Secure and Auditable Academic Collections Storage via Hyperledger Fabric-Based Smart Contracts

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B.S in Computer Engineering

Submitted to the graduate degree program in Department of Electrical Engineering and Computer Science and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Master Of Computer Engineering.

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Date defended: December 11, 2023

The Thesis Committee for Thomas Atkins certifies
that this is the approved version of the following thesis:

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Drew Davidson, Chairperson

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Abstract

This paper introduces a novel approach to manage collections of artifacts through smart contract access control, rooted in on-chain role-based property-level access control. This smart contract facilitates the lifecycle of these artifacts including allowing for the creation, modification, removal, and historical auditing of the artifacts through both direct and suggested actions. This method introduces a collection object designed to store role privileges concerning state object properties. User roles are defined within an on-chain entity that maps users' signed identities to roles across different collections, enabling a single user to assume varying roles in distinct collections. Unlike existing key-level endorsement mechanisms, this approach offers finer-grained privileges by defining them on a per-property basis, not at the key level. The outcome is a more flexible and fine-grained access control system seamlessly integrated into the smart contract itself, empowering administrators to manage access with precision and adaptability across diverse organizational contexts. This has the added benefit of allowing for the auditing of not only the history of the artifacts, but also for the permissions granted to the users.

Acknowledgements

Acknowledgements go here.

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Chapter 2

Chapter 2 Design and Implementation

2.1 Smart Contract Object Model

Object Type	Action	C1
Collections	B2	C2
A3	B3	C3

Table 2.1: Operations

Chapter 3

Chapter 2 Title

Abstract

Chapter 2 Abstract: Code and figure example.

3.1 Example Section

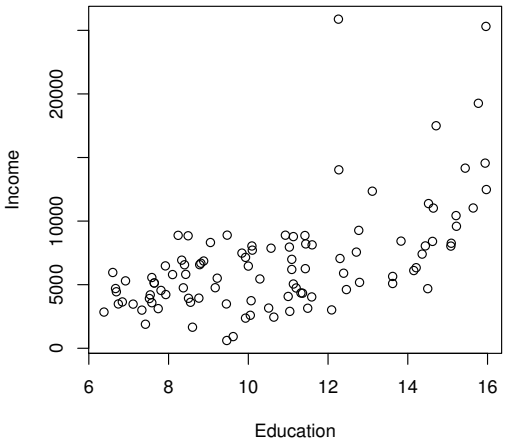
3.1.1 Code Example

Check on conventions on inputting code just to be safe. This is likely field dependent, so this is worth considering. This is the default style, which is aberrant to look at. In any case, this is how subimport works for nested files to organize your document with each chapter self contained in it's own folder.

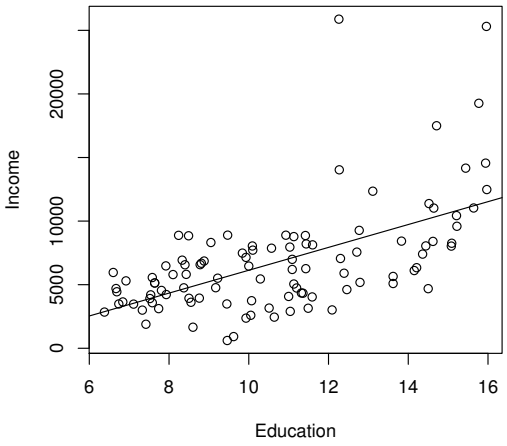
```
library(car)


pdf(file="car.inc.ed.pdf", height=5,width=5, onefile=F,
    paper="special")
plot(income~education, xlab="Education", ylab="Income",
    main="", data=Prestige)
dev.off()
```

3.1.2 Subfigure Example.

This is a true subfigure example.



(a) Caption A



(b) Caption B

Chapter 4

Conclusions

Abstract

Chapter 2 Abstract: Code and figure example.

4.1 Summary of Results

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4.2 Future Work

References

Appendix A

Misc stuff

Appendix B

Misc Stuff 2