

SWE 599 Project Due: 18 May 2015, 09:00 (-25% / each late day)

Project Outline

This project consists of a brief survey on the related works, identification of the system requirements, developing/designing a solution for the selected topic from the list given in the following pages. You are expected to prepare the requirements and design documents (both mandatory) as described in SWE 573, implement and test your algorithms/applications on realistic cases. **You may pick topics offered by the SWE instructors or define your own software engineering related project if you can take the approval of your selected advisor.**

- A) Please send an e-mail to pinar.yolum@boun.edu.tr containing **at least three** candidate **topics** from the list of topics offered by **three different advisors** (some of the projects can be described by you as long as an advisor agrees with it) before **15 February 2015 Sunday, 23:59**. Watch out every instructor has a limited quota of 2-3 students and the requests will be handled in a First Come First Served (FCFS) order. **If you do not send your preferences until the due time, you will be assigned a project topic and an advisor automatically.**
- B) **Your minimum 3 page long progress report should be e-mailed to your project advisor (due 6 April 2015) & should include:**
- A brief introduction, motivation
 - Description of the selected system/software/application
 - Requirements of the system/software/application
 - Designed system/software/application

Name Your File: SWE599-Project-Progress-2015S-Lastname-Name.doc (or docx)

30% of your grade will be based on the progress report, 70% will be based on the final report.

- C) **Your final project report should be e-mailed to your project advisor (due 18 May 2015, 09:00) & should include:**
- A brief introduction, motivation
 - Description of the selected system/software/application
 - Requirements of the system/software/application
 - Designed system/software/application
 - Implementation
 - Demonstration of its functionality
 - Conclusions including future work
 - Cited References: List full bibliographic, information about papers and any additional references you may have resorted to. Be sure that all these references are cited in your report. Do not include secondary references (references in other references) you have not seen.

Name Your File: SWE599-Project-2015S-Lastname-Name.doc (or docx)

- You may check electronic resources in our library such as: <http://ieeexplore.ieee.org> and <http://info.scopus.com/>

- You may also want to see the link for technical writing at <http://www.cs.columbia.edu/~hgs/etc/writing-style.html>

D) SWE 599 Final Presentation and Demo: 18 May 2015, 17:00 – 22:00 PM, at AVS Seminar Room, No: 16.

- You are expected to present your project in 15 minutes using carefully prepared visual material. Please, practice and time your talk. If possible, present it to your friends before your actual presentation.

(You MUST bring two-sets of the hardcopy final report: one for Pinar Yolum, one for your project advisor)

Note: If you have questions related to your research project, please contact with your project advisor.

Candidate Project Topics:

By Suzan Üsküdarlı:

