Master Project: Rules

• The Master Project is a **group project** with two or more members. → Chance of denial for individual projects: 99%

• The Master Project can only be started **after** the Master Basismodul has been completed successfully (only for Major). → Best time: During semester break. Max. 1 year to complete.

• The Master Project must be done **with an IfI professor**.

• You will get **18 credit points**. → Submit a **final report** that concludes your work.
Master Project Market: Procedure

- Groups at IfI prepared projects for you and published them online: http://www.ifi.uzh.ch/en/department/open-positions.html

- Projects are presented at the Market → ask representatives

- To form groups, go to OLAT http://tiny.uzh.ch/yi → use discussion boards

- Once a group is complete, hand in the application form.
Master Projects
Master Projects in Visualization & Graphics

1. Distributed web application for the interactive browsing and visual exploration of foreground/background film color analysis
   - Implementation of color metrics and visualization of film database based on existing tools, libraries and frameworks

2. Implementation of rendering algorithms for the display of large scale vegetation and forest data over vast landscapes
   - Development of demo application of methods, and integration into an existing terrain rendering system

3. City block generalization and visualization
   - Implementation of vector based city map layout simplification methods
Blockchain CarDossier: How to ensure data quality?

**Background:** Car Dossier is a joint project of a blockchain-based dossier in Switzerland that keeps information on vehicles over their lifetime. The main players involved are AMAG, AXA, Mobility, the Aargau Road Traffic Authority, the Swiss software company AdNovum, and the Lucerne School of Information Technology.

**Goal:** In order to make such a blockchain-based car dossier successful, quality of provided data about a car should be ensured. This master project aims to build a solution which allows to enhance quality and comprehensiveness of car-related data provided into the blockchain.

**Contact:** Liudmila Zavolokina (zavolokina@ifi.uzh.ch), Ingrid Bauer (bauer@ifi.uzh.ch)
Proof of identity in consortium-based applications using the example of the CarDossier

Challenge

- **What**: Proof your identity in a blockchain
- **Why**: To perform actions according to who you claim to be (private / organization)
- **How**: Gatekeepers or external parties?
  - Different identity levels/stages for different interactions?

Objectives

- Perform proof of identity with least effort
- Define reasonable stages/levels of identification

Examples

- Internal: Quorum of peers
- External: netki.com¹ / IDnow.de²

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¹ https://www.netki.com ² https://www.idnow.de
Extending an Augmented Reality Application for Financial Services

**Live Paper** is a prototype system with tangible interface and AR features to support financial service encounters. It has been developed and successfully evaluated for mortgage loan advisory services in 2017 and 2018.

Now it’s time to make the next step!

**System modularization:** The existing software needs polishing, such that new components can be attached and detached through clear-cut interfaces.

**Functional extension:** We envision a system that supports the advisor at client profiling, investment advice or bancassurance advice.

**Context awareness extension:** We want the system to understand and adapt to the advisee’s emotions.
Blockchain Projects @ CSG

Sina Rafati, Burkhard Stiller
Communication Systems Group CSG, Department of Informatics IfI
University of Zürich UZH
rafatii|stiller@ifi.uzh.ch
Supply Chain

- Federal Office for Agriculture & Food Waste
  - Food Chain
- Goals:
  - Tracking the Supply Chain From Producer to The End User
- Tasks:
  - Developing an Android app
  - Producer/Actor Validation
  - User Friendly Front End
  - Representing a Map for tracked objects
Developing a BC for Big Data

- What if we want to keep all of our data in a BC?
  - Use cases: IoT, Multimedia Libraries, News channel.
- Goals and Challenges:
  - Validity of the published data
  - An automated system (IoT use cases)
  - Capability of storing large amount of data
- Tasks:
  - Developing Smart Contracts in a PoSP BC
  - Developing a Proof of Space (PoSP) BC
  - Setting up a rating and reputation system
Ownership Project

- **ICO**
  - Who is the owner?
  - History of objects
  - Interface for Third Parties

- **Challenge:**
  - Know Your Customer (KYC)

- **Tasks:**
  - Participating in developing an ICO platform from scratch
  - Developing Smart Contracts
  - Developing Apps (e.g., Web, Android, iOS) back and front-end
  - Developing a BC-based monitoring web app as an online store
Contact:
- Sina Rafati
- rafati@ifi.uzh.ch
- BIN 2.E.2
Master projects in Spring 2018 at PAC

Visual analytic for eye movements

Mobile app for exercise posture correction

Ad hoc visualization for reading math

Tracking mouse cursor to estimate gaze
Interactive Alpscarf

A Visual Analytic System for Discovering Temporal Patterns in Eye Movement Data

Alpscarf is an extension of scarf plots that visualizes the conformity to a visit order (e.g., reading from top to bottom) and the re-reading behavior in mountains and valleys.

