

An Undergraduate Reflection of Participating in the Autism and Med App Jams at UC Irvine

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Abstract

App Jams are increasing in popularity as a way to stimulate innovation and creativity in the practice of app development directed at solving a particular problem. They are two-week long competitions where teams of about 5-6 students must collaborate to develop a practical, relevant, and competitive software application pertaining to the theme of the competition. The following discussion focuses on my participation in two App Jam competitions from the perspective of an aspiring medical student at UC Irvine. Both competitions were medically themed; Autism App Jam was a competition that directed teams to develop apps for patients with Autism, and Med App Jam focused more on apps for the general practice of medicine. I am going to reflect on my experiences with the App Jams and make a case for why it is important for similar events to be held at other medical programs around the globe.

What is an App Jam?

An app jam is similar to what is known as a hackathon, where participants compete for a set period of time in teams to develop an app or solve a problem. A hackathon is an intense competition that presents teams with a single, designated problem and gives them the opportunity to write code or develop software to solve such a problem in the span of a weekend or 2-3 days [1]. Awards are given to teams that either finish the fastest or finish with the best software.

App jams are two-week long competitions where teams are encouraged to think creatively and to develop software applications relating to a theme [2,3]. Each team develops their own application

which varies from team to team based on the problem that they wish to solve related to the theme. In the UC Irvine Med App Jam that is held annually in the Fall, teams are formulated from students at the UC Irvine School of Medicine and the Donald Bren School of Computer Science to collaborate and develop mobile health applications for use by clinicians and patients. Medical students are traditionally designated to help formulate ideas for the computer science students to implement. The UC Irvine Autism App Jam, which was last held in 2015, recruited any student regardless of area of study for the development of a mobile applications directed toward helping patients with autism. The UC Irvine Med App Jam was a more organized event that had the most lasting impression, and it will be the focus of my reflection.

Why did I participate?

I had always been interested in studying and practicing medicine, yet I took on a major in computer science to learn something quite practical and different and separate myself from other applicants. It was not until late in my second year of undergrad that I began to think that I should combine the two disciplines and try to develop technology for medicine. Aside from working in a radiology research lab, the Autism and Med App Jams at UC Irvine were the conduits to do just that. They presented to me the opportunity to explore and apply my skills in software engineering in the context of medicine, however I was not great at writing code or developing software, so naturally I was apprehensive about participating. Nevertheless, I decided to challenge myself.

In the Spring, I participated in Autism App Jam. It was a rewarding experience to work with others to develop a tangible product as part of Autism App Jam; we developed a simple tap-the-moving-dots game for

Android, called DotDotDot, that would help autistic patients develop their hand-eye coordination. This first competition helped me find my niche in the software engineering process, applying my project management skills and design prowess even though I could barely code. I helped craft the app idea, design wireframe mockups (drafts of the user interface), compose the promotional video, assemble the poster, and keep our project on track to finish on time; I was the project manager. I embraced that role and wanted to bring that role to fruition in the Med App Jam.

The Med App Jam

The competition began with a sign-up process right before the opening ceremony, and I was assigned to a team with two 2nd-year medical students and three

computer science students, one of which named himself the head developer because he was the most experienced. We were pitted against 14 other teams to develop the best mobile iOS application with the theme of improving communication between the doctor and the patient. After about a day and half, the medical students came up with the idea of using the iPhone's internal sensors to measure and quantify hand tremors for patients with Parkinson's Disease. The app that we used as a model for similar function was the LiftPulse app on iPhone. For reference, the company and software was purchased by Google in 2015.

