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| Contract for CSS 497  **Computer Science and Software Engineering Capstone** | 18115 Campus Way NE · Box 358534 · Bothell, WA 98011-8246 Ph: (425) 352-5279 · Fax: (425) 352-5216 | |
| **STUDENT INFORMATION** | | |
| Ly, Danny | | **1465570** |
| **Full Name** *(Last, First)* | | **Student ID** |
| **STOP:** Are you ready for your capstone experience? Have you completed the CSS core courses (CSS 301, 342, 343, 350, 360, 370, 422, 430) and 10 credits of CSS electives?  YES NO, that means you need to complete the courses first or petition to take the capstone early (i.e., complete the Course Petition form). | | |

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| **CREDIT DISTRIBUTION** *(Credits from all quarters must equal 10)* | | | | | | | | | | | | | |
| **First Quarter** | | | | | **Second Quarter\*** | | | | | **Third Quarter\*** | | | |
|  |  | |  | |  |  | |  | |  |  | |  |
| Quarter | Year | | Credits | | Quarter | Year | | Credits | | Quarter | Year | | Credits |
| **Grade Option** (Check only one) | | | | | ✓Decimal | | | | |  | | | |
| **Faculty Advisor: Dong Si** | | | | | | | | | | | | | |
| **\*If the capstone is more than one quarter, an ‘N’ grade (meaning in progress) will be assigned until the final quarter.  When the final quarter grade is assigned, the ‘N’ grade(s) change to that grade on the transcript.** | | | | | | | | | | | | | |
| **CAPSTONE INFORMATION**  *Please answer the following questions regarding your proposed Capstone project.* | | | | | | | | | | | | | |
| **Project Title:** | | Exploration of Genetic Algorithms | | | | | | | | | | | |
| **Option:** (Circle/highlight one) | | **1**  Sponsored Internship | | **2**  Current Employer | | | **3** Faculty Research | | **4** Individual Project | | | **5**  Group Project | |
| **Capstone Sponsoring Organization(s):** | | | | | | | | | | | | | |
| **Brief Description (75-125 words)** | | | | | | | | | | | | | |
| In this project, I hope to explore and gain knowledgeable understanding of how genetic algorithmic neural networks work. Although combining genetic algorithms and neural networks have exist since the 1980’s I hope to further explore applications of this type of network. I will proceed to learn the theoretical heritage of this network, and with that knowledge apply it, by implementing a simple computer versus player Ping-Pong game where each game will produce a new generation of networks that outperform its predecessors. Eventually leading to a trained network which can play Ping-Pong correctly. | | | | | | | | | | | | | |

**This contract is a copy of the CSS’ at** [**www.uwb.edu/bscss/css497**](http://www.uwb.edu/bscss/css497) **.**

**Answer every question in detail directly after the question.**

1. Describe the capstone.
   1. Include any relevant background information.

This capstone is a personal project which will investigate data modeling using genetic neural network. Since taking the course Artificial Neural network, I would like to further understand more neural network models. I choose genetic neural network for its ability to further optimize the hyper parameters through generations of training sets.

* 1. Clearly describe the benefits of the proposed project (e.g., ‘What is this project going to accomplish?’).

The benefits of this project will help me accomplish a better understanding of how to machine learning algorithms work in a smaller scale, which in turn will allow me foundational knowledge to help grow my solutions to more complex problems.

1. Provide a clear, detailed description of the academic merit of proposed project. Academic merit is defined as ways in which you will further develop your core and advanced technical competencies. Please list the competencies you will focus on and provide a brief description of how each one will be further developed by your involvement in this project. (For more information, see “Core & Advanced Competencies” at [www.uwb.edu/bscss/css497/student-guide/competencies](http://www.uwb.edu/bscss/css497/student-guide/competencies) )

Through this project the competencies:

I will be gaining would be a better academic information gatherer, because this project’s level of knowledge is quite high(academically) it will require me to be efficient at gathering good quality resources to learn from.

This project will help develop my thoroughness in planning and developing the project. I believe this project will invoke much through planning and designing before any product/code is written.

This project will also allow me to learn by doing, I hope to not only gather information about genetic algorithm neural networks. I hope to take that knowledge and apply it to a small problem, ping pong game.