1. **Mapping Social Media Content:** Last few years witnessed a tremendous increase in the use of digital mediums for personal communication. A lot of work has been done to understand the dynamics and the overall information content in these type of media. However, a possible research area was left unexplored in its full end: the location dimension associated with the message. In this project, we are bound to explore the social media in this dimension by building interfaces and representations which people come to call as "maps" traditionally.
2. **Sentiment Analysis of Microposts:** Microblogging environments are populated with content from a huge number of contributors on just about any given topic. The volume and characteristics of microposts presents its user with a vast amount of data that can be used to determine the sentiment associated with a query. For example, consider a political candidate, a product, a company, an song, a movie, or an idea for which you want to know what people feel about. Are they happy, excited, angry? In this project you will create a web application that given a query you will determine the sentiment associated with that query. You will use Twitter as a data source. You will fetch and process the content to discover the sentiment towards a user query. Twitter provides an API for fetching and filtering its content.
3. **Olive Tree:** This is an awareness and educational project. Olives and olive oil have been central to life in Turkey (and in Mediterranean areas) for ages. Olive harvesting and olive oil production continuously evolve from traditional to industrial methods. The production methods vary across different regions, yet there are some accepted standards about the quality of olives and their oil based on certain criteria. In this project you will gather the requirements that impact the quality of olives. You will develop an HTML5 based web application that models an olive tree. The user will be able to interact with the tree by taking care of it and harvesting it. The user will also be able to inspect properties of the olives to see the impact of care and environmental conditions. You will have access to external advice regarding this project to help you understand the issues relevant to olives.
4. **Living Memories:** As time goes by what lives in the memories vs what we see around is changes. Have you ever took your friend somewhere and told them about how things used to be there? Perhaps there was an ice cream shop that made the best pistachio ice cream and that your family would go there on summer nights. That place no longer physically exists, but does so in memories. Many books and films depict how things were. This application will let people describe how a particular part of the world used to be at some given time. Naturally, the same location will have different memories that change over time and different perspectives depending on personal views. The descriptions will include the place (maybe places), the time (may be approximate and the exact time may be not known), and the description. Pictures, videos, and sound recordings can be used in the description. The memories can be searched (also semantically) and browsed. Searches can be by location, type of memory. When looking at any given memory, the map should show the location. People who are interested in the same areas or similar kinds of memories are likely to be interested in similar memories. In fact it might be interesting to connect people based on similar memories. This application will recommend interesting memories and users. User can give feedback related to a memory, such as "I remember that!" and so on. This will be an android application.

By Alper Şen:

5. **Development of Android/IOS applications:** The student will develop a mobile application for a multiplayer interactive game with location data. The concept of socket programming will be used to allow the communication of clients and servers. The players will search for the list of prizes dispersed in a given perimeter of the list of players. Whoever grabs the most number of prizes will be the winner.
6. **Development of Android/IOS applications:** The student will develop an online appointment system for a potential SME. The appointment system will have customers that can request access to the appointment calendar. Once the request is given they can choose from the list of available slots provided by the SME. The system will allow cancellation and notification of the parties involved.
7. **Verification of Java applications:** The goal is to develop a data race detection tool in Java. A data race is characterized by the unsynchronized access of two or more threads to a common resource such as a shared variable. Detection and elimination of data races is crucial for the development of multithreaded programs. There are two simple types of race detection algorithms. In this project you will use a popular Java instrumentation library ASM to automatically modify a given Java binary and implement a race detection algorithm.
8. **Record and Replay of Concurrent Programs:** Debugging plays a big role in verification of programs. In this project, you will develop an automated tool that records the execution of a buggy multithreaded program and then replay the program based on the recorded execution. This will ultimately help identify the cause of the bug in the program.
9. **Implementing a mutation testing tool:** Mutation testing is used to evaluate the quality of software tests. It involves automated insertion of bugs into the user's program. The goal is to check whether the software test suite can identify the difference between the bug inserted program and the original program. In this project you will develop an automated mutation testing tool for a programming language of your choice (Java, C, C++). Several toolsets are available for instrumentation depending on the language, C/C++ gnu gcc, C CIL, Java ASM, Android Redexer.
10. **Implementing parallel algorithms in GPGPU:** GPGPUs are useful for speeding up applications. They can be applied in many contexts. The project involves the application of GPGPUs in the context of a chosen application. Potential languages are CUDA and OpenCL.
11. **Development of a software testing coverage tool:** Coverage is crucial for testing. The student is asked to develop a coverage tool that includes line and branch coverage as well as potentially others such as path coverage or mutation coverage.
12. **Implement a tool to collect software code/change metrics:** Code metrics are important to understand the complexity of software development. Potential metrics are Chidamber & Kemerer suite such as lines of code, methods, classes, attributes, inheritance, code churn
13. **Bug prediction using data mining:** This project involves the usage of data mining techniques for bug prediction. Several versions of an open source project from Eclipse or PROMISE will be used to measure the effectiveness of the techniques.

