

External Master's Projects 2016

Title: Wide Assessment Test Service

Project owner: Wide Assessment AS

Project description

We are creating a platform called Wide Assessment (WA), where candidates showcase their skills to desired jobs and companies, and companies market their needs and human capital to attract applicants. Consequently, candidates get more insight when choosing a potential work environment, and visa versa for the companies. But the beauty lays in WA's effortless matching tool. A company simply creates a job listing with specific requirements, and in return they'll receive a ranked list of potential new employers who can fulfil their needs. The traditional CV serves terrible as a data foundation for this, so we'll have the candidates create objective skill résumés instead.

They candidates assess skill level, how much they have used it, and when they used it last. The skill can also be connected to a job, project or education to show whether or not the skills is practical or theoretical, and applicable to the potential job listing. To enhance their odds, they can verify the skill levels through the testing service. Verified skills are valued higher than self-assessments in the matching-algorithm.

While most of the WA-system is under development, the testing service is not. We have not made the requirement specifications yet, but we want the candidate to be able to log in and both *assess* and *verify* skills from their mobile phone. We aim to make the testing service fun for the candidates and reliable for the companies.

Related work:

* Recruitment agency Gyriil Norway AS, gyriil.com

Supervisor/contact person:

* Stine Andreassen, Project Manager, 47372074, stine@gyriil.com

* Eivind Hjernes, Technical Manager

Title: Lock-free audio parameter implementation for concurrent computation

Project owner: BEK - Bergen Centre for Electronic Arts

Project description:

Concurrent systems are those in which multiple pipelines of computation are performed in parallel. In code these may be implemented as threads within a single program, multiple processes (or programs) on a single device (computer, phone, embedded system) or across multiple devices on a network. Maintaining a consistent and valid state for a system in the face of many parallel operations is a challenging subject area, traditionally addressed with "locks" — a means by which any given resource may only be accessed by only one computational pipeline at a time and all others must wait for an indeterminate amount of time until the lock is released.

A unique demand of realtime audio is that there is a fixed amount of time in which to perform a computation. If the computation is not completed on time then an audible and unexceptable glitch results, distorting the audio. So-called "realtime-safety" states that in the face of this realtime demand, one must not perform any action which takes an unknowable amount of time to complete. As a result, the use of locks for synchronizing concurrent computation in realtime audio can be seen as an intractable problem.

Lock-free techniques to address the needs of real time audio have only just begun to be explored. In most existing implementations it is typical that there is a "producer" thread and "consumer" thread that might represent the user interface and the audio engine. A vast field of possibilities exists, however, if we think beyond this typical paradigm to audio-rate parameters in addition to control-rate parameters and include parameter changes from across a network of devices. We will review existing solutions, design the architecture for a new lock-free parameter mechanism, and develop a prototype implementation.

Jamoma 2 is a header-only C++ library for building dynamic and reflexive media applications and systems with an emphasis on audio processing. It facilitates the structuring of common sound synthesis and effect processes into multichannel audio graphs. We will extend this library by adding support for parameter changes made from multiple simultaneous "views" or user interfaces. These "views" will include webpage user-interfaces running on mobile devices, audio-rate parameter changes, and control-rate/MIDI applications developed in Cycling'74 Max.

Related work:

- Jamoma - <http://www.jamoma.org>
- JUCE - Audio-centric framework for building applications -

www.rawmaterialsoftware.com/juce

- Moody Camel - lock-free queue for C++ -

<https://github.com/cameron314/concurrentqueue>

- Link - synchronizes musical beat, tempo, and phase across multiple applications running on one or more devices - <http://ableton.github.io/link>

- Cycling'74 Max - <http://www.cycling74.com>

Supervisor/contact person:

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* Tim Place, tim@cycling74.com

Title: SpatLib - Spatial sound library with common and inter-changeable interfaces

Project owner: BEK - Bergen Centre for Electronic Arts

Project description:

