Master Project Market · FS 2017

Nathan Labhart
Academic Coordinator
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/teaching/studiengaenge/msc/msc-proj.html

• Projects are presented at the Market → ask representatives

• To form groups, go to http://tiny.uzh.ch/yi → OLAT course

• Once a group is complete, hand in the application form.
Master Projects
Blockchain Research at IMRG

Blockchain for International Trade

Blockchain for Automotive Industry
Good to know

– The project will be specified at the beginning of summer
– The project should run during summer: 3 months full-time
– 2 to 4 students will be working in a team

Contact: Liudmila Zavolokina, Prof. Dr. Gerhard Schwabe
Information Management Research Group
Collecting data about pain should not be painful

Having data about patient’s pain symptoms prior to clinical interview can improve diagnosis and treatment.

In this project you will:
• evaluate the usability of the existing web-based pain questionnaire
• design and implement an information visualization that summarizes the questionnaire results to be used in by the patient and the clinician during consultations
• design and implement a mobile app how pain changes over time

Available as Master project or thesis

zpac.ch/theses
Question: What did my co-workers do during my vacation?

Master Project:

- Refine and extend the prototype (scalability, performance, new repos, visualizations)
- Evaluate the prototype with real-world developers
- Implement new use cases, integrations, applications (e.g. mobile, touch, etc.)
- Your own ideas!

→ Contact: André Meyer: ameyer@ifi.uzh.ch
Prof. Dr. Harald C. Gall and Prof. Dr. Thomas Fritz

Visual Studio – Cloud Performance Annotation Plugin

**Existing:** Initial version of an Eclipse Plugin

**Master Project:**

- Explore annotation possibilities in Visual Studio in combination with Azure Insights (Cloud Analytics)

- Try to adopt functionality with different constraints

- Adopt appropriate prediction models (e.g., machine learning)

→ Contact Jürgen Cito: cito@ifi.uzh.ch

[https://vimeo.com/209732055](https://vimeo.com/209732055)
Invent a Voice Algorithm to Recognize External Interruptions

- **Problem**: Significant parts of a developer’s work flow are disturbed by interruptions from co-workers at inopportune moments
- **Solution**: Streamline interruptions and make developers more productive and happy :)

**Master Project:**
- Implement an algorithm to distinguish different people’s voices from each other (voice recognition APIs, microphones, etc.)
- Recognize interruptions and distractions (e.g. background noise) from co-workers in the same (open-space) office

→ Contact: André Meyer: ameyer@ifi.uzh.ch
**Perf-CoRe: Performance Code Review**

**Are Performance Bugs detected during Code Review?**
- Code Reviews Mining (GerritHub)
- **Performance** Reviews Validation (Profiler)

**Does Code Review help developers in fixing Performance Bugs?**
- Extraction of Versions affected by Performance Bugs (discovered during Code Review)
- Code Performance metrics **BEFORE** and **AFTER** the Code Review

**How can we support Developers during code review to fix Performance Bugs?**
- Code Review Augmentation with dynamic Performance metrics/information


Contact:
- vassallo@ifi.uzh.ch
- laaber@ifi.uzh.ch
What is the best price for my app?

Motivation: developers lack support for setting a good price for their apps.

Approach: use machine learning models to learn and recommend the best price for an app.

Research Questions:

• can we use machine learning to recommend the price for a new app?

• what are the best features for recommending the price?

Outcome: intuitive UI that uses the trained models to recommend the price for a new app.

Contacts: ciurumelea@ifi.uzh.ch, panichella@ifi.uzh.ch
BenGen: Automatic Performance Test Suite Generation

- Hard to write -> requires knowledge of (dynamic) compiler internals/optimizations
- No clear understanding, no best practices
- No (to few) standard libraries -> Java has JMH since v1.7
- Hardly anyone writes benchmarks -> in 2015 ~ 30 Github Projects w/ at least 1 JMH commit

FACTS

- # of Students: 2
- Also available as Master Thesis
- Contact: Christoph Laaber (laaber@ifi.uzh.ch)
Integrating Generally Valid Relational Algebra Operators for Ongoing Relations into PostgreSQL

- Integrating query functionality for relations with ongoing time points into PostgreSQL
- Extending each step in the process of query evaluation
  1. Parser to actually state the queries in SQL
  2. Analyzer and optimizer to create a plan on how the query will be executed
  3. Executor to actually evaluate the query to a result

Supervisor: Yvonne Mülle (muelle@ifi.uzh.ch)
Database Technology Group

User states query Q:

\[ Q: \text{Res} \gets \pi_{\text{CID,BID,BVT,RVT}}(\mathcal{B} \cap \mathcal{C} \text{.CD} \cap \text{BVT overlaps RVT RS}) \]

Ongoing input relations

Query result Res remains valid as time passes by.
What if your literature finds itself?

The goal of this project is to make use of a structured database to find knowledge in text documents and link all of them together.

You will
- Identify pairs of public data sources
- Create a reference dataset
- Craft a pipeline to match and link documents and database
- Run the evaluation on a cluster
- Contact Matthias Baumgartner
  baumgartner@ifi.uzh.ch

https://xkcd.com/1459/
Completion of 3D Point Clouds of Interiors using Autonomous 3D Sensors

- Combine and extend laser range scanned 3D point clouds with 3D data acquired by an autonomous flying drone
Crossplatform FlexiSketch

A flexible editor for diagram sketching, runs on Android + iOS + Mac + Windows

Created with the 2D game framework Corona SDK and the scripting language Lua

Includes multi-user support

Find videos and more on www.flexisketch.org  
Contact: Dustin Wüest, wueest@ifi.uzh.ch
ImitGraphs

An Immitgraph is an extended version of a simple graph.

