# Chapter 3: Methodology

## Chapter Overview

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## Research Methodology

This research is based on the conversion of the process of Raster to Vector in classified GIS imagery with the use of best-fit conversion parameters. The theory of the research is based on a hypothesis that has been established as follows. **"Images that have similar characteristics and can be classified as such using an image classifier can have a similar set of best-fit conversion parameters for Raster to Vector conversion to obtain optimal results of conversion."**

### Research Paradigm

When considering the different approaches that can be considered when approaching this research topic. We can identify three clear approaches that have been established by researchers. These are the approaches of 1) Positivism 2) Interpretivism 3) Critical theory. This is essential because as consumers of research, we have to be able to look deeper into claims made by researchers who adhere to different research paradigms (Reference here).

we are establishing a hypothesis and are testing to obtain empirical data to form a relation between the phenomena we can consider the research paradigm of this research to be of a **positivism approach**.

### Research Methodology

When considering research methodologies, there are two main types of methods that researches generally can be categorized under. 1) Deductive approach 2) Inductive approach. The deductive approach starts with specifying the objective. The inductive approach emphasizes on observation and deriving conclusions through observation. (Reference here).

And as we are establishing this hypothesis and directing our research to test it. We can consider this research to be of the **deductive approach**.

## Design Methodology

Two main design methodologies can be considered to be used to design the proposed system. These can be identified as Object-Oriented Analysis and Design (OOAD) and Structured Systems Analysis and Design Method (SSADM). Each of these methods have their pros and cons according to what kind of system is being designed. In this section we will identify factors when considering each design methodology to pick the most suitable approach for designing the proposed system.

In the Object-Oriented analysis and design approach initially, requirements are identified and a software specification and documentation is developed in terms of an object model. These are objects that integrate both data and function ns and are modeled after real-world objects. After these objects are identified it is then mapped into classes and constraints and relationships are identified. This methodology gives access to certain OOD principles such as classes and objects, encapsulation, polymorphism and interfaces/abstract classes. OOD can be considered a good design methodology to manage complexity in applications and to enable the reusability of components.

In the structured system analysis and design methodology graphical tools are used in a systematic approach to refine objectives out of well-defined user requirements. In the case of these requirements not being clearly described initially, it can lead to problems in the process of the solution created. This approach also does not accommodate dynamic user requirements that might be subjected to change through the development life cycle of the solution.

When considering the above factors as the requirements of the proposed solution may be subject to change through the life cycle of this research. The **OOAD** methodology is better suited for the analysis and design methodology of this project.

## Development Methodology

When starting a project that has as purpose the software development, it is very important to use a methodology that increases its success rate. The success rate of software development projects can be increased by using a methodology that is adequate for the specific characteristics of those projects. Multiple software development methodologies that can be employed when determining the development life cycle of a software application. These can be identified as follows. Waterfall, Agile, Feature-Driven, Iterative, Spiral, Prototyping and RAD (Rapid

Application Development). The following features that might be considered as factors that affect which mentioned methodology is most suitable for this project can be identified due to their repeated occurrence during this project.

* The initial requirements are identified and recorded in the Project initiation document.
* These requirements are subjected to change over the development of the project due to feedback and development constraints
* Development is done by breaking down the project into components
* Development will be done component by component.
* Each component will have the ability to be tested independently.

The Agile development methodology can be considered an iterative and incremental process that focuses on rapid delivery of working prototypes that finally create the working product in incremental builds. When considering the above stated factors, it is evident that an **Agile** Software development methodology is better suited for the development methodology of this project.

## Chapter Summary