



# COMPUTATIONALLY INTELLIGENT EXPERT SYSTEM FOR DESIGN PARAMETERIZATION OF STRATEGIC TERMINAL WEAPON SYSTEM



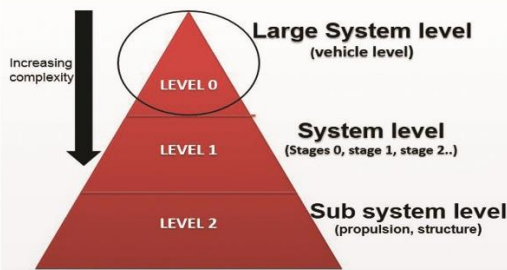
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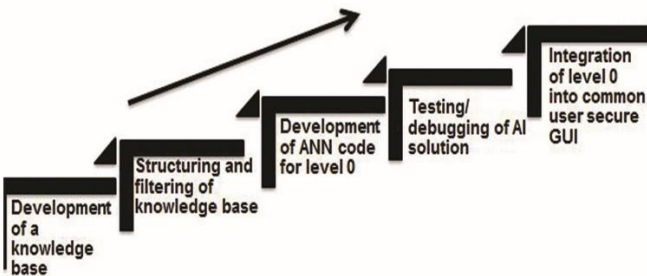
## SCOPE

- > Development of a computationally intelligent tool for numerical prediction of design parameters for a user-defined ballistic system.
- > The Expert System is based on parametric knowledge base of various worldwide weapon systems and logic inferences.
- > Numerical prediction of new design parameters is carried out using artificial intelligence embedded in the Expert system.

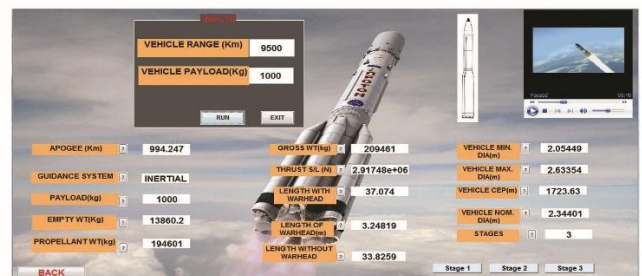
## METHODOLOGY



- > To determine design parameters of carrier vehicle (Level 0), a top down approach is developed and intelligent solution is evolved

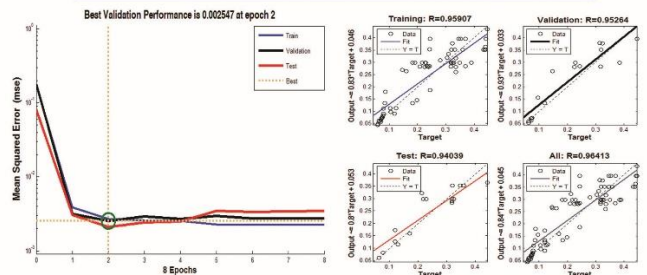


## GRAPHICAL USER INTERFACE

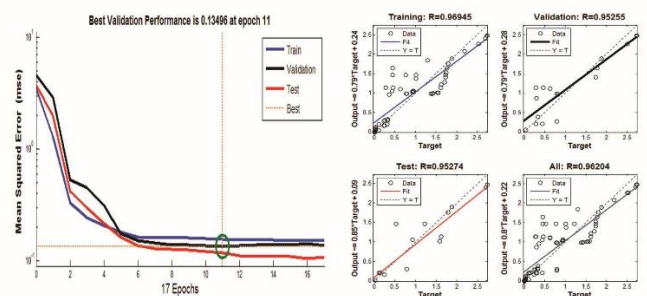


## ANN RESULTS

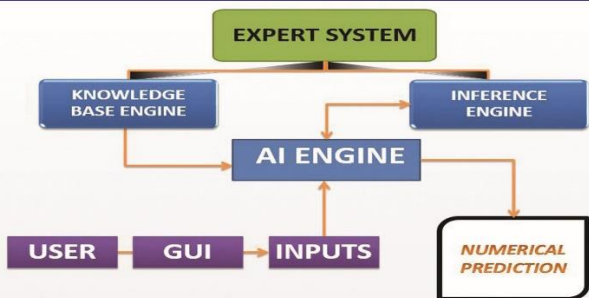
### VEHICLE LENGTH WITH WARHEAD



### VEHICLE PROPELLANT WEIGHT



## SYSTEM BLOCK DIAGRAM



- > The Intelligent computational tool consists of a knowledge base and logic(inference) engine.
- > knowledge base uses vehicle design data of various ballistic systems used world wide.
- > Logic(inference) engine guides the decision emulation process.
- > AI engine provides mathematical transfer function for numerical prediction of design parameters using

## CONCLUSIONS

- > Flattening of performance plot towards the end of training indicates there is no need of further iterations and optimal fitting has occurred.
- > The Mean Squared Error variation between validation, training and testing set error is very small.
- > Training, validation and test results, all shows R value of above 95%, which indicates a well fitted and generalization model