

The Agony and the...

Master Thesis Proposal

Tristan Leiter

Vienna University of Business and Economics

January 18, 2026

Agenda

- 1 Problem Statement
- 2 Methodology
- 3 Preliminary Data
- 4 Plan

Motivation

- **Context:** Modern distributed systems generate massive logs.
- **Pain Point:** Manual analysis is error-prone and slow.
- **Goal:** Develop a hybrid deep-learning model for real-time detection.

Research Gap

Existing solutions struggle with high-dimensional, unlabeled data streams.

Proposed Mathematical Model

We assume the state transition follows a Markov process. The posterior probability is updated as follows:

$$p(\mathbf{x}_k | \mathbf{Z}_k) = \frac{p(\mathbf{z}_k | \mathbf{x}_k) p(\mathbf{x}_k | \mathbf{Z}_{k-1})}{\int p(\mathbf{z}_k | \mathbf{x}_k) p(\mathbf{x}_k | \mathbf{Z}_{k-1}) d\mathbf{x}_k} \quad (1)$$

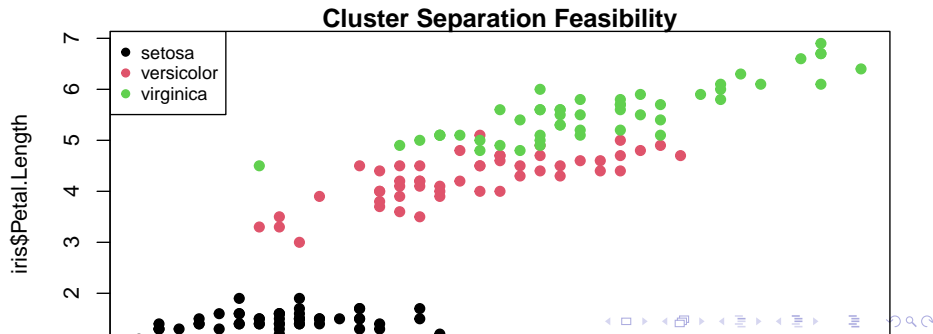
Where:

- \mathbf{x}_k is the system state at time k
- \mathbf{Z}_k is the observation history

Preliminary Data Analysis (R Integration)

Using R directly in slides ensures plots are always up-to-date with your data.

```
# We can generate plots dynamically  
par(mar=c(4,4,1,1))  
plot(iris$Sepal.Length, iris$Petal.Length,  
     col=iris$Species, pch=19,  
     main="Cluster Separation Feasibility")  
legend("topleft", legend=levels(iris$Species), col=1:3, pch=19, cex=0.8)
```



Project Timeline

Phase	Deadline
Literature Review	Month 1
Data Collection	Month 2
Implementation (Prototype)	Month 3-4
Evaluation & Tuning	Month 5
Writing Thesis	Month 6

Table: Estimated milestones for the 6-month period.

Thank you for your attention.

Questions?