I tasked myself with the same responsibilities as those of the Autism App Jam: drawing mockups for the user interface, writing the obligatory daily



Figure 1: The SWOT analysis that depicts the strengths, weaknesses, opportunities, and threats of developing a product (our app) in the context of entering a business market. This was one major component of the Business Case Analysis.

blog, assembling the poster, writing the business case analysis, the SWOT analysis (shown in Figure 1), and requirements specification, and assigning deadlines for certain parts of the project. The business case analysis was my main task which involved an introduction to the app including its functions, the problems it solves, and how it can impact the market. I communicated with every single member of our team all throughout the competition to make sure the project was on track to finish. I worked with our head developer to help him understand how hand tremors would impact the movement of the phone's gyroscope and accelerometer and how that movement should be visualized. The other two developers were assigned the task of implementing a medication reminder component to the project, which the medical students felt was necessary for patients with neurodegenerative diseases such as Parkinson's Disease. I had even reached out to neurologists with one of the medical students to determine if a mobile application like this would be useful; we received overwhelmingly positive feedback. The medical students were quite busy with their studies, but they checked in every few days to witness the manifestation of their idea.

Over the course of the project, I found myself taking on another kind of role. I understood a little bit about Parkinson's Disease and neurodegenerative disorders from my own research and personal experience in the hospital, and I was familiar with the process and demands of software engineering for an app jam. I

found myself to be a communicative liaison between the computer science students and the medical students because I understood both fields and needed to bridge the knowledge and communication gap between the medical and computer science students. Each area of study has its own jargon and method of understanding that must be effectively communicated. From the perspective of a computer scientist, the medical students had relatively unrealistic expectations for the implementation of the software in two-weeks, and the computer scientists, namely the head developer because he was working on the main functionality of the app, had a difficult time comprehending how we wanted the data of hand tremors visualized. I assisted by communicating the necessary software engineering steps to the medical students and explaining to the head developer Parkinson's Disease and essential hand tremors in non-medical, layman's terms and how they could be measured.

The algorithm for the tremor quantification was optimized 3-4 times, adjusting the accuracy of the tremor detection and increasing the number of axes in which the device movements were recorded. The data presentation originally displayed bar graph depicting the change in amplitude with respect to frequency (Figure 2). Two days before the closing ceremony, the medical students later suggested to display the data as a line graph conveying the change in relative amplitude over time, which we deemed

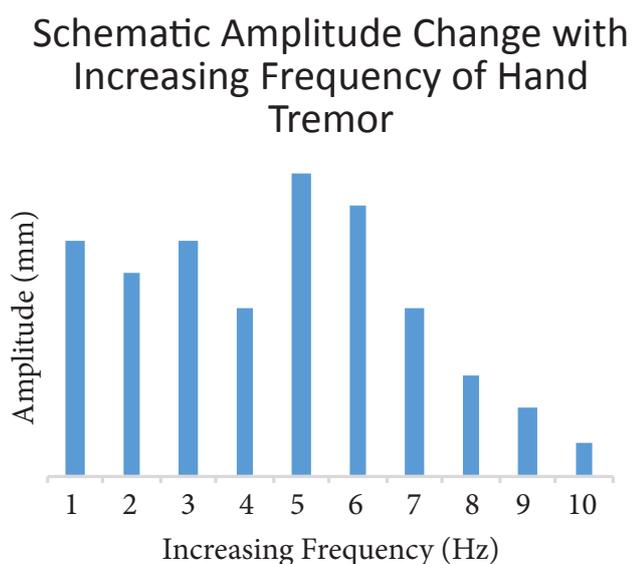


Figure 2: An example of the original depiction of the device tremor data on a bar graph conveying amplitude with respect to frequency.