By Haluk Bingöl:

14. **Video in synch with test:** Presentation of a series of url s with in synch with some video. Imagine that there is a video of a lecture of a course. In parallel to that there are a number of html pages with given urls. You may assume that the video comes from youtube and there is a table which provides info about which url should be shown at which moment of the video. The task is to show the html pages at the proper times with respect to the video and keep the pages on till it is tim efor the new page. Be careful that user can pause teh video as well as can restart, or rewind or fastforward as one can do in youtube videos.
15. **Animations:** Innovative animations to teach how computer works; how a programming language executes.

By Fatih Alagöz:

16. **iPhone Application Development Project:** The purpose of the project is to develop a iPhone Application. (for IPHONE owners ONLY)
17. **Mobile Application Development Project:** The purpose of the project is to develop a mobile application. (Android, blackberry etc.)
18. **MobilEye for blinds:** The main objective of this project is to develop a mobile camera-based warning system that will warn blinds for particular objects (stairs, trees, walls, etc).
19. **Design and development of target detection and inpainting for surveillance imagery:** You are given surveillance imagery. You need to detect a target from that imagery and remove the target and in paint it with something else. E.g. find the yellow cow at a given farm picture. Replace the yellow cow with a camel.
20. **Noise meter for Android Mobile Phones:** In this project, your task is to design and development of signal to noise ratio (SNR) measuring software for android based mobile phones. The volume of sounds using your ANDROID should help us to measure the noise (Noise Meter). An apparatus for comparing sound intensity levels usually in decibels. Mandatory features: Show average, min, max and peak signal to noise ratios in dB. Nice interface may be better.
21. **Tamper proof mobile communication system (special project):** The main objective of this project is to develop a secure tamper-proof multimedia capture software system based on digital watermarking in the context of the mobile vision: an environment in which we constantly interact with the media around us using our mobile devices and generate authentic content.
22. **Design and development of a home surveillance system:** In this project you will design and develop a new home surveillance system. The system should be capable of taking snap shots of intruder(s) and transmitting them to a police center and to your mobile phone via an ADSL connection. The system should have two operational modes: Highly secure mode (HSM) is capable of capturing small objects such as rats, cats, etc. and Standard Mode (SM) is capable of capturing large objects such as human, car, etc. Make literature search on current surveillance systems and motivation for a new system. Proposed System: Place a camera with 5-6 frames/sec. Compare Mean Square Error (MSE) of two consecutive frames. Alarm message including the snapshots should be sent to the police center and your mobile phone if MSE is greater than a threshold for HSM mode. Send message only to your mobile for SM mode. Include false alarm strategy for lights and weather changes. Assume that the lights are on at 6PM-6AM.
23. **Design and development of a new watermarking technique for digital voice ownership:** Throughout out the last few decades with the advance in technology, the information sharing between people become easier than ever before. But the information sharing has become an important consideration since people want their information to be secure. Digital watermarking technique is proposed for copyright protection or ownership identification of digital media, such as audio, image, video, or text. Digital voice watermarking is a method of embedding information in a voice stream in such a manner that it cannot be removed. This watermark can then be extracted from the host media and used to identify the owner of the media. It provides ownership protection, copy control and authentication. Your aim is to design and develop a new watermarking technique for digital voice ownership.
24. **Design and development of a new watermarking technique for digital image ownership:** Throughout out the last few decades with the advance in technology, the information sharing between people become easier than ever before. But the information sharing has become an important consideration since people want their information to be secure. Digital watermarking technique is proposed for copyright protection or ownership identification of digital media, such as audio, image, video, or text. Digital image watermarking is a method of embedding information in an image in such a manner that it cannot be removed. This watermark can then be extracted from the host media and used to identify the owner of the media. It provides ownership protection, copy control and authentication. Your aim is to design and develop a new watermarking technique for digital image ownership.

25. Implementation of Digital Video Watermarking: Authentication of multimedia with respect to ownership and intactness (legitimacy) is crucial for copyright ownership and tamper detection. In this project, you will design and develop a video watermarking algorithm.

