



Risk Analysis Models for Cyber Insurance

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Part of the H2020 project CYBECO on supporting cyber insurance from a behavioural choice perspective

Risk Analysis Models for Cyber Insurance

Model 1 – Cybersecurity risk analysis [to support IT owner]

Model 2 – Cyber-reinsurance portfolio [to support insurance company]

Model 3 – Granting a cyber insurance product [to support insurance company]

Cybersecurity risks and cyber insurance

Overcome risk matrices as risk calculation tool

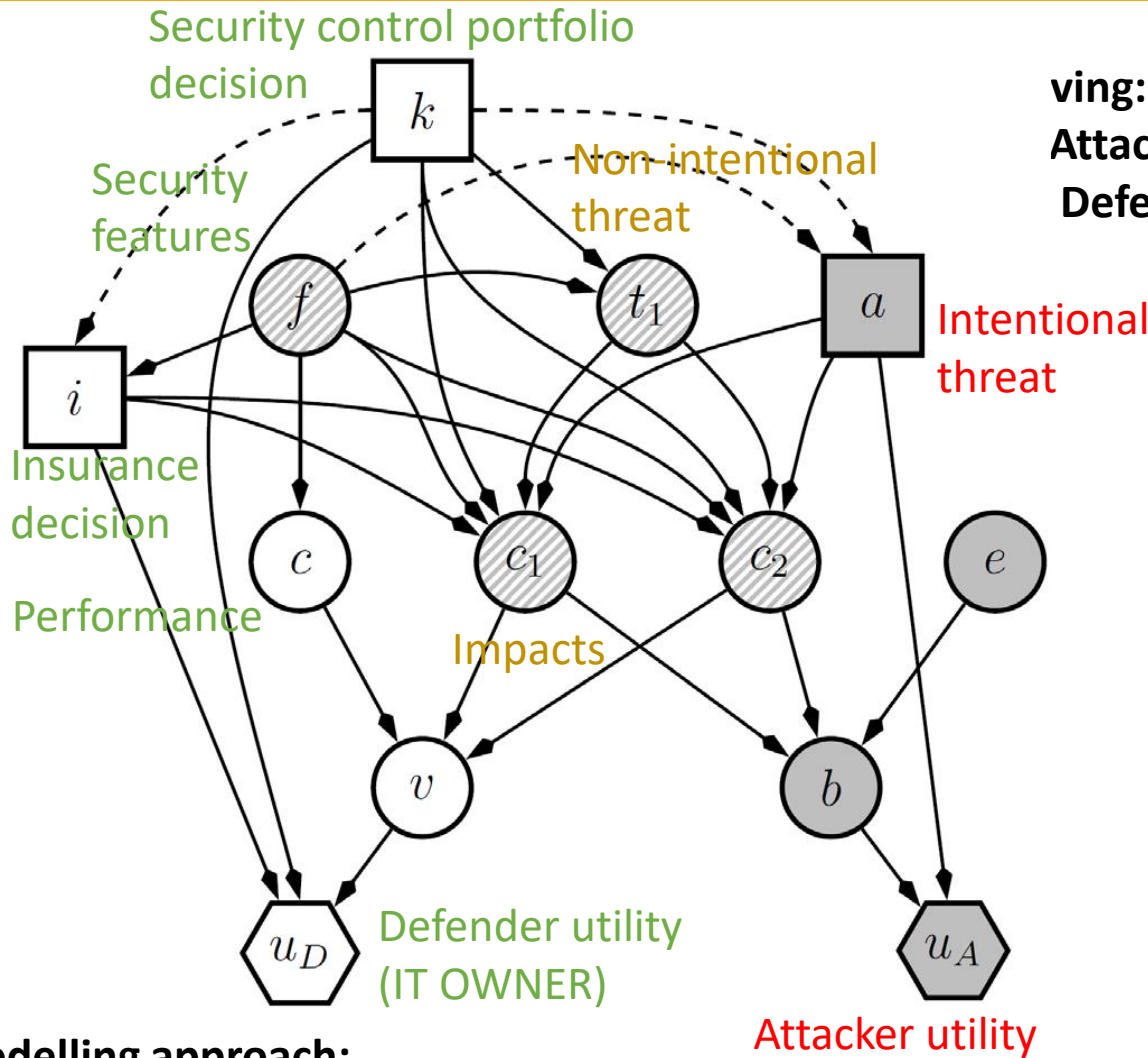
Include cyber insurance in risk analysis modelling