This project should invoke my creativity by gaining this type of knowledge it will allow me to be open to suggestions from my faculty advisor and/or sponsors to implement a better game or testing platform to apply my knowledge to.

1. Identify what specific software development tools you will use to complete this project and describe why are they appropriate.

The software development tools I will be using will mainly consist of Python programming language, this is because python will have a lot of predefined data science libraries I believe will assist in my development of this project

I also will choose to use Git version control to help aid in bug tracking during the development process of the network. This is software is important because it allows me to share my code, as well as any bug reporting or fixes with my faculty advisor and/or peers, such that they will be able to see my changes.

I will also be using Docker containers and digital ocean cloud server nodes to deploy nodes to the cloud, this is important because if the network training model requires that I run the program unsupervised for a period of time I believe deploying the training process to a cloud node within a container would be more practical.

1. List all computer equipment, office/lab space, human resources and/or financial support that are required to complete this capstone.

None outlined thus-far

1. Provide a list of potential barriers and/or problems that may slow down or potentially prevent the successful completion of this capstone.

None outlined thus-far

1. Provide a detailed project plan including proposed deliverables and due dates.

Below is an outline of the project deliverables and expected schedule.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Meeting | |
| Date | Objective | Faculty | Sponsors |
| December 29 2017 | Preliminary research for information Gathering |  |  |
| January 5 2018 | Choosing a defined Project Topic | **x** | **x** |
| January 12 2018 | Implementation Design Proposal |  |  |
| January 19 2018 | Submit the Proposal & Adjustment | **x** | **x** |
| January 26 2018 | Implementation | **\*** |  |
| February 2 2018 | Implementation | **\*** |  |
| February 9 2018 | Submit the Progress Report & Implementation Feedback | **x** |  |
| February 16 2018 | Implementation Adjustment & Testing |  |  |
| February 23 2018 | Final Report & Check-in | **x** | **x** |
| March 2 2018 | Faculty Advisor and Sponsor Final Project Evaluation | **x** | **x** |
| March 9 2018 | Presentation Practice Run and Overview |  |  |
| March 16 208 | Colloquium Presentation |  |  |

Note:

**x – Expected meetings with Faculty advisor**

**\* – Possible meeting with Faculty advisor**

Key Dates:

*Jan 5: Post Research, Defining a topic*

*Jan 12 – Jan 19: Implementation Design feedback and adjustments to the project*

*Jan 26 – Feb 9: Implementation of Project*

*Feb 16: Testing and Feedback*

1. Describe the methods and criteria you propose for evaluation of this capstone. Be specific.

The basic success criteria for this capstone would be the understanding knowledge attained from what genetic algorithmic neural networks are. However, in an overall project’s scope I feel the success criteria would be the ability to demonstrate a genetic algorithmic neural network in real time through a ping pong game, if the computer is able to play this game against itself following rules it has learned, this would be considered success.

