

GRADUATION PROJECTS

1. Team organization: Each team should be organized as a group of 3 or 4 people. Teams are directly responsible to provide progress to their project assistants. Each assistant is assigned to one of the instructors. Instructors will be the project coordinators.

2. Meetings: Meetings will be done with the assistants on a regular basis. In these meetings, progress on the project will be reported to assistants and each team member will be graded individually in terms of his/her contribution. Grading will be based on a guideline whose details will be determined by the project coordinators. In addition to weekly meetings, monthly meetings will be done with the instructors.

3. Reports: The documents that should be prepared throughout the project development are listed below. These are the reports that should be prepared by all the groups. The general format and the outline of the reports will be announced by the project coordinators at the starting of the semester. However, depending on the project, project coordinators/assistants can request extra reports and demos.

- **Software/Hardware Requirements Specification:** The requirements document should give information about the general solution overview, including but not limited to the purpose of the product, important definitions, system overview, references, overall description of the product, product perspective, system interfaces, user interfaces, hardware interfaces, software interfaces, communication interfaces, memory constraints, functional requirements, external interface requirements, performance requirements and time planning. This document should be presented to the project coordinators at the first or second monthly meeting.
- **Software/Hardware Design Report:** The design document should include information about the detailed design considerations, detailed data description (possibly a data dictionary and an ER diagram for the database design), architectural design, details about the system components, user interface design, and a detailed design of the final product. This document should be presented to the project coordinators accompanied by a demo of the prototype of the product.
- **Final Term Project Report:** This will be the final report that will give the overall description of the project. This report will be prepared at the end of each semester. The outline of this report will be determined by the project coordinators and assistants and its format can vary depending on the project type and content. Students will be encouraged to write an academic paper that can be submitted to a related conference or workshop; therefore, if the project coordinator approves that the project can be reported as an academic paper, the final report will be prepared based on the guidelines of a selected conference or workshop.

4. Presentations: At the end of each term, students will present their projects and make a demonstration. The presentations will be made to the whole class. All the project coordinators and assistants will attend the presentations. Other department members related with the topics can also attend to the presentations. At the end of the year, projects will be graded and they will be evaluated by a selected group of instructors and the best 3 projects will be given awards by the department.

5. Iterations:

Iteration 0: Weeks 1-2 Group formation Deadline: 09.10.2015, 23:59

Determination of the project groups and the project topics.

- You can either select from the announced topics or propose your own topic.
- Till 02.10.2015 17:00, students will submit a form including the names of the team members and selected project topic.
- In case you determine your own topic, you should discuss the topic with one of the instructors and take confirmation. In your form, provide your project title and description.
- If you select from the announced topics, you should choose 3 of them and list them in the form.

Iteration 1: Weeks 3-5 Requirements Deadline: 30.10.2015, 23:59 20%

Give an analysis of the requirements your project must meet for it to fulfill its intended function. The main thing you will need to produce is *use-cases*, English descriptions of what functionality the program should have, and their test cases. You should submit your requirement analysis document till the mentioned deadline to the assistants.

Iteration 2: Weeks 6-8 Design Proposal Deadline: 13.11.2015, 23:59 20%

Give a design proposal, including the core use-cases you want to implement, and the core classes and their responsibilities. Having some code at this point is strongly encouraged.

Iteration 3: Weeks 9-11 First Pure Code Iteration Deadline: will be announced 15%

Some core functionality is coded.

Iteration 4: Weeks 12-13 First Prototype Deadline: will be announced 15%

Some core functionality of the project is working.

Iteration 5: Week 14- Final Demonstration Deadline: will be announced 30%

First release

6. Project topics: Teams should select one of the topics listed below. The selection should be approved by the project coordinators.

Project #	Project Title	Responsible Asistant	Responsible Project Coordinator	Related Topics
1	YBU Student Affairs System			
2	Report Expert	ElifGül	Rahime Belen Sağlam	Database Applications, Object Oriented Programming
3	Opinion Detector		Rahime Belen Sağlam	Opinion Mining, Text Mining
4	Disease Map		Rahime Belen Sağlam	Text Mining
5	Department Website + News Group			
6	Crypt attack application	CavidanYakupo ğlu	Baha Şen	Cryptography, computer networks
7	Efficient Intrusion Detection Systems	CavidanYakupo ğlu	Hilal Kaya	Computer networks
8	Travel logger	Erdem Özdemir	Ahmet Ercan Topcu	Software engineering, Multimedia applications, Social Networks
9	Intelligent traffic route planners	Erdem Özdemir	Ahmet Ercan Topcu	Modelling, optimization
10	Mobile phones	ErdemOzdemir	Ahmet Ercan Topcu	Computer vision, Machine learning,

