



VeriAbsL: Verification by Learning Verification Strategies

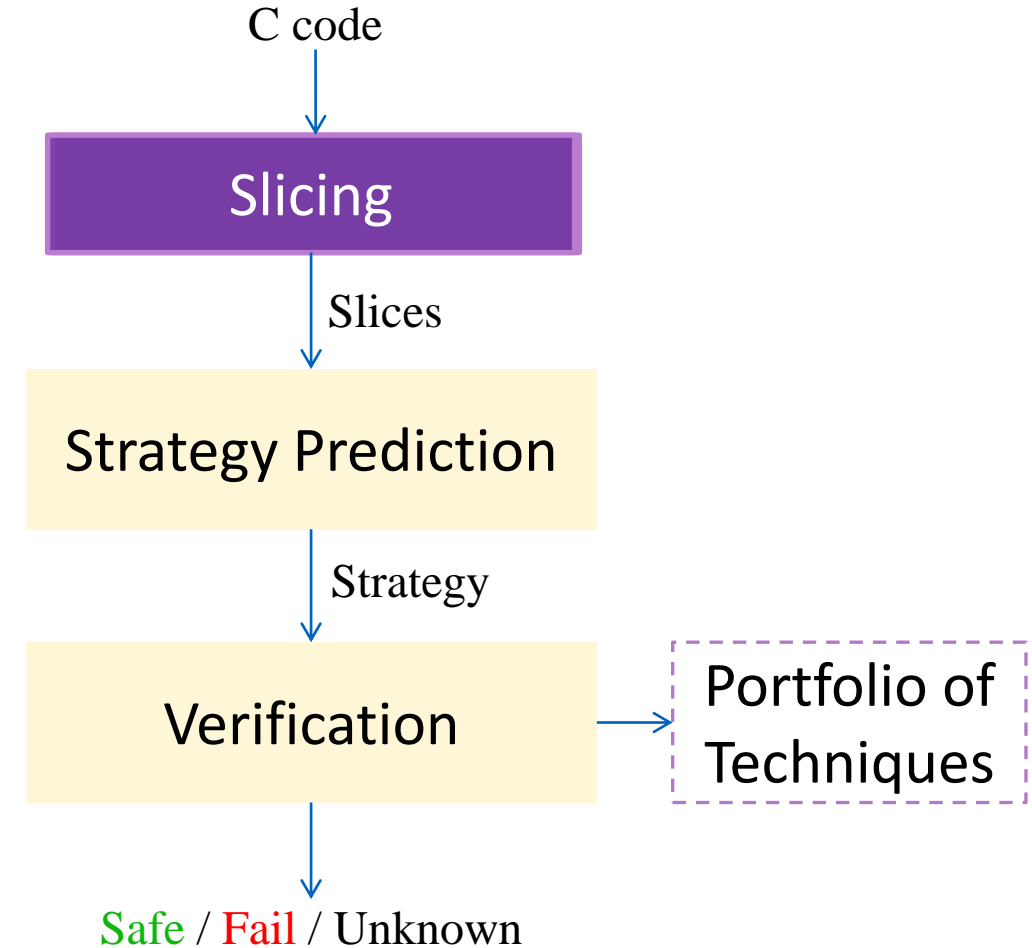
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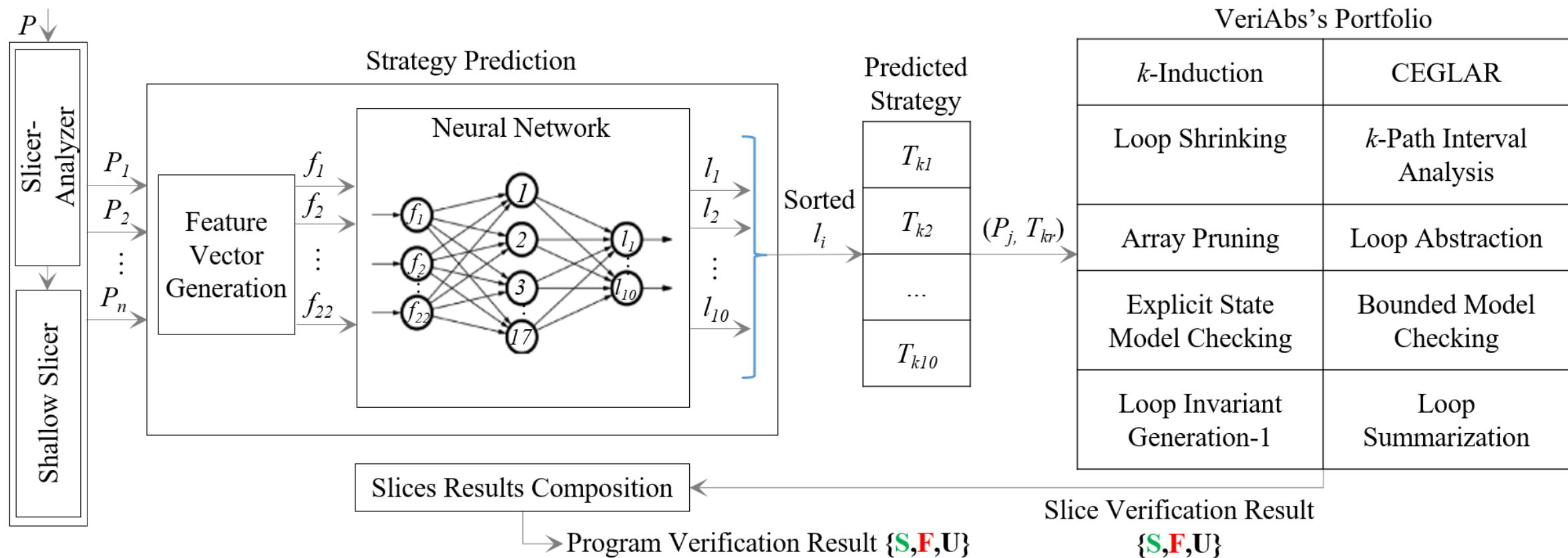