26. ONDEMAND projects

By Taflan Gündem:

27. **Design a Data warehouse:** For a firm that you chose design a data warehouse using some available tools.
28. **Implement a Data Clustering algorithm for multi-core PC:** You are going to be given a specific clustering algorithm. You are to implement it for a multi-core pc. Some experience with multi-core system programming needed.
29. **Implement context aware type-ahead search:** While we are typing a word, after a few characters the rest of the word is guessed and several possible words that start with the characters we typed appear on the screen. Some of these possible words may be discarded according to the context information. The context info may be the person typing, the time, place etc.
30. **Password reminder:** Design and implement a program that stores all your passwords in a secure manner and reminds them to you when you need them. Some experience with web page implementation needed.
31. **Personal recommender:** Design and implement a program that recommends something (such as books, movies etc.) to you under different circumstances (such as time place etc.).
32. **Retail Database:** Design and implement a retail database. Using this db the user will be able to fix the price of products and how many products to send to a certain store.
33. **Implementation of Skyline Queries:** Implement and compare the performance of two different skyline query processing algorithms. Skyline queries are based on special type of multi criteria optimization. They return objects that are not dominated by any other object in all attributes (or criteria).
34. **Simulating a smart phone user interface for novice users:** Write a program that simulates windows 8 operating system's user interface for smart phones.
35. **Emergency help to elderly people.** Using some sensors your program will detect an emergency situation and will call a phone number for help.
36. **Tuning of mixed column store raw store database:** Assume you have both column store and raw store in your database management system. Your program will dynamically decide which part of the database should be stored row wise and which parts columnwise.
37. **Any database related implementation you want.**

By Oğuz Tosun:

38. **A Teaching Aid for SRE (Software Reliability Engineering) Using Computer Aided Software Reliability Estimation Tool (CASRE):** CASRE is one of the popular tools for "Software Reliability Analysis" and is freely available. The goal of the project is first to understand the capabilities of the tool CASRE and than master of its use. Secondly "failure data " that is readily available from different sources will be collected and classified to establish a failure data repository. Finally demos based on the selected data sets will be designed and implemented to be used by the student in self- learning mode.
39. **Operational Profile Specification & Automatic Test Case Generation:** A target application will be selected (i. e. ERP software module) and its operational profile will be generated using the approach described in SWE 550 course. Once the profile is generated than using one of the available open source test generation tools test cases

will be generated and statistical testing will be conducted to the target module. The failure data obtained from the test will be used to predict the module reliability.

40. **Optimum Container Loading:** The problem is related to optimal placement /loading of parcels/boxes into ship containers. Also known as bin packing problem, the goal is to pack the objects of different volumes into finite number of containers/bins of volume V in a way that minimizes the number of containers used. You are expected to survey the literature to see the algorithms developed to solve the problem, select and implement a relatively simple algorithm preferably with a friendly visual interface. A synthetic box generator which generates boxes of different random volumes should accompany to test the developed system.
41. **Web based monitor for Data Center Servers:** The purpose of the project is to develop an application which will monitor the resource (CPU, memory etc) consumption (at process and object granularity) of the applications running on various servers in a data center. The application will be web based and expected to log and report the resource consumptions so that problematic processes and objects may be identified and better load balancing can be achieved between servers.

By Fikret Gürgen:

42. **Implementation of an interface for telehealth ECG monitoring system:** Telehealth Electrocardiograph (ECG) monitoring is a typical application of software engineering. ECG is heart rhythm monitoring for humans. It is a noninvasive method that detects arrhythmia cases. Here student will concentrate on interface part of the system. Various important windows may be used with available tools.
43. **Implementation of an algorithm for distant sensing of the measurements of monitoring signals:** Various measurements are used for case-based reasoning systems. These systems may be medical, security, ecological, etc. The student will make an implementation for the usage of the features in these systems. At least 3 features are expected to be obtained and shown in the diagrams.
44. **Implementation of a decision making system with any given features:** WEKA software is already available for usage by the students. The student will search and use a set of feature in two typical areas such as speech, distant monitoring data etc. With a number of parameters, he/she will perform experiments for a few performance measures e.g. accuracy,

