# ARTIFICIAL INTELLIGENCE

Combining symbolic and sub-symbolic methods to realize explainable decision support systems

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<th>Funded By</th>
<th>UNIVERSITA’ DEGLI STUDI DI VERONA [P.iva/CF:01541040232]</th>
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<tr>
<td>Supervisor</td>
<td>SALA PIETRO -</td>
</tr>
<tr>
<td>Contact</td>
<td>Combi Carlo <a href="mailto:carlo.combi@univr.it">carlo.combi@univr.it</a></td>
</tr>
<tr>
<td></td>
<td>SALA PIETRO -</td>
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### Context of the research activity

The research will focus on the development of applications of an ensemble of data mining/business intelligence/formal frameworks for explaining predictions of a classifier/regressor by analysing the input data, the training data, the trained model, and the outcomes provided for unseen instances. Such applications will be designed, analyzed, and discussed first from a methodological, and more general, standpoint, then, they will be instantiated and tested on real world safety critical domains.

### Objectives

Nowadays, machine learning methods for both supervised and unsupervised learning provide an unprecedented level of accuracy in predicting outcomes which play an ever growing role in supporting decision for critical tasks. Such phenomenon can be observed at the edge of industrial, business, and healthcare domains. However, the more critical the scenario the more the prediction alone does not suffices for supporting decision. Those in charge of the decision (e.g., stakeholders) more than often demand supportive information in the form of similar instances, ad-hoc measures, forecasts of future outcomes, and general rules. Data mining and business intelligence techniques as well as symbolic methods such as model checking represent viable well-developed solutions for providing such information.

### Skills and competencies for the development of the activity

The candidate should have a strong background in some of the following topics:
- machine learning models;
- data mining;
- business intelligence and OLAP analysis;
- formal methods and/or model checking techniques;
- process mining and/or learning automata theory.

The candidate should have the willingness to improve her/his knowledge in the aforementioned disciplines especially if she/he does not have a strong background in some of them at the time of the application.