**Use Cases**

**Heart Failure**
- Readmission & real-time admission prediction of telemonitored heart failure patients

**Diabetes**
- Personal guidance of diabetes patients

**Breast Cancer**
- Guideline-based & Experience-based CDSS for Breast Cancer

**Applications**
- Predictive Modelling & Patient Stratification
- Clinical Knowledge Extraction and Exploitation
- Guideline-based & Experience-based Clinical Decision Support Systems (CDSS)
- Authoring tool for CDSS
- Smart Electronic Health Record Systems & Semantic Web Technologies
- Patient Empowerment & Personalised Guidance
- Blockchain & Smart Contracts
- Data Curation

**Main Features:**
- Range of algorithms and AI techniques for personalised diagnostic and treatment support, patient stratification and predictive models
- Interactive and intuitive visual interfaces
- Configurable and reusable modules easily adaptable to different use cases (diseases, clinical specialties…)
- Integration with external 3rd party solutions & Electronic Health Record (EHR) systems using wide-use standards (HL7, FHIR, OpenEHR, SNOMED CT, …)
- Scalable solutions from local to big data computing
- Transparent licensing schemes

**eHST** is a toolkit for rapid-prototyping and fast development for data analysis and decision support systems in eHealth and mHealth applications. It implements a range of algorithms and visual analytics approaches allowing personalised, predictive and preventive medicine approaches.
## Modules and Architecture

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Dependencies*</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>ehs_dem</td>
<td>Decisional Event Modelling</td>
<td>None</td>
<td>Java</td>
</tr>
<tr>
<td>ehs_cig</td>
<td>Clinical Guideline Formalization to Computer Interpretable Formats</td>
<td>HL7 – CDS</td>
<td>NRL, Java, XML</td>
</tr>
<tr>
<td>ehs_o2j</td>
<td>Ontology Handler</td>
<td>Protégé</td>
<td>Java, OWL</td>
</tr>
<tr>
<td>ehs_cdss</td>
<td>Adaptive Rule-based Decision Support System</td>
<td>Drools, Maven</td>
<td>Java, SQL, DRL</td>
</tr>
<tr>
<td>ehs_wfe</td>
<td>Web Front-end for Fast Prototyping</td>
<td>AngularJS</td>
<td>Javascript</td>
</tr>
<tr>
<td>ehs_va</td>
<td>Visual Analytics</td>
<td>Dash, Bokeh, Plotly</td>
<td>Python</td>
</tr>
<tr>
<td>ehs_app</td>
<td>Android App Fast Prototyping &amp; Deployment</td>
<td>Android SDK, Retrofit</td>
<td>Java</td>
</tr>
<tr>
<td>ehs_fhir</td>
<td>FHIR Resource Repository &amp; Exchange</td>
<td>REST HAPI, Tomcat</td>
<td>Java</td>
</tr>
<tr>
<td>ehs_pm</td>
<td>Predictive Modelling &amp; Data Mining Algorithms</td>
<td>SCIKIT-Learn</td>
<td>Python, R</td>
</tr>
<tr>
<td>ehs_txc</td>
<td>Text Codification to Clinical Terminologies (SNOMED CT, UML)</td>
<td>IXA Pipes</td>
<td>Java</td>
</tr>
</tbody>
</table>

*eHST is structured into a small set of modules with minimal dependencies.

Supported standard formats:
- **Document streams**: any JSON or XML-encoded
- **Image formats**: DICOM, JPEG, TIFF
- **Terminologies**: SNOMED CT, CIE9/10
- **EHR standards**: HL7, OpenEHR, ISO13606