By M. Ufuk Çağlayan

45. **Trusted/Tamper-Proof Operating System Boot:** Availability of add-on software to boot an operating system in a trusted and tamper-proof manner is important. The student will first comparatively evaluate existing trusted/tamper-proof add-on software to boot a selected operating system, then design and implement a new software add-on package with state-of-the-art security and digital signature mechanisms.
46. **Development of License Enforcement and Anti-Theft Software:** Availability of Software for Software License Enforcement and Anti-Theft to help developers to create secure and licensed distribution of software applications is important. The student will first comparatively evaluate existing License Enforcement and Anti-Theft Software, then design and implement a new software package with state-of-the-art Internet based mechanisms.
47. **Development of Software for Software License Distribution Follow-Up:** A web based system for Software License Distribution Follow-Up is important to help software distribution companies to follow up who has what type of software licenses. Additional information on licenses such as authorized ip numbers, expiry dates, etc and functions such as key installation/removal/renewals and automated emails to consumers about renewals will be handy. The student will first comparatively evaluate existing License Distribution Follow-Up Software, then design and implement a new software package with state-of-the-art Internet based mechanisms.
48. **Reverse Engineering of and Improvements in AGORA Secure Voting System:** AGORA is a secure web based voting system developed in PHP quite some time ago. Several additions have been done to AGORA following its development. Your task is to understand the code for reverse engineering purposes, document its detailed design

preferably in UML and extend AGORA with a number of additional functions. (Continuation of work previously done)

49. **Development of a Graph Visualizer for Use in Trust Modeling:** Trust modeling by graphs, generally by colored graphs, is a recent and important research area. Your task is to develop a colored graph visualizer, where nodes could have hierarchical structures. Visualizer should be able to support usual scroll and zoom in/out functions, since graphs in question are very large, with thousands of nodes and edges.
50. **Development of a Security API for Use in Secure Application Development:** Availability of a security API to help developers to create secure applications is important. The student will first comparatively evaluate existing security libraries, then design a new security API with functions/components from existing API's.
51. **Use of Model Checking Techniques for Verification of Distributed Software Specifications:** Model checking exists for almost 20 years, to verify the integrity of software specifications at any level, that is requirements, design and implementations. The most frequently used approach is by Holzmann, the Promela specification language and SPIN verification tool. There are also other approaches like SMV and UPPAAL. The student will first comparatively evaluate these approaches of model checking, then select an approach and demonstrate the verification of the specification of a small software system, preferably by SPIN.
52. **Verification of UML Specifications:** Conversion of UML specifications into other representation forms with the purpose of analyzing such specifications for conflicts, ambiguities and missing specifications is a current research area. Currently, such conversion and analysis are carried out for a specific subset of UML. Different techniques such as model checking, theorem proving etc are targeted for verification. The student will first comparatively evaluate existing approaches, then select an approach and demonstrate the verification of the specification of a small software system.
53. **NS2 Network Simulator and Emulator Project:** NS2 network simulator and emulator is a very popular software tool. The student will comparatively evaluate existing simulators and NS2, then demonstrate the use of NS2s for a small but real life network system to evaluate its performance by simulation.
54. **Design of a Smart Card Software Development API for Multi-Vendor Support:** Availability of smart card API's to help developers to create smart card applications is important. The student will first comparatively evaluate existing smart card API's, then design a new smart card API with functions/components from existing API's so that devices from multiple vendors can be supported. Implementation is not required, the design is the product to be delivered.
55. **Fractal-Julia Figure Generation in Multiple Windows:** A fully parameterized version of fractal and Julia figure generation software, for high resolution display in very large LCD/LED screens. Software must be able to generate such figures in real time in multiple windows.
56. **Development of Trust Assessment Software:** Classical subject to object trust modeling. There is a very large number of subjects and objects. Subjects and objects may have subgroups. Subjects have properties like nationality, age, etc. Objects may have properties like location, object type. Subject to object trust is a simple value say 1-to-5. Goal is to develop software to answer various questions about trust assessment. Mysterious project? See www.tripadvisor.com as an example of consumer and hotel trust assessments.
57. **Development of a Simulator for Flocking: Bird Movement:** The way in which populations of animals move together is referred to as "schooling", "flocking", or "herding" depending on the considered animals. Such animal movement is generally defined and described by what is called "the Mathematics of Emergence" by certain authors. Your goal is to study flocking, define first a 2D then 3D flocking model, build a simulator for it together with a nice 2D and/or 3D visualizer. (Cucker and Smale, On the Mathematics of Emergence, Japan. J. Math. 2, 197-227, 2007) (Continuation of work previously done)
58. **Development of a Facebook Application:** Understand the Facebook API and develop any application that you desire, for example a simple game, a robot to classify some information about Facebook users, members or not, etc.

