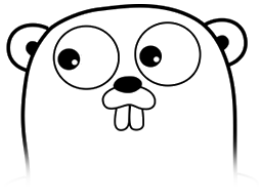

Song Gao

Education

2011 – Present **PhD**, *Auburn University*, Auburn, AL, *GPA: 3.89/4.0*.
Major in Computer Science and Software Engineering;
Wireless Networks, Distributed Systems

2007 – 2011 **B.E.**, *China University of Geosciences*, Wuhan, Hubei, China.
Major in Computer Science and Technology

Work Experience

2011 – Present **Teaching Assistant**, *Auburn Uniersity*, Auburn, AL.
Working as an Instructor, Grader, and/or Lab Helper for following courses:
- COMP 1000 – Personal Computer Application (Microsoft Office & SharePoint)
- COMP 1200 – Introduction To Computing For Engineers And Scientists (MATLAB)

July 2007 **Web Developer Internship**, *sycatv.net*, Shiyan, Hubei, China.
Developed a static sub-site for sycatv.net[1], serving contents related to the Chinese Valentine's Day of that year.

August 2007 **Medical Intern**, *People's Hospital of Shiyan*, Shiyan, Hubei, China, Department of Cardiovascular.
- Undertook some routine medical examinations, e.g., Electrocardiography (ECG), Blood Pressure, Blood Glucose;
- Worked with doctors on miscellaneous items and learn medical basics.

Project Experience

August 2012 – Present **Squirrel**, *Sole Developer*, Auburn University.
- Squirrel[2]is
  - a tool initially developed in C++11 but soon re-written in Go
  - that emulates 802.11 networks over ethernet;
  - It helps testing *real-world* wireless applications and user-space routing daemons;
  - Programs running with squirrel get similar network performance like 802.11.
- In order to achieve its objectives, squirrel
  - creates `TUN` interfaces,
  - and applies a interference model to IP packets based on virtual positions of each virtual mobile nodes.

* Technology used: Go (golang), Linux Networking, TUN/TAP Interfaces

[2]More: `http://songgao.github.com/squirrel`

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March 2012 – March 2013 **Data Dissemination on Mobile Ad-hoc Networks**, Auburn University.

- The research is to develop algorithms and explore techniques to disseminate data in MANET (Mobile Ad-hoc NETworks). OLSR (Optimized Link State Routing) is chosen as the MANET routing protocol and we use `olsrd` in the implemented system.
- My contribution includes:
  - Compare different OLSR implementations and make decision on which one to use
  - Build a rough platform[3] to test `olsrd` and get an idea of its bandwidth usage.
    - It consist of 32 KVM hosts, each of which denotes a virtual mobile node.
    - There's a simple mobility simulator assigning virtual positions for each node;
    - `memcached` is used to store virtual positions of all nodes so that every node can look up;
    - Each node based on virtual positions, uses `iptables` MAC layer blocking to handle connectivity between any pair of nodes
  - Test the system with Android devices and Gumstix boards.
    - 6 Android devices and 2 Gumstix ARM boards are used
    - 8 nodes are in the same Ad-hoc network. `olsrd` runs on each to maintain the routing table and provide multicast flooding. Data dissemination algorithms run on top of it.

* Technology used: memcached, KVM, NFS, Python, Linux (Wireless & Ethernet) Networking, Android NDK, shell scripting

2008 – 2010 **Evolvable Antennas**, *Principal Developer*, China University of Geoscience.

- The objective was to use multi-objective evolutionary algorithms and NEC antenna simulator to design satellite antennas, optimizing antenna Gain and VSWR with constraints such as antenna's dimension and mass.
- I was one of the two principal developers who designed and implemented a distributed platform that supports using evolutionary algorithms to solve a problem in parallel.

* Technology used: C#.NET 3.5 (WCF, WPF, linq), db4o[4]

Spring 2008 **Thinking Messenger**, *Principal Developer*, China University of Geoscience.

- The project was intended to build a chatting system that supports the scenario that a group of people, e.g. customer support, need to chat to other people one-to-one behind a public identity.
- I contributed over 80% code.
- The project was submitted to Microsoft Imagine Cup 2008.

* Technology used: C#.NET

Selected Course Projects

November 2012 **A Two Player Board Game**, *Artificial Intelligence*, Auburn University.

