



VeriAbsL: Scalable Verification by Abstraction and Strategy Prediction

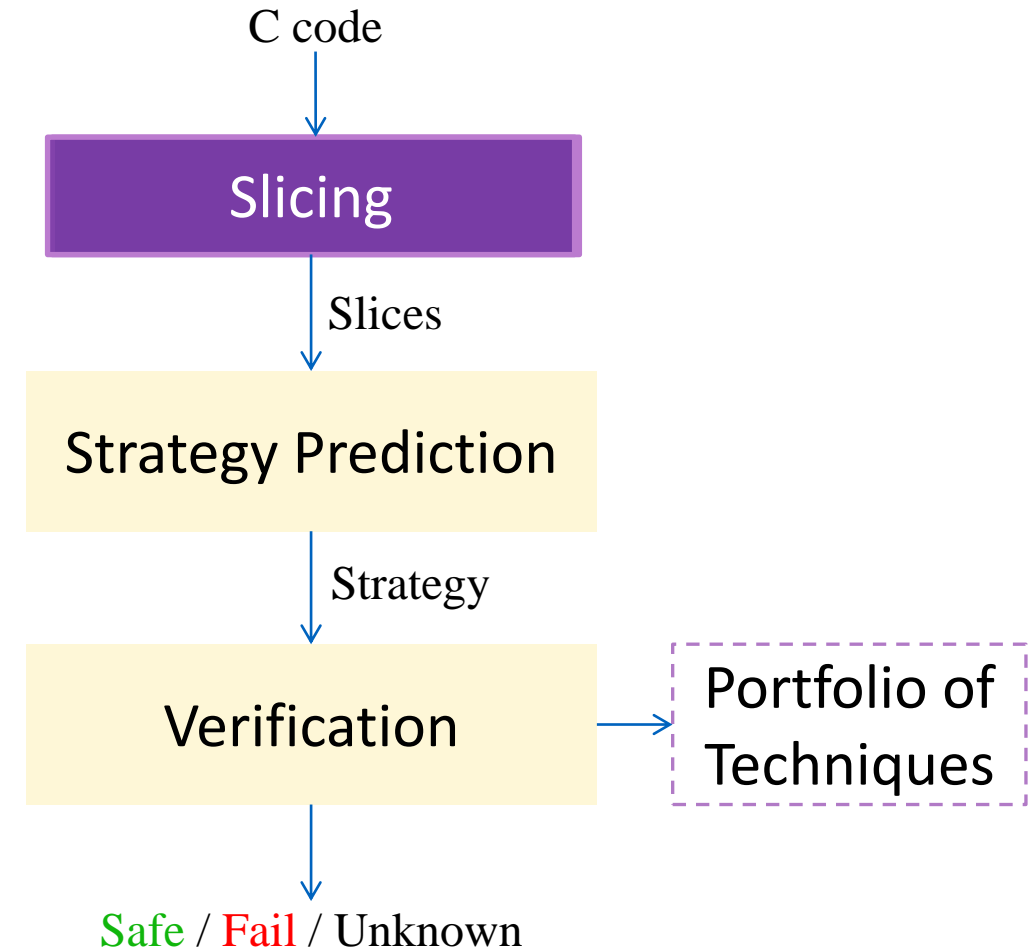
Priyanka Darke, Bharti Chimdyalwar, Sakshi Agrawal, Shrawan Kumar, R Venkatesh, Supratik Chakraborty

April 22, 2023

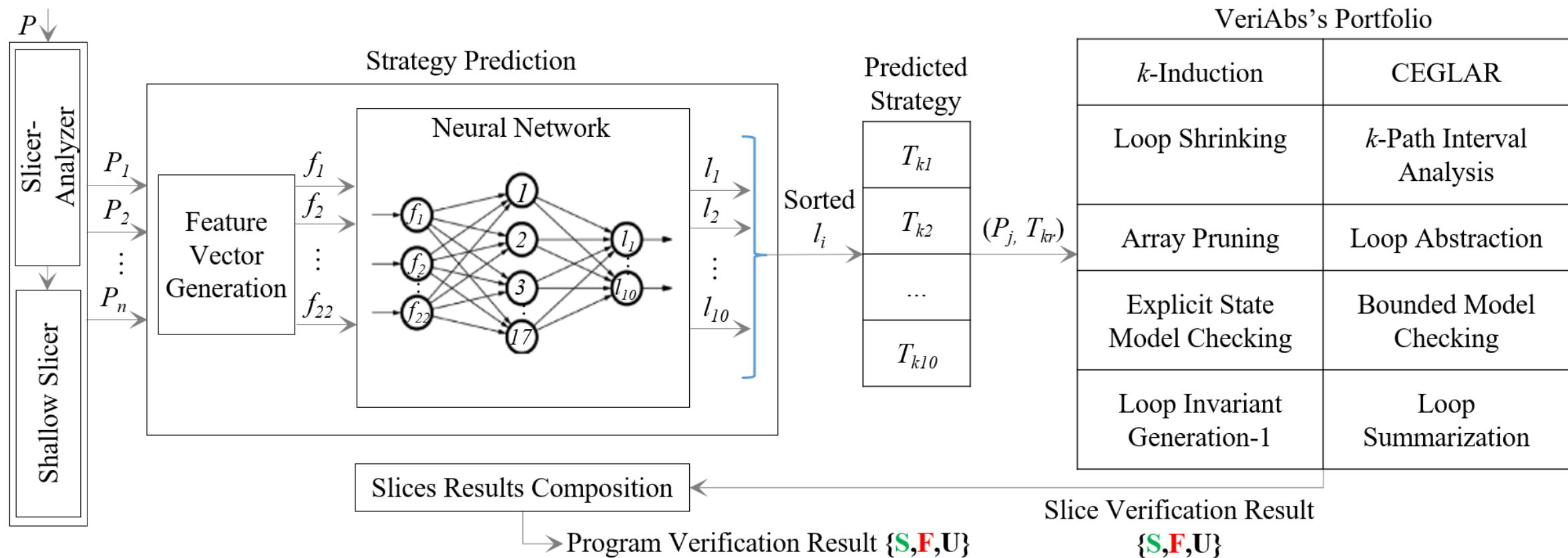


VeriAbsL

- A strategy prediction-based reachability verifier
- A neural network for strategy prediction
 - Boolean program features
 - Features describe program syntax and semantics
- Slicing before strategy selection
 - Slicer-analyzer
 - Shallow slicing
- Tooling: Built on top of VeriAbs, TCS Prism for slicing, program analysis, and abstractions; CBMC, MiniSat, Z3, CPAchecker, AFL-Fuzz



Architecture



Performance at SV-COMP'23

- Silver medal in ReachSafety
- Trained on 800 randomly selected benchmarks from ReachSafety SV-COMP 2022
- Comparison with Veriabs (ReachSafety winner)
 - Verified 227 more programs in 4% lesser time
 - Verified 475 programs that VeriAbs could not
 - Better strategies
 - Could not verify 248 programs that VeriAbs can
 - Technique not represented in training data
 - Verified 72 more programs in sub-categories missing from training data
- 8 incorrect results – bugs

Category	# Programs	% Programs Verified	Score
ReachSafety	6138	67.9	6478