59. **Development of an Apple IOS Application:** Understand the Apple IOS API and develop any application that you desire, for example a simple game, a commercial information retrieval facility, etc.
60. **Development of an Android Application:** Understand the Android API and develop any application that you desire, for example a simple game, a commercial information retrieval facility, etc.
61. **Development of a Microsoft Azure Application:** Understand the Microsoft Azure cloud services and API, then develop any application that you desire. Windows Azure and SQL Azure enable you to build, host and scale applications in Microsoft datacenters. They require no up-front expenses, no long term commitment, and enable you to pay only for the resources you use. <http://www.microsoft.com/windowsazure/>. We already have a number of MS Azure accounts for a real life experience.
62. **Development of an Apache httpd Module for Anti-Crawling:** Apache httpd is the most frequently used (60-70% worldwide) web server software. Understand crawling mechanism and Apache httpd API, then develop an Apache httpd module that will dynamically trap crawlers and prevent crawlers to visit all or most pages of a web site served by an Apache httpd
63. **Development of a Generic Web Based E-Commerce System:** A web based e-commerce system for producers and consumers will be developed. An initial RSD will be provided to the student and RSD will be finalized by the student. Then, the system will be designed and implemented by the student. It is expected that the e-commerce system will be generic in the sense that it is reconfigurable at installation to meet the different demands of e-commerce web site owners and consumers. Also, multi language support is expected.
64. **Development of File/Directory Encryption/Decryption Software:** Design then implement and test a C or C++ or Java program to encrypt and decrypt first a single file, then a directory of files recursively. Your application should be able to authenticate the user by public key cryptography (private key and public key, where public key not necessarily by a certificate), then use any symmetric encryption/decryption algorithm (of course, for performance reasons) as a black-box subprogram to actually provide confidentiality. You must implement your program to work with encryption/decryption algorithms of your choice, actually it is a better idea if algorithm could be selected by the user. You can use public key and symmetric encryption/decryption algorithms implementations already available in Internet.
65. **Development of a Generic Web Based File Upload/Download System:** A web based file upload/download system will be developed. An initial RSD will be provided to the student and RSD will be finalized by the student. Then, the system will be designed and implemented by the student. It is expected that the file upload/download system will be generic in the sense that it is reconfigurable at installation to meet the different demands of web site owners and users. Also, very large file upload/download, directory upload/download and multi language support are expected.

By A. Taylan Cemgil:

66. **Machine Learning pipelines and big data appliances:** Investigate and experiment with novel data processing environments for machine learning on big data: Hadoop, Storm and/or Spark. The project will include the implementation of a basic ML algorithm on the platform and measuring its performance.
67. **Analysis and visualization of Social Media Data:** In recent years, social media platforms such as Twitter and Facebook have become very popular. The generated data is huge and dynamic. Exploitation of this rich but highly unstructured data became a focus in current research. In this project, you will investigate data analysis in publicly available twitter data, develop and implement methods for analysis and visualization.
68. **Sentiment analysis in social Media Data:** Sentiment analysis is important for deriving meaningful statistics from bulk social media data. For example, merely reporting the number of tweets containing a particular hashtag is not sufficient for measuring the public opinion; a breakdown in terms of positive, negative and neutral opinions is much more informative. With this vision, you will investigate approaches such as topic models that have potential to boost performance when combined with modern supervised classification methods.

