Bachelor Projects in the HIPERFIT Research Center

Developing and Improving the "HIPERFIT Portfolio Management Prototype"

The "HIPERFIT Portfolio Management Prototype" is a System for Managing and Pricing Portfolios of Over-the-Counter Financial Contracts

A Bachelor's Project Teaser!
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About the Projects

The projects emphasize the combination of

1. using core computer science techniques for solving technical computer science problems; and
2. applying some software engineering disciplines for working with group members and other groups with the aim of coordinating cross-project development (e. g., work with github and github "issues") and cross-project design.

Students are expected to work in groups (>1) and to develop the concrete project descriptions in coordination with the supervisors.

Supervisors:

Danil Annenkov (PhD stud.)

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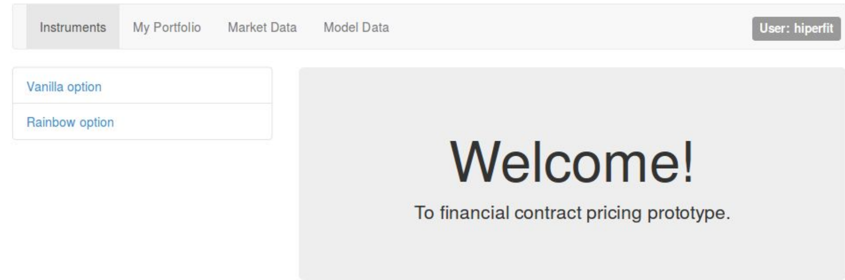
Look at the next slides for concrete project proposals...

Project 1. Quotes and model parameters

- Fetch historical data from a public source available in the Internet (e.g. Google Finance API).
- Compute model input based on historical data (correlations, volatilities).
- Display quote grid showing quotes stored in database.



The Prototype: The *HIPERFIT Portfolio Management Prototype* integrates a number of HIPERFIT research efforts and seeks to demonstrate the application of the research in practice, including:

- Domain-specific languages for contract management
- Certified program development
- High-performance numeric computations on GPGPUs

Contacts:
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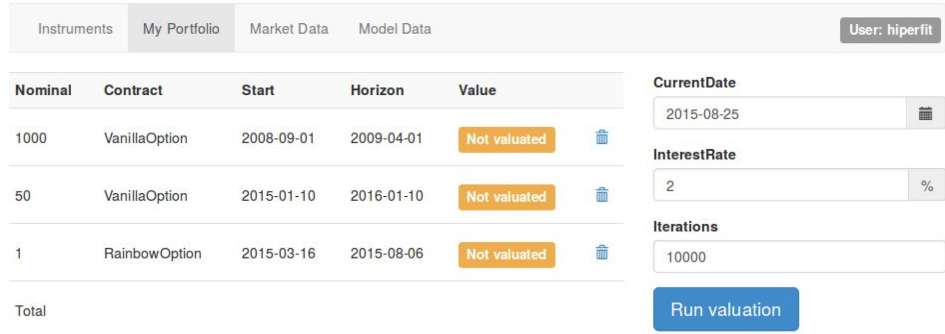
For more information about HIPERFIT and the research conducted in the center:

http://hiperfit.dk

Project 2. Portfolio evolution

- Fetch historical data from a public source available in the Internet (e.g. Google Finance API).
- Compute Profit and Loss (P&L) for portfolio and individual contracts.
- Display P&L on the portfolio valuation screen in the Prototype web-interface.
- Display graph showing evolution of portfolio P&L over time.



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Project 3. More user functionality

- Improve portfolio management in Prototype.
- Improve authentication.
- User management and access rights.
- User-specific data (quotes uploaded by user).
- Support for market conventions and calendars.
- Support for stocks in portfolio.

POWERED BY Haskell

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Additional Topics

- More two-party contracts
- Multiparty contracts
- Pricing financial contracts in Haskell (possibly, using Haste to run in a browser)
- Pricing financial contracts in Futhark
- Risk calculation
- User-defined instruments and instrument templating.
- Model implementations:
  - FX (Garman-Kohlhagen)
  - American optionality
  - Hull-White

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