A knowledge management and processing framework is needed in order to efficiently store, organize and process existing knowledge of a certain domain, to gain new insights, or efficiently reuse existing knowledge. A prototype of a platform (a software system) for information processing and knowledge management (IPKM) was implemented. In the context of CLAFIS (EU-FP7-Project “Crop, Livestock and Forests Integrated System for Intelligent Automation”), it focuses on the specific requirements of the agricultural domain.

The different “views” on the framework are
- the architecture itself and implementation of needed knowledge management in several realized Use Cases
- the used data aspects and
- the cloud-readiness of the architecture and the parallelism of the used algorithms

### Software Architecture

- **Modules**: encapsulate and bundle different Use Cases and can be added and removed to the framework
- **Services**: smallest unit of functionality, modules are a collection of services, also general services are available
- **Support for different data storage technologies** (relational database, NoSQL database, etc.)
- **Layered architecture**: data access, business logic (services and modules), interface layer (web services: SOAP, REST)
- **Cloud ready**: support for IaaS & PaaS, integration of proven cloud patterns for a robust and resilient execution
- **Technologies**: modern programming languages and frameworks (ORMapping with Spring Data, Spring Framework, Java EE)
- **Open to new knowledge**: easily extendable (dependency injection pattern) by integrating external services, data, technologies

### Implemented Modules

In the course of the CLAFIS project, the following modules were implemented as a proof-of-concept of the framework:

- **Knowledge Extraction Module**
  - Prototype for Chemical Documents (extraction of meta data of e.g. governmental chemical documents)
  - Extraction- and Search-Functionalities for PDF Documents
- **Plant Protection Module**
  - Calculation of Disease Pressure (ad-hoc or periodically)
  - DPM (Disease Pressure Model) developed by LUKE
  - DPM (Disease Pressure Model) developed by DACOM
- **Cereal Maturation Module**
  - Cereal Maturation Formula developed by LUKE

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Example: Plant Protection Module

Plant Protection Web Service (SOAP & REST)
Spring Framework (MVC) and Apache CXF

General Services
Weather Data Service (FMIS Weather Data Service, MAXSOFT Weather Data Service), Field Service (available fields, crop history)

Data Services
access to local relational database, logging to Apache Cassandra (NoSQL), access to global database (CLAFIS database)

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