Spatial audio is increasingly important in diverse fields of multimedia content production such as cinema, gaming, virtual reality, electronic music and art and museum installations. A number of spatialisation algorithms have been developed that control how sound sources are distributed to a playback system with many loudspeakers. Most existing spatialisation applications rely on one technique only, but the differences in sonic qualities between the various techniques means that having access to several of them provides a wider sonic palette of creative possibilities. We will review existing solutions, design the architecture for a new spatialisation library, and develop a prototype implementation of some spatialisation algorithms. We want to be able to mix and match several spatialisation techniques, and the library needs to be extendible, so that additional spatialisation techniques can be added in the future.

SpatLib will be implemented as part of Jamoma 2. This is a header-only C++ library for building dynamic and reflexive media applications and systems with an emphasis on audio processing. It facilitates the structuring of common sound synthesis and effect processes into multichannel audio graphs. We will extend this library by adding support for several common spatialisation algorithms such as vector-base amplitude panning (VBAP), distance-based amplitude panning (DBAP) and first and higher order Ambisonics. We will research how the library can facilitate a flexible stratified approach to sound spatialization algorithms, and offer common and interchangeable interfaces for the various spatialisation algorithms. Additionally, we want the library to support SpatDIF with respect to how spatial scenes can be described and authored. We will make use of automated unit and integration testing to verify correct behaviour, and the creative potential of the library will be examined by developing one or two simple implementations for real-time interactive sound processing in popular environments such as Cycling'74 Max and OpenFrameworks.

Related work:

- * Jamoma - <http://www.jamoma.org>
- * SpatDIF - Spatial Sound Description Interchange Format - <http://www.spatdif.org>
- * OpenFrameworks - <http://openframeworks.cc/>
- * Cycling'74 Max - <http://www.cycling74.com>

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Title: Reinsurance Research and Development

CSC is a global powerhouse in business and technology transformation. Our people lead businesses, governments, and communities on their digital transformation journeys and help them solve their toughest challenges, by providing innovative next-generation IT services and solutions that leverage deep industry expertise.

We are always on the lookout for new ways to reinvent ourselves, hence input from students with the newest academic knowledge is something we highly value in CSC.

Project Objectives

CSC's Reinsurance Research and Development Organization, located in Oslo, is responsible for the continued development of CSC's world leading Reinsurance Administration product suite SICS. SICS is used by some of the largest Reinsurance organizations in the world and has over 30 years with proven success in the market. Key to this success has been the ability for the product team to ensure that the product has evolved with the constantly changing IT requirements of large enterprises. Originally developed as a Mainframe/COBOL application, SICS has been through several technology evolutions, from its origins as a procedural/COBOL application, to a fully Object Oriented application in the late 1990s, to moving to the Java platform in 2004 to secure the technology base for the future development of the product.