Include IT owner and insurance company preferences and risk attitudes

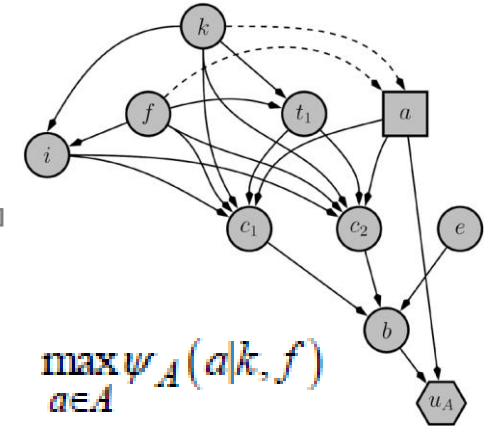
Facilitate informed decision-making in cybersecurity

Model 1 (IT owner perspective)

Cybersecurity risk analysis

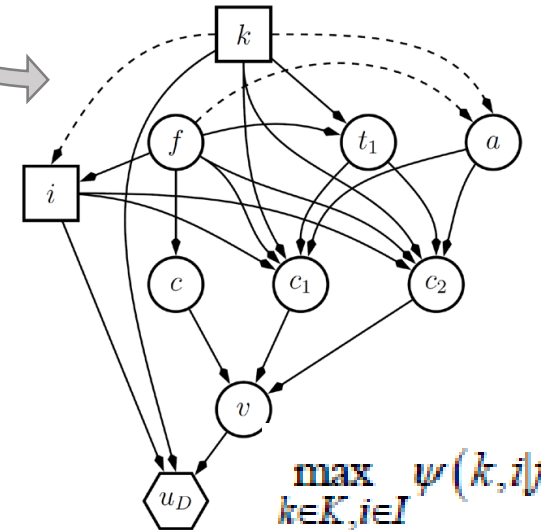


Attacker problem
Defender problem