	rather than expensive car features			Driver Assistant Systems
11	Course and Exam Timetable Software using an Optimization Algorithm	Hatice Çataloluk		Artificial Intelligence, Optimization
12	Implementation of an E-Commerce application with Data Mining methods	Hatice Çataloluk	Hilal Kaya	Data Mining, Web Programming
13	Biomedical Sound Recognition System	Ayşe Arslan	Hilal Kaya	Machine Learning, Signal Processing, maybe Parallel Programming
14	Biomedical Image Recognition System	Ayşe Arslan	Hilal Kaya	Machine Learning, Image Processing, maybe Parallel Programming
15	An indoor navigation app. for a shopping center in Ankara	Elif Gül	Shafqat Rehman/ Baha Şen	Mobile (Android) Programming, Data Mining, Sensor Programming , Localization Techniques
16	Furniture placement application	Elif Gül	Baha Şen	Augmented Reality, Mobile Programming, Image Processing
17	Clustering on Cloud	Erdem Özdemir	Ahmet Ercan TOPÇU	Big Data, Cloud, Data Mining
18	Medical Image Search Engine	Erdem Özdemir	Ahmet Ercan TOPÇU	Big data, Computer vision, Data mining
19	Cloud Services for Internet Documentation of the publications	Erdem Özdemir	Ahmet Ercan TOPÇU	Big data, Text Processing, Data Mining, Internet Services
20	Data Analytics using Spark or related Technologies	Erdem Özdemir	Ahmet Ercan TOPÇU	Big data, cloud, distributed programming, Spark
21	Data Semantics for Large Files	Erdem Özdemir	Ahmet Ercan TOPÇU	Big data, cloud, distributed programming, Semantic Extraction
22	Face Identification System		Osman Serdar GEDİK	Image Processing, Pattern Recognition
23	Sign Language Translator		Osman Serdar GEDİK	Computer Vision, Pattern Recognition
24	Network Traffic flow monitoring and visualization using SDN (Software Defined Networking)		Shafqat Ur REHMAN	Computer Network
25	DDoS Detection and mitigation using sFlow		Shafqat REHMAN	Network Security
26	Image Processing using Hadoop MapReduce		Shafqat REHMAN	Image Processing, Big data

Project #	Description
1	Details will be announced later.
2	The project will produce sophisticated ready-to-use reports by transforming raw data into meaningful and useful information. It will generate reports in predetermined formats but it will also allow end users to generate their own report formats by selecting attributes and dimensions. The goal is to allow easy interpretation of large volumes of data by reporting several information such as basic descriptive statistics.
3	The project will detect opinion polarity in blog comments and give statistics about the comments for each entry (number of positive comments, number of negative comments etc.). It will guide the authors by detecting the topics which get the most positive comments. Topic extraction and sentiment analysis will be carried out within the project.
4	A web-based application that processes data organized from social media and search engine trends about chronic diseases will be developed. The aim is to create a disease map for Turkey which can guide doctors about the potential environmental affects on these diseases. The project will also keep historic data and check proportion of increase in talking or searching about diseases in social media or search engines.
5	Details will be announced later.
6	Implement application allowing to perform crypt attack: 2.1. Known plaintext-ciphertext attack for Hill cipher 2.2. Known ciphertext attack for mono alphabetic cipher 2.3. Known plaintext-ciphertext attack for Playfair cipher 2.4. Known ciphertext attack for poly alphabetic cipher Your application should ask from user all necessary for attack information, perform attack, and display results of attack.
7	Intrusion detection is the problem of identifying unauthorized use, misuse, and abuse of computer systems by both system insiders and external penetrators. Develop a new IDS for different scenerios.
8	Travellers is an mobile app for storing paths travellers took, pictures they took and activities they performed. By the help of traveller logger, users will be able to share fantastic videos of their daily activities on social media or keep those videos as memory. Details: Mobile phones will automatically collect gps locations & pictures taken by mobile phone etc and will create a path on map with pictures of what places traveller visited or what they did. In the end, using those logs and pictures a video will be generated with different designs depending on user's choice.
9	Traffic route planners would take current location of the driver and driving destination to suggest best route in terms of time and road conditions etc. Typically, those expert systems use city map, distance of the roads etc but those static data might lead to poor plans when there are dynamic changes on traffic conditions such as traffic congestion due to an accident etc. Recent advances in GPS and mobile technologies gave us a chance to probe drivers' locations anytime and this data can be used to estimate real time hot spots in traffic. Intelligent traffic route planners would ideally use real time GPS data for better routing in real time and have drivers avoid hot spot roads. In this project: You will read academic papers related to the problem, and will develop a model that combines map data, GPS data and sometimes even other factors such as time of day, safety of road, events etc for route queries. Ideally you will have a web interface that uses Google's map or OpenStreetMaps to take input of route queries (source - target destination) and show routes to the user.
10	Nowadays, car manufacturers sell security package such as traffic sign detection, lane detection, pedestrian detection features for thousands of euros. In this project, you will come up with a simple mobile application that will do automatically using mobile phone camera and itscpu! With this mobile app, everyone who place their camera on front of their car will have a security package in their car for a very low price rather than paying thousands of euros to car manufacturers. You can also add other set of features such as location of traffic controls, detection of traffic jam and route planner to this cool package.
11	The aim of this project work is develop course and exam timetabling software that will be useful to our faculty, using artificial intelligence and optimization algorithms. The main challenge is to schedule courses and exams to timeslots and rooms over a specific period while satisfying a set of constraints.
12	A web application for e-commerce will be developed. Then a data mining model will be developed that uses association rules algorithms to identify patterns of product models which are commonly purchased