Student, Faculty Advisor & Capstone Sponsor  
**Statement of Agreement**

1. The **Student** agrees to:
   1. Perform to the best of his or her ability and to the satisfaction of the Capstone sponsor(s) those assigned tasks related to the cooperative component of this contract and adhere to all personnel rules.
   2. Perform to the best of his or her ability learning activities negotiated with the faculty advisor as stated in the contract, including communicating with the faculty advisor according to the scheduled course meetings and other scheduled events as indicated in the contract.
   3. Talk with the Capstone sponsor, faculty advisor, CSS Internship Coordinator, and other program representatives with regard to any changes, revisions, or concerns regarding the Capstone project. Meet with the CSS Academic Advisor to complete an audit of your degree completion.
   4. Complete all deliverables as described in the contract, present findings at the CSS colloquium and prepare a final report and poster.
   5. Turn in a final assessment of your Capstone experience including any “lessons learned” and advice for future students.
   6. Prior to the completion of CSS 497, prepare an abstract to be approved by the faculty advisor and the internship sponsor. The approved abstract needs to be turned in to the CSS Internship Coordinator
2. The **Faculty Advisor** agrees to:
   1. Provide instructional support and guidance by communicating regularly with students about their on-site experiences, pertinent readings, theoretical frameworks, and project designs.
   2. Utilize meeting times with the student as an opportunity to develop writing skills by reviewing one or more drafts of the final paper and/or software project, and the abstract.
   3. Approve an abstract of the project prior to assigning the course grade. At the end of each quarter, assign a decimal grade or credit/no credit grade according to the evaluation criteria identified in the Capstone Contract. (Note: these criteria are reviewed during the program approval process of the Capstone contract.) Upon completion of the 10-credit project, provide your final evaluation of the project. Incorporate any feedback received from the Capstone sponsor into your final evaluation.
3. The **Capstone Sponsor** agrees to:
4. Provide a good learning and training environment for the student, keeping routine work such as typing and filing to a minimum.
5. Evaluate the proposal and make agreements, if applicable, with the student and faculty advisor pertaining to the following: a) any and all intellectual property rights; b) non-disclosure or confidentiality of specific sponsor methods, technologies and/or business strategies; c) time-limitations for non-compete agreements between all parties; and d) acknowledgement of any and all rights to ownership of pre-existing knowledge.
6. Work directly with the student and make explicit arrangements with the student concerning the overall goals described in this contract, communication with the student, expectations, and records of the student’s hours and performance.
7. Approve an abstract of the project prior to completion of the contract. Complete an evaluation of the student’s performance. This evaluation will be sent to you by the CSS Internship Coordinator before the student can receive credit.

The CSS Internship Coordinator will coordinate the internship and provide administrative support services as needed by the student, faculty advisor, and Capstone sponsor.

This contract may be terminated or amended by the student, faculty advisor, or Capstone sponsor at any time upon two weeks written notice, which is received and agreed to by the other parties.

Acknowledgement of the completion of the CE requirement for the Bachelor of Science in Computing & Software Systems will be granted for the Capstone project when the CSS Program has received the following: a satisfactory evaluation of the student’s performance from the Capstone sponsor, a final grade, student assessment of the Capstone experience, and a copy of the student’s final paper or project.

*CSS 497 provides students with the opportunity to earn academic credit while working on a project that has potential benefits for industry or community organizations. Students learn by connecting classroom theory and community-based experience through the completion of an academic project.*

**We, the undersigned, have read and approved the above proposal and understand the requirements of this proposal per the responsibilities identified in the preceding ‘Statement of Agreement’.**

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| Dong Si |  | | | dongsi@uw.edu | | | | 12/25/2017 |
| **Faculty Advisor** | Signature | | | Email | | | | Date |
| Danny Ly |  | | | 360-220-2258 | | | | 12/24/2017 |
| **Student Name** | Signature | | | Phone | | | | Date |
| Arkady Retik | | | | |  | | | |
| **1st Capstone Sponsor Name** | | | | | **Title** | | | |
|  | | | | |  | | | |
| Company/Organization Name | | | | | Phone | | | |
|  | | |  | | |  |  | |
| Address | | | City | | | State | ZIP | |
|  | | |  | | | |  | |
| Signature | | | Email | | | | Date | |
|  | | | | |  | | | |
| **2nd Capstone Sponsor Name** | | | | | **Title** | | | |
|  | | | | |  | | | |
| Company/Organization Name | | | | | Phone | | | |
|  | | |  | | |  |  | |
| Address | | | City | | | State | ZIP | |
|  | | |  | | | |  | |
| Signature | | | Email | | | | Date | |
| **William Erdly** CSS Program Authorization Professor, Chair CSS Division erdlyww@u.washington.edu  Ph: (425) 352-5370 | |  | | | | |  | |
| **Signature** | | | | | **Date** | |

Although the CSS Program has taken reasonable steps to ensure a positive learning environment with sponsors, it should be understood that this Capstone agreement has potential risks. In signing this Capstone Contract, the student acknowledges inherent hazards and risks, including but not limited to physical injury and death, and assumes those beyond control of the University staff and faculty.

***In case of emergency, I, the student, give my consent for emergency medical treatment and agree to pay for any charges not covered by my personal health insurance. In addition, I understand my responsibilities as described in the Statement of Agreement on the reverse.***

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|  | December 26,2017 | Danny19@uw.edu |
| Student Signature | Date | Email |