Internship title

Big Data: Field Data Analysis to build product reliability models

Company

Markem-Imaje is a trusted world manufacturer of product identification and traceability solutions, offering a full line of reliable and innovative technologies and solutions.

Facts sheet
- 3,000 employees
- 300 engineers
- 7 coding technologies
- 6 research centers
- 30 subsidiaries

markem·imaje
a Dover company

- ❑ **3 divisions:** USA, UK, FR
- ❑ **Solutions**
  Product, Case and Pallet coding
- ❑ **Printers technologies**
  Inkjet, Thermal Inkjet, Thermal Transfer, Laser and Print and Apply Labeling
- ❑ **Substrates**
  Plastics, glass, metal, cardboard, flexible packaging, directly onto food,..
- ❑ **Markets**
  Food, beverage, cosmetics, toiletries, electrical & electronics equipment,

Context introduction

Product reliability and income are intimately linked. Therefore, it is crucial to have models in order predict a product reliability before it is released to the market, to size validation plans, to monitor product reliability during development as well as in the field, to define appropriate preventive maintenance and to define relevant reliability target (see picture below). These models are also essential to learn about the relationship between reliability, product configuration and use conditions, especially for problemed solving.

To build these models, we need data. While testing is essential to have this data (life distribution), it is not the sole source of information. Data received from the field is the "true" measure of products reliability. It includes warranty data (sales and returns) and information about the way our customers are using our products (Customer Usage Profiles: CUP).

Field data could be gathered from several sources (see picture below):

- Logfiles: events log records, saved in the machines
- SAP (Systems, Applications and Products for data processing): technicians report information about their interventions (dates, equipment running hours, product configuration, failed parts, reparation actions, ….) in SAP
- Repair Center: some parts are refurbished and reused. A deep analysis could be then performed: failure modes and causes are reported
- Helpdesk: information about the equipment and its use conditions could be collected when the customer call the helpdesk
- IOT (Internet Of Things): data could be remotely collected via implemented sensors
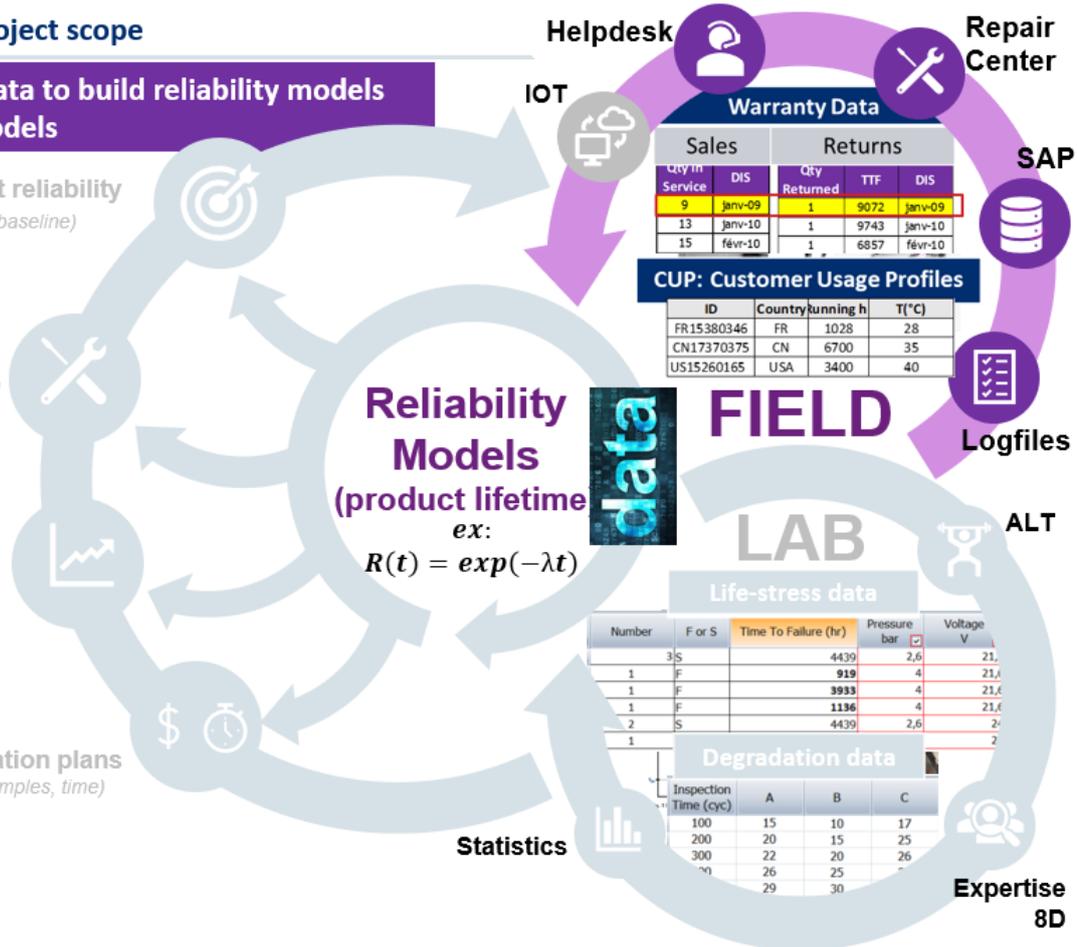
Challenge/project scope

Using filed data to build reliability models reliability models

Define relevant reliability target *(metrics & baseline)*

Preventive maintenance, warranty, …

Monitor the Reliability *(development & field)*,

Size validation plans *(number of samples, time)*

Statistics

Reliability Models (product lifetime

$$ex: R(t) = exp(-\lambda t)$$

FIELD

LAB

Mission & Deliverables

The aim of this internship is to elaborate and implement a process to:

- Gather existing field data (logfiles, SAP, helpdesk, repair center, clouds)
- **Apply machine learning (supervised and unsupervised) to identify relationships between the unreliability (and quality issues in general), the product configuration and the use conditions (sector, country, …)**
- Define adequate outputs for problem solving (8D, …) as well as reliability and quality program (actions to be carried out to improve reliability and quality)

Keywords

Data science, Machine learning, Field Reliability Data, Reliability Modeling

Location

- Bourg-Les-Valence France
- If required, travel to KEENE, BOSTON or NOTTINGHAM are possible

Skill profile

- Bac+5 in reliability/quality engineering or industrial engineering or data scientist or applied mathematics
- Organizational and leadership abilities
- Excellent communication skills
- Problem-solving aptitude
- Fluent English

Perspectives after the internship

- This multidisciplinary subject will allow you to acquire strong knowledge and skills in the following fields: customer usage profile, reliability modeling, data analysis, IVVQ (Integration Verification Validation) process

- Working during 6 months in a multinational and multicultural company will improve your communication skills and capability to work in an international environment (France, UK and USA)

- Hiring after the internship would be possible in one of our technical centers (France, UK or USA), in departments like Reliability, Quality or IVVQ.

Internship allowance

- Gross salary: 1100/month
- If the student has two residences in his name, an additional allowance is granted: up to 250 € / month
- Monthly public transit pass: 50% of the monthly public transit pass (train, bus)

Contacts

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