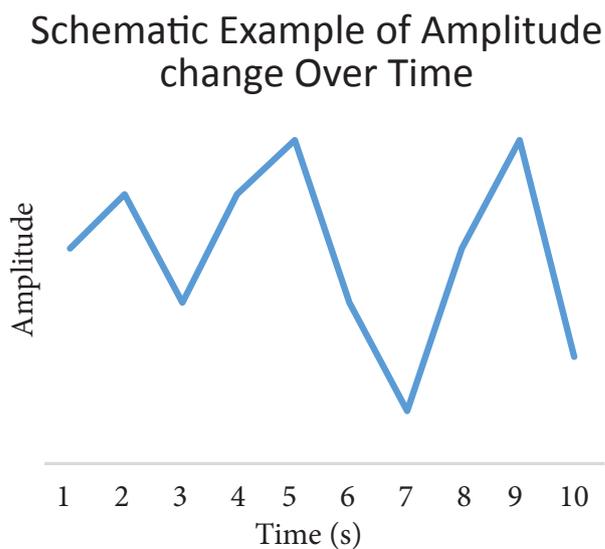


Figure 3: An example of the updated depiction of the tremor data on a line graph conveying the change in amplitude with respect to time. This was deemed a more intuitive representation of the data.

more intuitive for the judges (Figure 3). I completed the poster the morning of the closing ceremony, the developers combined their different components into one app later that day. The medical students took on the responsibility of editing the demonstration video for the app, which we later called Panda, and uploaded it to YouTube that day as well [4]. Everything was finished very close to the deadline, which I noticed was the nature of this kind of competition.

At the closing ceremony, we presented and demonstrated the app to the judges, medical professionals, and other competitors. It was an remarkable feeling to witness our idea become a tangible and usable product. We received praise from the judges, clinicians, and professors from the medical school, making a strenuous two-week effort quite valuable. In the end, our app, Panda, was awarded the Most Innovative Application of the competition, and one of the most rewarding two-weeks of my undergraduate education was swiftly over.

Personal Reflection

Both competitions, the Autism and Med App Jams, were somewhat similar. Figure 4 compares the two competitions. The Med App Jam was a much more in-depth competition that demanded more from the participants: a poster, video, business case analysis, and daily blog updates. A working application, video, and poster were all that was needed for presentation at the Autism App Jam. Nevertheless, both were two-week competitions that involved working in teams to develop mobile applications. In both competitions, I took on the role of project manager to make up for my poor coding skills.

Participating in App Jams was a unique and priceless experience. It added value to my education in software engineering and exposed my skills in project management, writing, and communication. I also gained a much better perspective on the use of technology in a medical setting. Both competitions led to development of two fully functional applications that I could add to my portfolio. DotDotDot did not win any awards at the Autism App Jam, yet Panda was awarded the prize for the most innovative mobile application in the Med App Jam. Both competitions, whether they resulted in an award were difficult yet fulfilling because I applied my developing software engineering skills in a way other than coding to create

tangible apps that could potentially make a difference in the field of medicine.

There were at least three things that I learned from participating in the App Jams. (1) There is a role for everyone. I was not a good coder, and I hardly participated in the coding at all, yet I made myself useful by tackling all the side projects such as the writing the app documentation, composing the poster, helping to film the video, designing the user interface, and facilitating communication between the entities of the team. Of course, a good team requires competent coders, and medical students are necessary for coming up with medically relevant ideas for the project, but I was a good example of someone who was an expert at neither yet I was crucial for the project. (2) An App Jam is a powerful tool to facilitate innovation and interprofessional collaboration. The most lauded accomplishments are achieved when professionals of different disciplines collaborate. The App Jam Model exposed students of different backgrounds to the utility of their skills in other academic disciplines, which emulates the working world. (3) The creativity of each team will be tested, which leads to a richer competition. Fifteen teams competed in each competition, which bred thirty different apps all trying to solve different problems in the field of medicine and autism rehabilitation. In the span of two-weeks per competition, one could say the field of medical technology had been greatly advanced.

The App Jams at UC Irvine provided students with the opportunity to enhance their education and skillset as well as forge a path for potential business ventures, clinical research studies, and career development. My team and I had become more familiar with the app creation process and how difficult, yet rewarding it might be. Adding software projects to a student's portfolio is critical to the advancement of a career in software engineering, and it potentially separates medical students from the crowd when they attempt to apply to specialty training programs after medical school. In my case, my participation helped me develop my skills in software engineering to make progress in the field of medicine and ultimately reinforced my career choice.