**Simple Notation**

Node: A

Joint: 1, 2

Connection: 1 → 2

**A Set of Manipulation Commands**

Properties to Represent Various Models

Vehicle: A

Wheel: B

Login: D

Imitgraphs are intended to be used in usability tests of modeling tools’ UI instead of the real graphical models. **First we should make sure that they behave similarly.**

**MSc-Project**

- Implementing a modeling tool for ImmitGraphs
- Conducting experiments to compare the behavior of ImmitGraphs with their original models

ghazi@ifi.uzh.ch
MSc-Project
Implementing the magnet-and-spring visualization technique
- An innovative UI for navigating and manipulating documents and artifacts
- Development in Android

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Feedback Discussion and Negotiation between End-users and Developers

- **Fact**: Feedback is a **valuable information** for software evolution.

- **But**: Current feedback solutions often do not allow
  - Feedback senders to **comment** on feedback sent by others,
  - Feedback receivers to ask questions for **clarification**,
  - Feedback senders to receive information about the **feedback status** (e.g., issue solved).

- **Goal**: You develop **solutions** that
  - Support the **discussion and negotiation** among feedback senders and between feedback senders and receivers,
  - Inform the feedback senders about the current **status** of their requests.

Norbert Seyff (seyff@ifi.uzh.ch)
Feedback Configuration and Advanced Feedback Mechanisms

- **Fact**: Feedback is a **valuable information** for software evolution.

- **How**: Multimodal feedback mechanisms allow a high number of end-users to easily communicate problems, needs and ideas for improvement.

- **Status**: First **modular** Android and web feedback mechanisms are developed.

- **Goal #1**: You **extend** the existing solution and develop advanced feedback mechanisms - to motivate and support end-users to give feedback.

- **Goal #2**: You build a **Feedback Configurator** allowing non-technical feedback receivers to **customize** the feedback mechanisms.

Norbert Seyff (seyff@ifi.uzh.ch)
Implementing Automated Pollution Monitoring System using IoT and Smart Contracts

Goals
- Supporting automated contracting
- Broadcast the pollution information
- Secure IoT architecture

Tasks
- Design of a secure IoT architecture
- Development of an IoT monitoring system
- Development of smart contract
- Prototyping

Supervisors
Sina Rafati, Dr. Corinna Schmitt and Prof. Burkhard Stiller
Communication Systems Group CSG, rafati@ifi.uzh.ch
Implementing Network Analyzer using Machine Learning as a Virtual Network Function

Goals
- Making network analysis easier, more convincible and intractable.

Tasks
- Developing a virtual network function for IoT networks.
- Developing a self optimizer network monitoring system.

Supervisors
Sina Rafati, Dr. Thomas Bocek, Prof. Burkhard Stiller
Communication Systems Group CSG, rafati@ifi.uzh.ch
An easy-to-use interface to the DPMFA Python package

DPMFA: Dynamic Probabilistic Material Flow Analysis

Method and Package developed by PhD student Klaus Bornhöft

Goal: Develop an interactive interface to create models, select stochastic distributions for model parameters and start simulation runs.

Prerequisites:
– programming experience in Python
– basic knowledge in stochastics
– interest in simulation modeling, in particular Monte Carlo simulation

Perspective: We will probably need a PhD student in this field for a project starting Spring 2018

Prof. Dr. Lorenz Hilty, Informatics and Sustainability Research (ISR) Group http://www.uzh.ch/isr
A Web-based tutorial for “System Dynamics” Modeling and Simulation

System Dynamics: Simple Stock-and-Flow modelling method invented by J. W. Forrester at MIT and used for the world models created by Meadows et al., published in “The Limits to Growth” in 1972 (!)

Prerequisites:
– interest in systems thinking
– interest in simulation modeling, in particular “System Dynamics”
– ability to find, test, embed and create Web-based tools
– ability to instruct the user in clear language and good examples

Prof. Dr. Lorenz Hilty, Informatics and Sustainability Research (ISR) Group http://www.uzh.ch/isr
A Web-based tutorial for Agent-Based Modeling and Simulation

Agent-Based Model (ABM): a class of computational models for simulating the actions and interactions of autonomous agents (both individual or collective entities such as organizations or groups) with a view to the phenomena emerging at the macro level.

Prerequisites:
– interest in systems thinking
– interest in simulation modeling, in particular ABM
– ability to find, test, embed and create Web-based tools
– ability to instruct the user in clear language and good examples

Prof. Dr. Lorenz Hilty, Informatics and Sustainability Research (ISR) Group [http://www.uzh.ch/isr](http://www.uzh.ch/isr)
User Involvement for Software Evolution

Emitzá Guzmán
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User Feedback from social media and app stores contains important information for software evolution
User Involvement for Software Evolution

**Goal 1:** Apply *data mining* techniques for automatically classifying, *summarizing* and *prioritizing* (and *other* mining tasks of your preference!) the feedback available in Facebook, Twitter and the *app store*.

**Goal 2:** *Visualize* results to aid developers identify the most pressing issues

**Goal 3:** *Scientifically validate* the quality of your results

2-3 people
Interested in a project? Talk to representatives and form groups!

http://tiny.uzh.ch/yi

Good luck with your Master Project 😊