Title
Program Analysis for Reliable Sensor Network Software

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**Introduction:** Early Identification of Errors in Embedded Sensor Network Systems

Using Staged Checks to Identify Errors

- Staged checks can detect many classes of errors in sensor networks
- Analysis improves software development
- Early error identification eliminates many problems before deployment
- Provides meaningful feedback to systems designers

Evaluating Checkers

- Static analysis is inherently formal and can provide powerful guarantees
- Static analysis can be applied to unknown and untrusted target systems
- Static analysis can be applied to partially-known systems
- Static analysis can be applied to partially-trusted systems

Approaching the Problem: Static Analysis of Program Source Code

(1) Begin with program code
(2) Transform code into readable format
(3) Apply domain-specific checks to transformed code
(4) Fix any noted error and compile code

Overview of Static Analysis of Program Source Code

- Static analysis of program source code
- Analysis improves software development
- Early error identification eliminates many problems before deployment
- Provides meaningful feedback to systems designers

Using Staged Checks to Identify Errors

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Current Challenges and Future Work

- Memory models and memory ownership verification
- Event-based framework is pushing the limits of static analysis
- Developing formal models of the system

Conclusion:

- Providing meaningful feedback to systems designers
- Early error identification eliminates many problems before deployment
- Provides meaningful feedback to systems designers

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