# Introduction

**Goal**
- Solution to generate code (such as Java and PHP) using a language independent ontology-based abstract algorithm.
- Code generated can then be deployed on the server and run as a web service. The code can be modified and regenerated at run time to make the service more dynamic.
- Collaborate with Trinity PhD Simone Grassi’s research, the aim of which is to create an abstract specification of algorithms (based on a set of ontologies) as a Model Driven Platform to build software.

**State of the Art**
- Modelling techniques are an evolution in the field of software development.
- A modelling language can be used to express information, knowledge or systems in a structure that is defined by a consistent set of rules. Rules are used to interpret the meaning of components in the structure.
- An ontology-based modelling algorithm
  - Ontology is more semantic and descriptive than XML.
- A set of ontologies are created to add a rich set of semantic information to the modelling algorithm.
- Two major ontologies are:
  - Algorithm Ontology (AO): Tree structure model contains individuals that constitute an algorithm.
  - Specific System Logic Ontology (SSLO): Ontology specific for different languages like PHP or Java. It includes syntax rules for language features (control flow, operators, variables, etc) using XSLT.
- This approach decouples the algorithm from any particular architecture, framework or programming language.

# Code Generation Engine

- CGE interprets AO using SSLO to generate code
  - Output can be functions, full classes, or any valid code
  - Code can be deployed on the server as web services
  - Code generated depends on the SSLO and AO, but the CGE is independent from any specific programming language.
  - Code can be modified and regenerated by changing the AO, making the service dynamic and pluggable.

# New Approach to Algorithm Modelling

- An ontology-based modelling algorithm
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# Test and Evaluation

- The model of a non-recursive Quicksort algorithm was created. PHP was chosen to be the target output language. The final PHP code was then deployed on the server and executed successfully.
- Some modification made to the model, produced a new version of the code, used to dynamically change an online service.

# Conclusion

- CGE is very generic and language/framework independent
- Easy to extend to a new language by creating a new SSLO
- Provide ability for supporting dynamic, pluggable web services

# Further Information

- Contact Information
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**M.Sc. in Computer Science**

**(Networks and Distributed Systems)**