$$\max_{a \in A} \psi_A(a|k, f)$$

$$p(a|k, f) = P(A^*(K, f) = a)$$

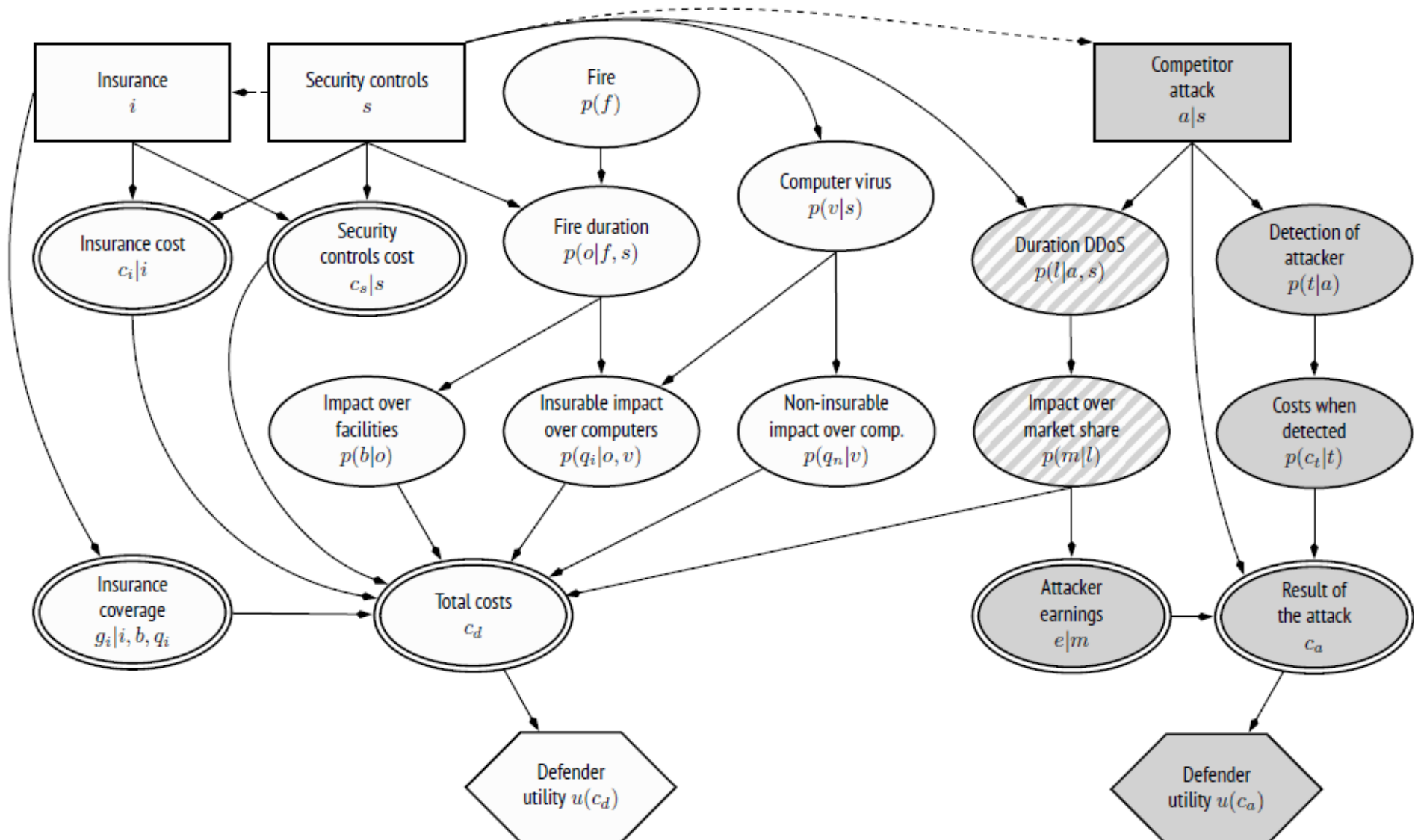


$$\max_{k \in K, i \in I} \psi(k, i|f)$$

Modelling approach:
Adversarial Risk Analysis (ev. From Multi-Agent Inf. Diagram)

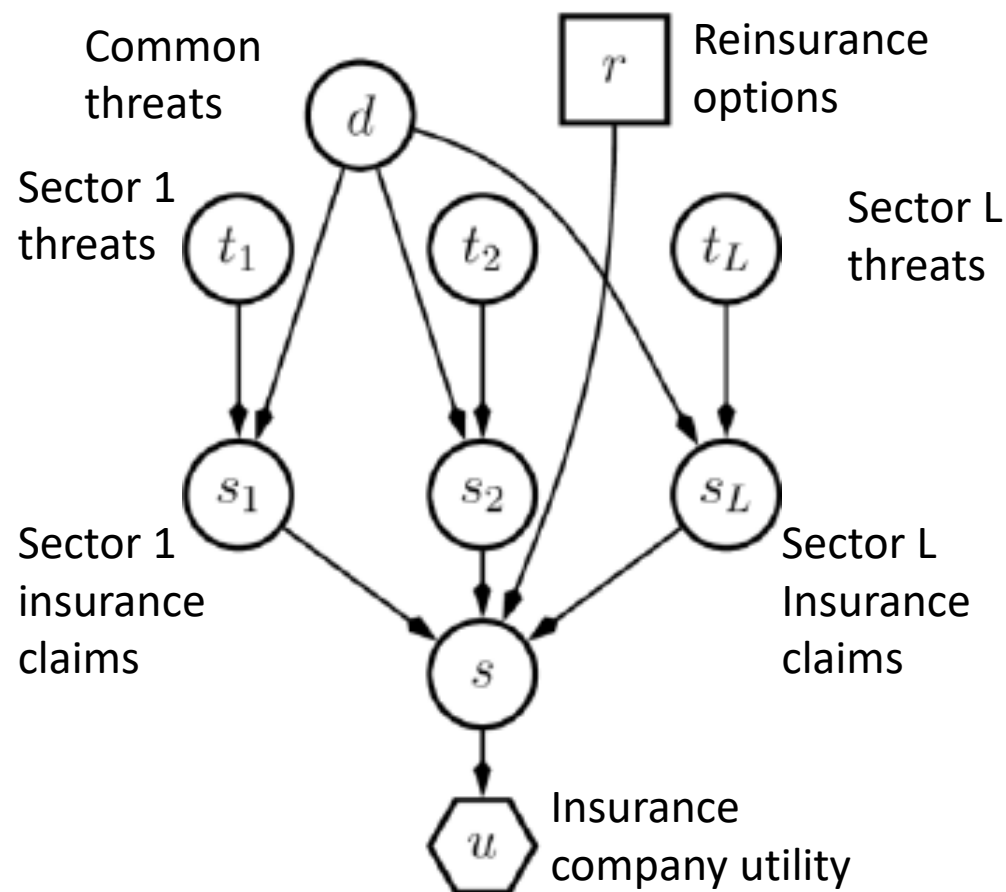
Model 1 (IT owner perspective)

