

CMPE 295 Project Topics Spring 2013

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General Guidelines

For potential MS project students, please send me a list of three choices, in the order of your preferences, along with your background, such as unofficial transcript, course projects, and industrial experiences.

Usually I expect my MS project students to perform both research and development in their projects. To communicate on project progresses, we meet once every two weeks in my office hours. Meeting after 6pm is very difficult, so if you work full time, and can't make it to my office hours, I would suggest you consider alternative project choices. You need to maintain a project collaboration page (e.g., GoogleDoc) and continuously update on your progress there.

Project Topics

Project Topic #1: Network monitoring and security visualization using Javascript

Your project consists of two parts. The first part is a framework for network monitoring and intrusion detection. You can leverage existing network utilities to build your framework. The second part is Javascript based visualization library and browser plugin to support 2D and 3D charts, line graphs, spline, areaspline, column charts, pie charts, bar charts. The plugin should work with commonly used web browsers.

Project Topic #2: Crowd sourced computing utilization VMs on routers and network storage (in collaboration with NetGear)

In this project, you will implement the VM to run applications, and implement a provisioning server that tracks the CPU/storage usage of devices and allows charging end-users for payment.

Project Topic #3: OpenFlow project (in collaboration with NetGear)

OpenFlow networking protocols (aka Software Defined Networking) were developed by Stanford University, to enable network research and innovations. Many industrial companies, including Cisco, Juniper, HP, VMware, have deployed OpenFlow protocols on their router/switch solutions. In this project, you shall implement an OpenFlow network in a single computer, and shall implement a prioritized scheduling framework to provide different quality of service to different types of network applications.

To get more information on open networking protocols, visit the web page:
<https://www.opennetworking.org/research>

Here is a tutorial to OpenFlow:

http://www.openflow.org/wk/index.php/OpenFlow_Tutorial

Project Topic #4: Panoramic image stitching for optimal route planning

In this project, you will create a desktop application to generate panoramic view images taken from slightly variant angles. The images are saved in standard dot matrix format, and adjacent pictures have overlapped regions. Your algorithm will extract features from the images and form a big panoramic picture. If there is blurring due to lack of focus, your program will apply smoothing algorithm to make stitching lines invisible.

You shall develop your project using C++ and your project should run in both Linux and Windows environments. You should also provide a set of APIs for other applications to implement panoramic view from pictures.

An example application of this project:

http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5685494&url=http%3A%2F%2Fieeexplore.ieee.org%2Fexpls%2Fabs_all.jsp%3Farnumber%3D5685494

Project Topic #5: Flow optimization and traffic engineering in software defined networking

In this project, you will implement an optimization agent that communicates with OpenFlow controllers to read detailed flow data, analyze them, rebalance the workload, optimize route selection, and calculate network resource utilization.

Your project should also have a visualization component to display flow data and analysis results to users.

Project Topic #6: Optimizing the performance of cloud storage

In this project, you will implement application-level UDP (or SCTP-like) protocol to optimize storage of big data to cloud storage providers. You will make your protocol work with common cloud storage providers, including Amazon, Dropbox, Google Drive, and iCloud.

Other interesting project topics?

Talk to me and we can discuss whether it is a good choice.