We implemented an R package for Alpscarf, but it generate static charts. To aid researchers, we wish to develop an interactive web application that will enable researchers to more fluently analyze their datasets.

In this project, you will:
1. Prototype the UI of Interactive Alpscarf
2. Design and implement the back-end with React
3. Implement the front-end as D3.js application
4. Evaluate the usability with expert users

Suitable for a team of 2 students as a master project
Supervisor: ir. Chia-Kai Yang and Prof. Dr. Chat Wacharamanotham

Info: zpac.ch/projects
The Tasks (at least 2 people)

I. Assess current MVP in design workshops & prototyping sessions
II. Use React Native to migrate and improve the app for Android & iOS
III. Apply Interaction Design principles
IV. Improvement regarding UI/UX, features, feedback logic, gamification, ...
V. Conduct user tests and collect feedback to assess improvements

Possible Extensions (for more people, depending on applications)

I. Conceptualise and implement extended gamification and motivational features
II. Implement training plan for body-weight exercising
III. Integrate other types of exercises and/or activities (e.g., walking, sitting, ...)
IV. Enable continuous tracking mode without smartphone connection
V. Conceptualise and implement anonymous data storing procedure
VI. Implement body calibration feature

You are driving the project, your inputs and interests count!
Send your applications to alexander@vay-sports.com 🚀
Mathsplorer

Ad hoc visualization for reading mathematical formulae

When you read mathematical formulae, have you ever…

... scribbled a chart to try out the calculation?
... highlighted common symbols on multiple equations?
... rewrote the formulae in the symbol set that you understand?

These steps help you understand the math, and we would like to make it easier! Mathsplorer will provide building blocks for readers to create ad hoc visualization that can be linked with mathematical symbols.

You will:
1. Interview and observe how university-level students read mathematical formulae.
2. Design and implement interactive assistants for reading mathematical formulae as a Google Chrome plug-in.
3. Conduct a user study to evaluate your system.

Suitable for a team of 2-3 students as a master project.

Supervisor: Prof. Dr. Chat Wacharamanotham

Info: zpac.ch/projects
Using computer interaction tracking to estimate where people look while reading research articles and software code

Eye and mouse have similar movement patterns when reading results from web search

How much does this similarity exist in reading research articles and code review?

In this project, you will:
- learn about eye and computer interactions tracking
- extend applications (in Java and Javascript) to track computer interactions and include eye movement data stream
- design and conduct a lab study and analyze data

Figure: Navalpakkam et al. (2013)

Suitable for 2-4 students as a master project

Supervisors:
Prof. Dr. Alberto Bacchelli (Empirical Software Engineering)
Prof. Dr. Chat Wacharamanotham (Interaction Design)

Info: zpac.ch/projects
News Filtering Application @DDIS

- **Challenge:**
  - Social media & news
  - Information filtering algorithms
  - Filter bubble?

- **Project:**
  - Research how to present news
  - Develop news recommender app
  - Track user behavior using different algorithms

- **Planning:**
  - This summer
Master Project Presentations

Spring 2018
(1) Continuous Notification in Teams
(2) Continuous Software Performance Assessment

Project with Microbenchmarks

commit

Jenkins Plugin

Test Coverages
Cloud Selection and Deployment (IaC)
Test Execution
Regression Detection

Historical Data

Contact: Christoph Laaber laaber@ifi.uzh.ch
(3) Automatic Performance Test Suite Generation

1. Unit Test Suite

2. Static Analysis

3. Select/Filter

4. Generation

5. JMH Performance Test Suite

Contact: Christoph Laaber laaber@ifi.uzh.ch
**Basic Assumption:** Refactoring is a safe operation!

**Never Refactor without a proper test suite!**

**Goals:**
- Prove that refactoring is not always safe!
- Do it with ad-hoc test suites that “tests” the refactoring
- Understand in which circumstances a particular refactoring introduce a particular bug

(4) Refactoring: Is It Really Not Guilty?
(4) Personal Development Dashboard
More Details...

http://seal.ifi.uzh.ch » Teaching » Master » Master Projects

- Concrete Project Proposals
- More Projects
Interested in a project? Talk to representatives and form groups!

http://tiny.uzh.ch/yi

Good luck with your Master Project 😊