	together. The data mining model will enhance the existing web application to provide relevant purchasing suggestions to online customers.
13	Abnormal biomedical sounds may be a precursor of many serious diseases. Listening process can be supported by using computer aided automatic diagnosis systems for fast and accurate diagnosis. These systems are useful to remote diagnosis systems in place that have the lack of physicians and modern techniques. In this study, recorded biomedical sound data sets that may be found from web sources or can be recorded through an hospital can be classified by using machine learning algorithms. At the end of this study, different diseases will be detected just listening sounds by an automatic system instead of a doctor.
14	In this study, biomedical image data sets (tomography, mammography etc.) that may be found from web sources or can be recorded through an hospital can be classified by using machine learning algorithms. At the end of this study, different diseases will be detected just processing of these images by an automatic system instead of a doctor.
15	The aim of this application is that the store wanted to go easily can be found when a user is at a mall. The application should show the directions and describe stores' floor and place depending on users' location and malls' indoor maps. Moreover, If the system supports sound-based commands and alerts, it will be very useful for blind people. The final product will be a user-friendly mobile application that will work through user login. If it collects users' searches and top stores, it can recommend the top stores' sales to the user. So, user data will be recorded in a database.
16	The aim of this application is a preview of how desired furniture is placed in the photograph of a room. In this project, Augmented reality, image processing and database techniques must be used.
17	Clustering is a way of grouping a set of objects that are close to each other and is a well studied problem in literature. Today, these algorithms are used in many fields including machine learning, pattern recognition, bioinformatics, and information retrieval. However, with recent developments in technology, we are living in an information age and classical clustering algorithms dont work well for large scale data and there is need to implement those algorithms to work in distributed ways. In this project: you will read papers and books about map reduce and different clustering algorithms. In the end, you will provide an easy to use API that will take input data, run clustering algorithms on cloud and will give clusters as output.
18	With the widespread use of picture archiving and communication system (PACS) in the hospitals, the amount of medical image data is rapidly increasing. Thus, the more efficient and effective retrieval tools are required for assisting doctors in decision making. Using these tools, doctors can search for medical images in the system and see what other doctors diagnosed, what kind of treatments are applied and how it worked for similar medical images. In this project, doctors will be able to search medical records using queries that are both text and image based. For textual search, we will be using textual annotations on images and for content based image retrieval, the images will be retrieved on the basis of features such as color, texture, shape and local features. This system will be implemented in a cloud environment with data structures and programs running distributed.
19	Lots of data are generated rapidly in the world and to finding the latest version of updated data and management of this data is an issue. Scholarly publication data are critical for scientist to find related information for their research. Cloud based systems that provide services to manage publications data is important for finding related metadata. In this project, data will be collected from different environment and a search model will be built to extract related publication data using web services.
20	In this project, weather data will be analyzed using spark or related technologies. Measurements of the weather condition of specific geographical places will be analyzed and required reports will be generated using big data analytics for specific years (1 year/ 5 years/ 10 years)
21	In this project, large data will be chunk into small sizes and be distributed over the nodes (computers). Semantic analyze will be done for specific data sets held in data nodes and results will be presented to users through a web page.
22	The system that performs authentication (for instance during facility entrance) based on face detection and recognition. The system acquires query face image by a built-in camera, compares the face image with those in the database and displays the result (Verified or Not). The system should allow new entrances to the face database. All positive and negative queries should be logged and sent to the administrator e-mail address daily. For negative queries a representative image should also be reported.
23	The system that can recognize the images of Turkish Sign Language characters acquired by a camera. The system acquires a sequence of images each corresponding to a sign language character, recognizes the

	associated characters and forms the whole sentence aimed. An RGB or a depth camera (for instance Microsoft Kinect or Asus Xtion) may be utilized for the purpose.
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