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**University Talent Questionnaire**

What is your thesis focus and/or what are some of your most recent classes?

I have a large focus on security and networking recently in my coursework. I have taken Networking 1 (main topics are network layers, socket programming, load balancing) and will be taking Networking III at UCSB, which includes topics such as wireless and mobile networking, caching, as well as multicast systems.

I have taken Cryptography at UCSB and will be taking CS 177, the security course at UCSB, which covers topics like multi-factor authentication, session hijacking, SQL and PHP injection attacks, and DNS caching attacks.

Tell me about a University project that interested and engaged you the most.

Link to project: <https://github.com/justintjoa/178finalproj>

The report to the project is saved as 178\_project.docx in that repo.

In ECE 178 (Digital Image Processing), we were required to do a final project in downsizing an image while retaining quality. Ordinary down-sampling methods had final results that either A) lacked cohesiveness or B) removed very critical parts of the image away. In the implementation we were to use functionalities described in a research paper (<http://www.wisdom.weizmann.ac.il/~vision/VisualSummary/bidirectional_similarity_CVPR2008.pdf>), particularly the votemex and nnmex functions.

The idea was that there was an original approximation of the downsized image (using a flawed method of down-sampling) and the original larger image. Both would take turns comparing itself with another. In each “turn” all possible patches on the image would be compared to patches randomly selected from the other image, and would pick the new patch if it better resembled itself (nnmex). By using random patches rather than all possible patches, the run time of the algorithm would be greatly cut down, and with multiple trials the solution would have to converge to the best solution. This is enclosed in the method nnmex. Lastly, at the end of each turn all references patches would be plastered on the canvas of the other image and averaged out (will resemble more like the popular patches, hence the name votemex).

A brute force implementation (where all possible patches are considered in every turn rather than randomly selected ones) was run alongside the optimized algorithm (17 rounds were taken). The brute force method was left running for 10 ours and at best got 1/3 of the image processed. The optimized algorithm did the entire image in 30 seconds, showing the clear efficiency of the algorithm compared to the one it replaced.

I found this project very interesting mainly because of two reasons. Firstly, I had never imagined that such mathematical care had to be taken to downsizing, and it gave me a much greater appreciation for what seems like a very straightforward and simple action. The second thing I really enjoyed was the act of reading a research paper, turning it into more intuitive notes for myself, and re-engineering what I read into an actual coded solution. Dr. Pradeep Sen, our professor for the course, had told us that the project emulated what it would be like in the real engineering world, where one has to solve a problem with lots of cross referencing required, and learning to dissect a research paper (along with other ones) has truly molded me to be where I am.

Tell me about what you worked on in your current or most recent internship/work experience.

At Novacoast, Inc., where I interned as a developer for 3 months, I worked on the company website’s first comprehensive security policy. The problem was that after implementing it, it literally broke all the website’s code. This seemed to (and in some ways did) require a huge overhauling of the website code, which was written in HTML, CSS, and JavaScript, and served via Ruby on Rails. However, a close diagnosis of the issue showed the issue was large, but not as large as one would initially think.

The website didn’t show properly because all the styles were in-line (not compatible with CSP 3.0) and the Content Security Policy (CSP) was not in the terminal beginning of the site code, since the code called dynamic scripts that were pre-injected at the server side. This allowed a huge vulnerability of cross-scripting (XSS) attacks. To fix this I rewrote the code to avoid the use of inline-scripts for styles via proper references to a more complete CSS style sheet. In-line scripts that could not be removed were hashed. Some of these scripts brought in formatting issues to the page, so I ended up having to use JQuery to run when the site loaded to remove extraneous objects loaded by the dynamic scripts. Finally, the CSP itself had to be moved to the beginning of the HTML code (to prevent pre-injection attacks), so I used JQuery to move it before the HTML code before loading the page in the browser.

The ending was a site that was protected (at least at browser load-time) from cross-scripting attacks. It was very rewarding because majority of websites do not have such a policy (statistically 98%, according to sources) because it is quite difficult to make everything compatible, and I felt happy with my work. This work also required me to use legacy code fundamentals to ensure that the site maintained to the policy at all times, especially in light of the blog having new posts after our 2020 kick-off company conference.

What are your strongest programming languages?

My strongest programming languages are C++, Java, and Python.

Please confirm your estimated graduation date (month and year).

I graduate in June 2020.

Preferred office location?

I would like to work at the Palo Alto office.

What Type of VMware Technology most interests you (top 3)?

*Cloud Technologies Operating Systems Distributed Systems Machine Learning Security*

*Blockchain Network Mobile Kernel Full Stack Front End Quality*

I would enjoy Cloud Technologies, Security, and Network technologies.

Are you authorized to work in the United States?

Yes, I am. I am a Citizen of the USA.

Will you now or in the future require employer sponsorship for immigration?

I will not require sponsorship for immigration.

The two mandatory start dates slated for Launch are July and August 2020 – do you foresee any issues with these dates, if offered a position?

I do not see any problems with those dates at all.

Do you currently have (or are expecting) any full-time offers? If so, where are you offered the role and do you have an offer deadline we need to be aware of?

I am still in the process of interviewing and do not have any offers yet.