

# AI Tutor

*Technical Report*

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# 1. Introduction

## 1.1. Background

- Version 2
- Complete rewrite

### 1.1.1. Context

- AI Hype

### 1.1.2. Purpose

- Custom personalized tutoring
- 24/7 access

## 1.2. Scope

### 1.2.1. Goals

### 1.2.2. Limitations

- Other opportunities
- A very difficult semester

# 2. Design

- Browser Extension

## 2.1. Data

### 2.1.1. Analytics

### 2.1.2. Pipeline

### 2.1.3. Storage

## 2.2. Security

- JWT
- Keys
- SSH
- 2FA?

## 2.3. AI Behavior

- Class specific behavior / answers

# 3. Implementation

- Lessons Learned from first iteration

### **3.1. Infrastructure**

- Hetzner VPS
- Cost reduction
- Docker & Compose

### **3.2. Frontend**

- User Interface
- Prioritize good User Experience

#### **3.2.1. Browser Extension**

- Side panel
- Cookies

#### **3.2.2. Chat Interface**

- Streamlit

### **3.3. Backend**

- FastAPI

#### **3.3.1. AI**

- OpenAI API

#### **3.3.2. Tools**

- Catalog
- Upcoming Assignments
- Grades

#### **3.3.3. Telemetry**

- Plausible Analytics

### **3.4. Database**

- MongoDB
- Document Based

## **4. Challenges**

### **4.1. Permissions**

- UVU
- Competing Team

### **4.2. API Inconsistency**

#### **4.2.1. Canvas LMS**

- Name vs Course Code

#### **4.2.2. Plausible Analytics**

- Weirdest API I have ever seen
- Cartesian products galore

#### **4.3. Messy Data**

- Canvas
- My own Design

##### **4.3.1. Live Service**

- Developing / Adding features for an application in use is difficult

### **5. Solutions**

#### **5.1. Workarounds**

- Browser Extension

#### **5.2. Clever Tricks**

##### **5.2.1. Authentication**

- JWT / Cookie

### **6. Conclusion**

#### **6.1. Findings**

#### **6.2. Implications**