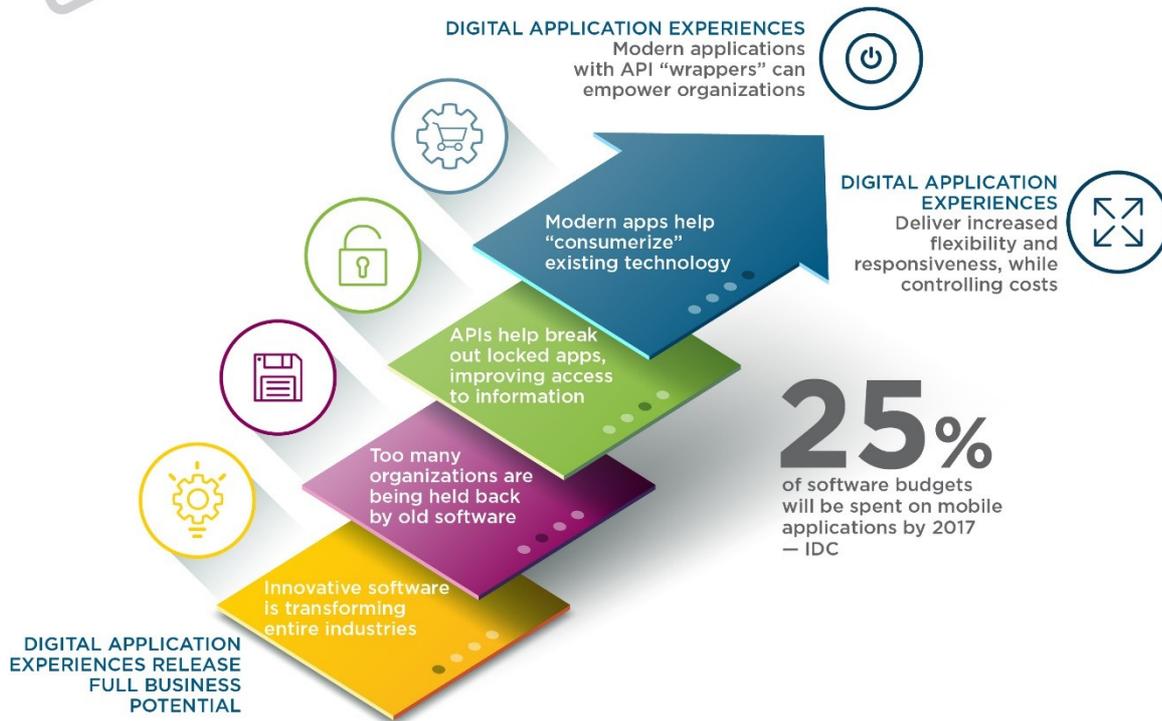
CSC is always looking to keep the SICS suite at the forefront of technology developments. Below, we have listed two areas in which we are looking for candidates to undertake projects in. However, these can be adjusted to fit the requirements from your study program, and we encourage you to bring forward own ideas and suggestions related to these areas as well.

Optimizations for Wide Area Network deployment – Being a traditional two-tier application, SICS uses remote desktop applications like Citrix and Microsoft VDI to deploy the application in a wide area network. The task is to investigate solutions to remove this dependency whilst having minimal requirement to re-write large portions of the application.

Automatic Document Handling – Work process optimizations are a hot topic with all enterprises. The SICS product has extensive electronic interfaces that reduce the amount of manual intervention required. However, many communications are still handled through non-structured data which is challenging to process automatically. The task will be to investigate solutions to process non-structured "electronic paper" that can then be transformed into structured processes to be handled by the application. Heuristic handling of incomplete data will be key to providing a higher automation rate and you will be tasked to investigate and suggest possible solutions to this problem.



Digital Applications: The Key to Releasing Your Business's Full Potential



We are highly interested in the success of your project and expect to apply your findings to further our strategic decisions in our organization. Your findings could have a significant impact on the course of CSC's Reassurance business development and very likely also a notable impact among our clients. As a result, at the end of the thesis collaboration we want to have a few page executive summary report of your thesis and a presentation of the key finding to our Reassurance management team.

Student Profile

We are looking for a student or a group of students within the last year of their master's degree that have a keen interest and understanding for software development. We expect you to be passionate about software and IT strategies.

You should be a self-driven and autonomous person that can plan and execute independently. You should also be good at communicating with people, have strong analytical skills and be capable of asking the right questions.

CSC will provide you with full support during the entire project collaboration including access to relevant data and guidance on company specific questions. You will have a direct contact person in the company and will be exposed to the management team. It will also be possible for you to come work on your thesis at our CSC office in Oslo at Filipstad brygge 1 during your thesis writing process.

This project collaboration will take place during Fall 2016-Spring 2017. You are already welcome to apply with your project proposals - the application deadline is November 1st.

You can expect to hear from us after the deadline.

If you have to start your thesis prior to this application deadline or should you have any questions about the project and application process - please contact us at talent@csc.com.

We are looking forward to receiving your application and to start this exciting collaboration!