VeriAbsL

- A reachability verifier
- Predicts verification strategies
- Second year of participation
- Uses
 - Function based code slicing for scalability
 - A neural network for strategy prediction
 - Boolean program features
 - Features describe program syntax and semantics
 - VeriAbs's portfolio
- Tooling
 - Built on top of VeriAbs
 - TCS's program analysis framework for
 - slicing, program analysis, loop abstractions, invariant generation
 - Portfolio uses tools
 - CBMC, CPAchecker, AFL-Fuzz



Architecture



Performance at SV-COMP'24

- Gold medal in ReachSafety
- Trained on 800 benchmarks from ReachSafety SV-COMP 2023
- Verified 78.6% programs from benchmarks added in SV-COMP'24 (verified 4060 out of 5167)
 - These were unseen programs types or types missing from training data
- Verified
 - 167 more unseen programs than VeriAbs
 - Last year this number was 72 more than VeriAbs

Reach Safety / Year	# Programs	# Verified	% Verified	Score	Score Gap from VeriAbs	Incorrect
2024	11305	8213	62.6	10735	194	2
2023	6138	4167	58.7	6478	- 150	8

Sr. No.	Sub-category	# Programs	Max Possible Score	VeriAbsL Score
1	Arrays	433	753	695
2	BitVectors	49	83	71
3	Control Flow	66	103	128
4	ECA	1263	2046	1252
5	Floats	1072	1876	841
6	Heap	239	405	300
7	Loops	729	1257	921
8	Product Lines	597	929	910
9	Recursive	156	258	97
10	Seq.	584	768	533
11	XCSP	119	179	155
12	Comb.	671	912	224
13	Hardware	1224	1951	166
14	Hardness	4005	8010	6014
15	Fuzzie	15	15	0