- It's a board game with interesting rules. (See source code and runnable web app on c9[5].) Two AI agents were implemented using min-max tree.
- In this project (2 people team), my contribution includes:
  - implementing user interface (Twitter Bootstrap, jQuery)
  - implementing ajax and server side handlers (Tornado Web Server)

* Technology used: Python/Tornado, Javascript/jQuery, CSS/Bootstrap

[3] Source code: `https://github.com/songgao/MAC-Address-Blocking-To-Emulate-MultiHop-AdHoc-Network`
[4] `http://www.db4o.com/`
[5] `https://c9.io/songgao/comp6600` (It's compute-intensive, so it's slow on c9.)

Summer 2012 **Django Web App**, *Web Development with Django*, Auburn University.

- It's a Django web app called "Need-A-Nerd" that connects students with software jobs.
- It's got:
  - an authorization mechanism (that is not quite secure)
  - a student portal where students can create their own profiles, view jobs, and apply for jobs
  - an employer portal where employers can post jobs, search for students, and contact students
  - ability to send email notifications
- jQuery is used to manipulate DOM and deal with ajax requests
- It's quite simple and rough, but it is nearly a minimum-viable-product (MVP), and indeed touches various aspects of Django framework.

* Technology used: Python/Django, Javascript/jQuery

Spring 2012 **OLSR Routing**, *Wireless and Mobile Networks*, Auburn University.

- The project (URL:[6]) was a 3 people team project. It was to simulate VANET (Vehicular Ad-hoc Network) communications using socket programming with C/C++ on a Linux cluster.
- My contribution includes:
  - simulator framework
  - a simple mobility simulator in which vehicles randomly move around in a grid map
  - fundamental data structures, e.g., vehicle, message, ad-hoc model, etc.
  - a thread-safe cache
  - configuration file loader
  - more than half the text in reports

* Technology used: C++11, POISX Programming

Spring 2011 **Parallel Image Processing**, *Bachelor Thesis Project*, China University of Geosciences.

- The project was to parallelize processing remote sensing images using MPI.
- The demo software uses Supported Vector Machine and Bayesian classifiers to recognize interested areas in large, many-band satellite images.

* Technology Used: C++, OpenMPI, QT, GDAL[7], OpenCV[8], Linux

Autumn 2009 **Minimum Banking Application**, *The Principals of Database System*, China University of Geosciences.

- The project was to build a simple database application with simplest functionalities such as: opening accounts, depositing, withdrawing, transferring, etc.
- It was an individual project. I took it as an opportunity to try out Google App Engine (for database and logics) and Google Web Toolkit (for UI).

* Technology used: Java, GAE, GWT

[6] `https://github.com/AU-COMP6360-2012Spring-Team2/AU-COMP6360-ProgrammingProjectsSolutions`
[8] Geospatial Data Abstraction Library (`http://www.gdal.org/index.html`)
[8] Open Source Computer Vision (`http://opencv.willowgarage.com/wiki/`)

Awards

November 2009 **Second Prize**, *National Challenge Cup Competition*, China.
- "Evolvable Antenna for Satellites"
- Awarded by:
  - The Central Committee of the Communist Young League
  - China Association for Science and Technology
  - Ministry of Education of the People's Republic of China
  - Ministry of Industry AND Information of the People's Republic of China
  - Students Union of China
  - People's Government of Beijing Municipality

June 2009 **Grand Prize**, *Provincial Challenge Cup Competition*, Hubei, China.
- "Evolvable Antenna for Small Satellites"
- Awarded by:
  - Communist Youth League Committee of Hubei Province
  - Science and Technology Association of Hubei Province
  - The Provincial Education Department of Hubei
  - Students Union of Hubei Province

2008 – 2009 **Excellent Student in Activities**, *China University of Geosciences*, Hubei, China.
- Awarded for excellent achievements and performance;
- Awarded by Office of CPC Committee, China University of Geosciences.

2007 – 2008 **Excellent Student**, *China University of Geosciences*, Hubei, China.
- Awarded for excellent achievements and performance;
- Awarded by Office of CPC Committee, China University of Geosciences.

Languages

English **ILR Level 3** *Professional working proficiency*

Chinese **ILR Level 5** *Native or bilingual proficiency*

Me Elsewhere

- GitHub: `https://github.com/songgao`
- StackOverflow: `http://stackoverflow.com/users/218439/song-gao`
- LinkedIn: `https://www.linkedin.com/in/songgao`

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