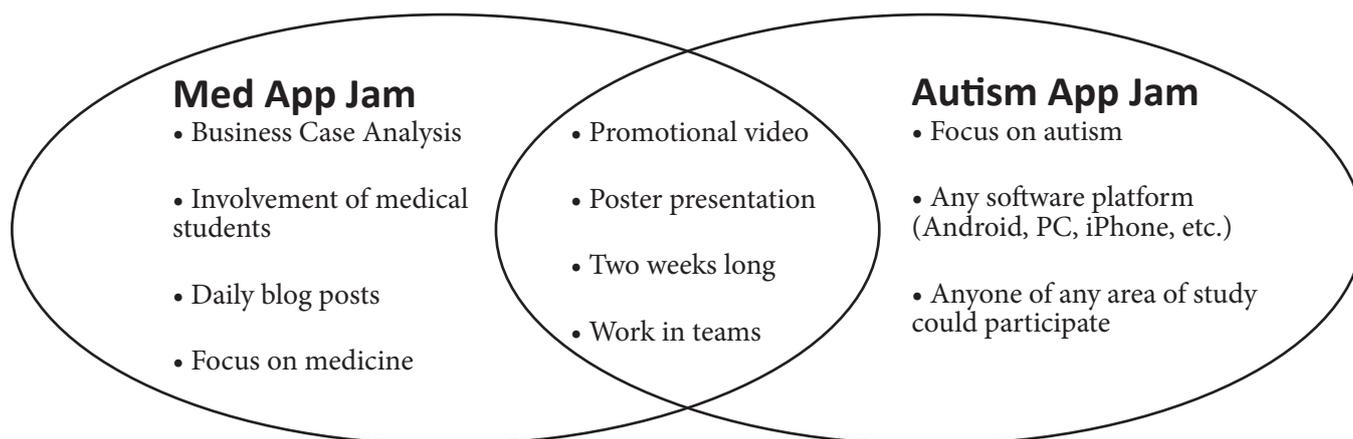


Figure 4: A comparison and contrast of both Med and Autism App Jams. Both had similarities but enough differences to keep both competitions interesting.

Moving Forward

As an aspiring medical student, I did my best to embrace the practical knowledge I was earning by studying the basics of Autism and Parkinson's Disease. Because of my interest in attending medical school, learning medicine was one of my top priorities with the participation in the competitions. I tried to spend plenty of time with the medical students on my Med App Jam team and speak with esteemed neurologists at the project symposium and award ceremony of the Autism App Jam. I wanted to learn more about medical school and the practice of medicine, namely the involvement of technology in medicine. I constantly asked how could the practice of medicine be improved by technology, and what can I do to help it.

Now as a medical student, I approach my studies with the same question. I think each medical professional should be asking that question, which is one reason I encourage the establishment of Med App Jams at all institutions of medical education around the world. I would embrace the opportunity to participate in another App Jam, but this time I would like to contribute to the other side of the competition, facilitating ideas for innovation in the space of medical technology and even organizing the competition itself at my institution. At UC Irvine, it spurred computer science students like me to apply their knowledge and make something tangible that could impact the world, and medical students were able to tap into their creativity and expand their impact of their knowledge of medicine beyond the hospital and potentially

into the palms of patients around the world. It is not understatement to say that an App Jam catalyzes innovation.

Technology is becoming more ubiquitous in health care settings, and it will become a requirement for medical professionals to have a solid understanding of the language of technology in order to optimize the care for their patients. Medical schools are tasked with adding this to their curriculum in one way or another, and the establishment of a Med App Jam could be a great start to addressing this issue.

Useful Links

<http://www.medappjam.com/wp-content/uploads/2016/11/MedAppJam2016InformationalPacketRevised.docx-1.pdf>

<http://www.medappjam.com/press/>

<http://2015.autismappjam.com/>

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