69. **Recommendation Systems and topic models:** Topic models have become one of the key tools in recommendation systems for collaborative filtering. In this project you will investigate and implement basic methods such as nonnegative matrix/tensor factorizations or latent Dirichlet allocation and test the results on benchmark datasets.
70. **Analysis of Network flows:** The analysis of network usage by individuals is of big interest for internet service providers and mobile operators. However, privacy concerns reduce the possibility for deep packet inspection. This project will investigate statistical methods for detection and segmentation of user characteristics from simple statistics such as packet sizes and counts and time dependent
71. **Statistical methods for detection and prevention of Distributed Denial of Service (DDos) attacks:** DDos attacks are costing companies and enterprises literally millions in terms of lost profit and user satisfaction. In this project, you will investigate methods for detecting and preventing such attacks using statistical techniques such as anomaly detection and outlier analysis. The project will involve a survey of DDos attacks and their evolution over the times.
72. **Large Scale Machine Learning for Music Copyright Management:** The amount of raw data from TV and radio broadcast in audio-visual archives is ever-increasing. Monitoring this data stream online is critical in diverse applications ranging from media copyright management, speech transcription and recognition to hearing aids. Indexing and extracting relevant information in such data streams while carefully managing computational resources is a promising but yet largely unexplored area. We have a large dataset available from a music copyright management organisation. The data set consists of audio tracks (about 250 GB) and one day of broadcast data from 40 TV channels (audio-video)). The goal is developing fast methods for indexing and retrieving hybrid data.
73. **Machine Learning algorithms on a GPU:** CUDA is NVIDIA's parallel computing architecture. It enables dramatic increases in computing performance by exploiting the architecture of the GPU. In this project you will learn the CUDA architecture and GPU programming and Investigate parallel computing for common tasks in machine learning and data mining such as solving matrix factorisation, clustering and classification problems.
74. **Machine Learning algorithms on Distributed Systems:** Distributed computation is key for scaling up algorithms to massive datasets. Modern computer systems such as clusters are typically hybrid systems where a cluster of multiple machines consists of shared memory multicore systems. In this project, you will learn and practice how to tailor specific algorithms for such architectures using MPI and OpenMP programming.
75. **Implementation of a realtime pitch tracker and/or a realtime tempo tracker as a VST plugin:** Steinberg's Virtual Studio Technology (VST) is an interface for integrating software audio synthesizer and effect plugins with audio editors and hard-disk recording systems. VST and similar technologies use Digital Signal Processing to simulate traditional recording studio hardware with software. Thousands of plugins exist, both commercial and freeware, and VST is supported by a large number of audio applications. The goals of this project are - learning the C VST SDK - MIDI and Audio Programming - implementation of algorithms for real time pitch/tempo tracking and MIDI conversion.

By Arda Yurdakul

76. **Architectural Simulation:** Architecture of a computing platform has a direct effect on the performance of an application. For example, an architecture which is the best for video processing cannot perform good for text search. Besides, today there are plenty of applications running on mobile platforms where battery life-time is a major concern. In this project, behavior of a set of selected benchmarks will be studied on multiple computing architectures to find the best application-architecture match in terms of performance and battery life-time. We will use an open-source simulator.

By Can Özturan

77. **Shell commands for the Amazon Cloud:** A set of high level shell commands will be developed that will perform various tasks on remotely started cloud instance machines. Programs for performing tasks such as machine starting, stopping, termination, remote execution of commands and programs, and file uploads/downloads will be implemented.

