**Implementing the Information Fusion Systems in the URREF Ontology**

**This paper we will cover an illustration if the Uncertainty Representation and Reasoning Evaluation Framework (URREF) and implementation of various use cases in the URREF ontology. We highlight how the potential data sources from the use cases will be identified and implementing in the URREF framework to assess the Uncertainty Model. In this paper we focus to implement 2 use cases and compare the uncertainty evaluation done by the URREF model.**

**Maritime use case Implementation**

The first use case that has been visited to be implemented in the URREF ontology framework is the maritime use case[1]. The class evaluation in the URREF ontology identifies various use cases implemented. An instance namely **MaritimeACSEvaluation** in the **Evaluation** class represents the maritime use case implementation in the framework. Every input mentioned in table four in the maritime use case paper [1]  has been added an instance in the **Evidence** class. **Evidence** class is an expression in some logical language that evaluates to a truth-value (formula, axiom, assertion). The maritime use case had 13 evidences, all of which have been added to the URREF ontology. The description of every input is annotated in the ontology. All the 13 inputs of maritime use case in the **Evidences** class are connected to the **MaritimeACSEvaluation** instance from the **Evaluation** class using an object property namely **IsEvaluationElementOf**. This object property helps connect all the **Evidences** from different use cases to its respective instance in the **Evaluation** class. Every input entered in the evidence class for the maritime use case has a piece of information (POI) attached. This POI is stored as data property namely **HasPieceOfInformation** in the ontology. The POI is unique to every evidence therefore the data property **HasPieceOfInformation** is individually connected to every **Evidence** of the maritime use case containing exclusive information for every evidence. Every POI is of different type I.e. either **Generic** or **Singular**. This information is stored using the data property **TypeOfInformation**. So, every instance of the **Evidence** class for maritime use case is connected to data property **TypeOfInformation**.

Every input in the maritime use case has been originated form a set sources, every potential source mentioned in the maritime [1] use case has been added as an instance in the **Source** class in ontology. Every **Evidence** in the maritime use case has been linked to a **Source** using the object property **HasSource**; **HasSource** property connects the instances from the class **Source** to the instances in class **Evidence** respectively. Every evidence has an uncertainty support associated with it. This uncertainty is stored various instance in the **UncertaintySupport** class. And every **Evidence** from the maritime use case is connected to the required **UncertaintySupport** using the object property **HasUncertaintySupport**. Every input in the maritime use case also has an imperfection, these imperfections are captured by the class **UncertaintyType**. This class has different types of imperfections are created as instances. The two classes **Evidence** and the **UncertaintyType** are connected by the object property **HasImperfection**. So, every **Evidence** from the maritime use case is connected to its attained imperfection I.e. stored in **UncertaintyType** using the object property **HasImperfection**.

Out of the different factors that affect the input in maritime use case one of the factors that affect the input is Uncertainty nature, this information is captured and stored in the **UncertaintyNature** class. This class stores different types of Uncertainty (Ex: **Epistemic** and **Aleatory** in this use case) as instances. The two classes **Evidence** and the **UncertaintyType** are connected by the object property **NatureOfUncertainty**. So, every evidence from the maritime use case is connected to the type of uncertainty it acquires using the object property **NatureOfUncertainty**. Uncertainty derivation is also one of the factors that affects the input in different domains. Therefor the URREF ontology has a class namely **UncertaintyDerivation** to capture the derivation of uncertainty from diverse domains. In the maritime use case the uncertainty derivation is either Subjective or Objective, these two are added as instances to the **UncertaintyDerivation** class as instances and connected to the evidences from maritime use case using the object property **DerivationOfUncertainty.**