Cybersecurity risk analysis: Example Case



Model 2 *(insurance company perspective)*

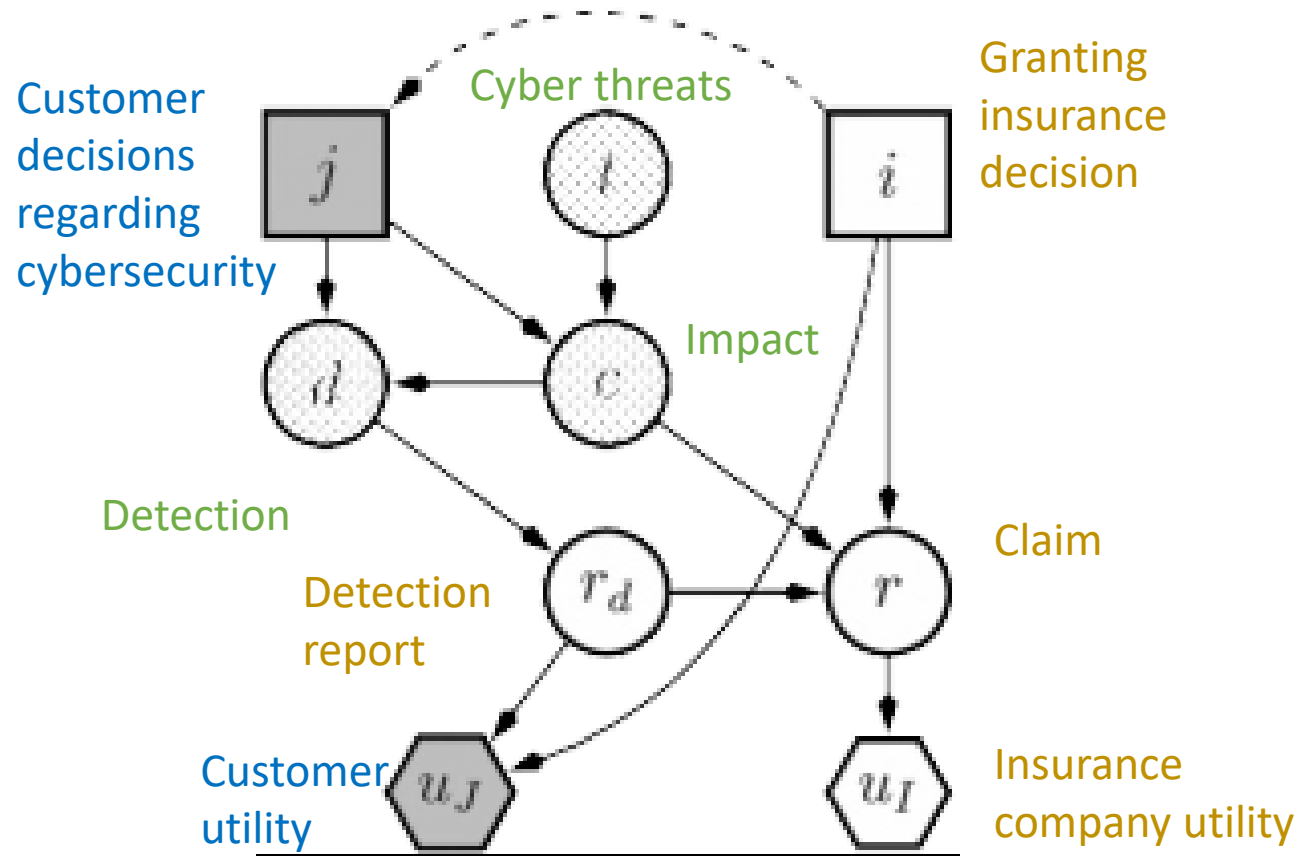
Cyber-reinsurance portfolio



Modelling approach: Influence Diagram

Model 3 (insurance company perspective)

Granting a cyber insurance product



Modelling approach: Multi-Agent ID

Final comments and current/future work

Doing a model for a complete risk analysis case study in CYBECO

Computational enhancements

Generalised interactions (ie, not only defend-attack cases)

Augmented probability simulation (ie, faster optimisation)

Software implementation

Preference modelling:

Cybersecurity risk management objectives

(trees of objectives > attributes that measures them > utility functions)

Cyber attacker objectives

Risk Analysis Models for Cyber Insurance

Thank you!



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