biodata are collected from wearable devices.
 - Biodata are stored and processed for medical inspections
- This work was presented in the last EMEA Users Conference 2017 in London.

https://www.osisoft.com/Presentations/IoT-in-Healthcare--Using-the-PI-System-for-Continuous-Patient-Monitoring/



Collaboration between UGR and Abbott Lab.



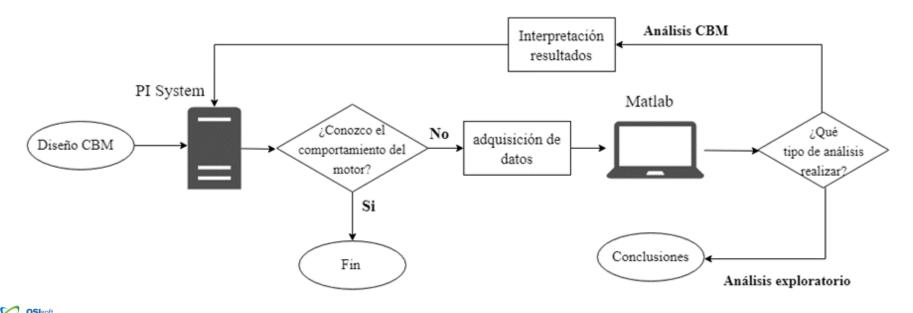


• Evaluate the possible faults of induction motors of the drying towers by means thermal and vibration analysis to prevent any malfunction.

• Design a predict model to improve the maintenance of induction motors.

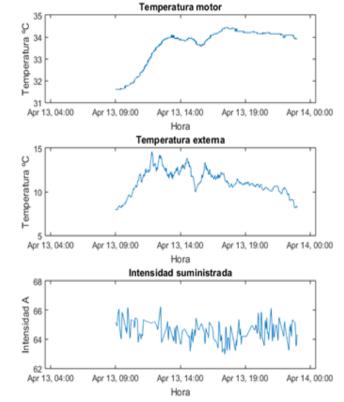


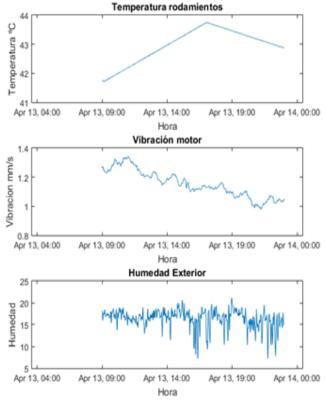
• Methodology:



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 Multivariant Analysis in MATLAB from data extracted from PI



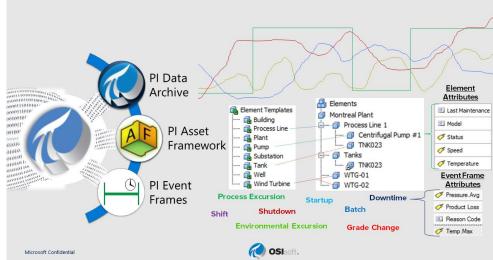




- Analysis Results:
 - Initial multivariant analysis does not give significative correlations
 - Determination of the conditions (warning and critical) using unidimensional statistics analyzing data from different days.



• From analysis, a CBM is modelled to four induction motors of the drying towers





UGR-Abbott Lab: Design of CBM

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#### **UGR-Abbott Lab: Design of CBM**



#### Conclusions

- PI gives important advantages to the research of UGR.
  - PI gives a storage of big data volumes that can be analysed in real-time.
  - PI can be complemented by other research tools such as R or MATLAB.
  - PI helps the centralization and management of data generated by different research projects.

- PI is a perfect infrastructure that helps the knowledge transfer between university and industry.
  - Industrial data can be acceded to improve the operational intelligence or maintenance.

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#### University of Granada

A successful study case of collaboration through PI system

#### CHALLENGE

Improve the research of UGR in industrial systems and helps the collaborations with local industry companies to transfer knowledge.

- Set solid relationships with local industry.
- Conceptualize new researches and develop new technologies applicable to industrial area towards industry 4.0
- Publish these researches in highimpact research journals

#### SOLUTION

Osisoft (PI) can become the nexus for finding and set collaborations with industry

- PI provide a data environment that can be exchanged by both parties (university and industrial companies).
- Each party (UGR and Abbot Lab) can be decoupled promoting independent research studies

#### RESULTS

Preliminary results can be significant and profitable by both parties.

- Best professional training for students in industrial area.
- Valuable research results are achieving in UGR.
- A prototype of a tool for conditioned based maintenance for Abbott Lab. was develop by a BSc End of Project.





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#### **Questions?**

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