- 78. Development of a Simple Workflow System for Clouds:** A DAG based workflow language will be designed . A workflow engine that executes on a client machine will transfer necessary inputs (files) and schedule tasks on Amazon cloud instances. Various commands that query and manage the workflow executions will also be developed.
- 79. Generating Web Forms from QT Designer Output:** A generator tool will be developed that will generate web application given a GUI form designed by QT designer. The generated web application will be based on Angular and Node.js.

By Pinar Yolum

- 80. RestaurantSocial:** There are various existing restaurant recommendation sites, such as Foursquare or Yelp. Their basic idea is to collect ratings and reviews from everyone in the system and aggregate the results to show an overall view about a restaurant. This has two disadvantages: 1) Users who provide opinions on venues may only want to share it with their own social network, not the entire world. 2) Users would like to get recommendations based on whom they trust, not on random people. Accordingly, this project will develop a peer-to-peer social network to recommend restaurants that will overcome the two problems listed above. The system will use GNU Social as an underlying layer. This provides each user in the system a node on which their personal information (ratings, reviews, etc.) reside. You will design a structured way to keep this information and exchange this information. You will research on various trust mechanisms that can be applied and then implement one on top of that so that only information from trusted users are shared. Overall, anyone that installs the software will be able to join the network, find friends, and exchange experiences appropriately
- 81. FacebookCentral:** Develop a Facebook application that detects popular places for a user. The application will access a Facebook user's newsfeed including her friendslist, posts, her own checkins as well as checkins of others to decide which places (neighborhoods, restaurants, etc.) are popular. Popularity might depend on various factors, including time, (e.g., a particular neighborhood might be popular on Friday nights, but not week nights) or occupation (e.g., doctors might prefer kebab restaurants but programmers might prefer pizza places). Your application will analyze the content and generate classifications of such.
- 82. HurriyetForMe:** Develop a Web-application that will enable personalized search for Web pages on hurriyet.com. The system will use Apache Nutch as the basis for a Web crawler. This crawler can by itself crawl Web pages and index them. Using keywords, the software can return indexed pages. Since the project aims to develop a personalized search engine, the developed application will extend Nutch to include personalized information such that different pages may be returned to different users for the same keywords. For example, a search on JAVA could return travel pages on island Java for a traveler, but it will return software pages for a programmer. This will require building user models as defined in the literature and recommending pages based on it

By Cem Ersoy:

- 83. Data Visualization for Parkinson's Disease:** 3D acceleration data is collected from the four extremities of Parkinson's Disease patients. This data will be used by the neurologists for adjusting the dose of medications for the patients. The project involves animated and graphical representation of the collected data so that the neurologist can reconstruct what has happened 1 hour, 2 hours, etc. after the medication intake.
- 84. Crowdsourced Noise Map Generation of a Campus/City:** This project requires that the target area will be covered by a sufficiently small cell size grid. Moreover, the map should be representing the noise level corresponding to different times of the day. Noise levels for each cell (decibel) reported by the application users (crowd) should be collected and visualized by the server side.
- 85. Comparative Evaluation of Cloudlet Scenarios:** The project involves the use of clod simulator Cloudsim for measuring the delay and throughput of Cloudlet versus Cloud scenarios for the cases of local versus wide area network access. Augmented reality like applications with real-time requirements will be used as target applications.

Boğaziçi University
Software Engineering MS Program

SWE 599 Project, Spring 2015

Supervisor: Name of your 599 project advisor

XYZ Development Project
Interim or Final Report

6.04.2015

Revision N

By: Name Lastname

Student Id: 201.....

Tentative Table of Contents

1. Introduction
 2. Overview of Background and related works
 3. Work Done in This Project
 - 3.1 Overall structure and system description
 - 3.2 software developed and performance measurements
 - 3.3 Interpretation of results
 4. Conclusions and future work
- Appendix A: Requirements Specification Document
- Appendix B: Design Specification Document