

## Essay Format (Your own resume must be attached) (1/3)

↓ ↓ Must be filled by the Applicant

JAF Number	7 - Audio and Graphics for Play Station
General Information	
Name	Sachin Goyal
Date of Birth	2nd May 1997
Student ID Number	150020069
Gender	Male
Education Information	
University	IIT-Bombay
Department	Electrical Engineering
Diploma	B-Tech(Bachelor)
We had explained during the Campus Talk our expectation of hiring long-term employees(at least 5 years). What are your future career aspirations and how do you think they align with Sony's requirement?	I aspire to lead a research group working on expanding fundamental domains in areas of graphics and computer vision aiming to help others develop more realistic games and animated films. Settling at Sony for a long period (at least 7 to 8 years) seems the best path to realise my dreams as Sony is known for driving innovation as well as serving consumers with moving and more engaging experiences.

## Essay Questions

### 1. Please describe your technological strength/expertise which you think would be suitable for the position you are applying for, and how you can contribute to Sony. (Less than 500 words)

In the past 3 years at IIT Bombay, I have explored areas of image and signal processing, **graphics and vision**. My research interests lie in exploring about **statistical and mathematical aspects** of graphics, images and broadly signal processing. Working with **3** major projects related to augmented graphics and image processing has given me a good insight and knowledge about intricacies in the area and at the same time has increased my desire and motivation to work and learn more in these fields.

Previously, I have worked on developing an **Augmented Reality application** for graphic rendering at desired orientation and location in real world scenes **guided by the hand gestures** and use of glyphs. Glyphs are basically play cards with a specific pattern on them which can then be identified by camera and used for graphic rendering or robotic navigations. The project mainly involved ->

a) Learning **camera calibration** before using it for position dependent tasks. b) Learning to filter out desired objects from the scenes and how to apply homography to extract the top view for further analysis of the object. c) Using **OpenGL** for **rendering** graphics and how to use **trackers like KLT** for stabilising the results.

The final application allowed the user to displace and rotate the rendered 3D object by simple movement of hands.

Currently, in the computer graphics course under Prof. Parag Choudhary, I am learning about various graphic **rasterization pipelines**, clippings, surface modelling, texturing, animations and **ray tracing**. I am working on creating a **short animation film** from scratch using OpenGL. Modelling the characters of the film helped me in having hands on experience of developing 3D shapes from triangles and triangle strips in OpenGL as well as using **splines** for complex surface modelling. I was exposed to the process of realising **illuminations** and **texturing** in games and animated films learning about the various associated challenges like the one for keeping far of objects in games least complex along with preserving there realistic visualisation. Currently, I am working on using **ray tracing** as an **alternative rendering technique**.

During my recent summer internship at Qualcomm, I worked with the **Multimedia Development Team**. I worked in integrating the car infotainment system with Qualcomm snapdragon precisely working on developing a framework for audio (driver voice) transmission from car dashboard microphones to the mobile using RTP backend. The project also involved development of a **command engine** to recognise the commands from received signal and integrate it to the android framework hence enabling **complete control** of driver **mobile using voice**.

Previously, in summers 2017, I have worked as a research scholar under Prof Jerry Prince of **Johns Hopkins University**, where I developed a **novel** algorithm for **super resolution** of MRI images using **anchored neighbourhood regressions** and Fourier accumulation (**Paper** -> **Sachin Goyal**, Can Zhao, Amod Jog, Jerry L. Prince, Aaron Carass "Improving Self Super Resolution in Magnetic Resonance Images" SPIE Conference on Medical Imaging and Biomedical Applications 2018, Houston, Texas).

Skills I gained by working on these projects have been sharpened by the **relevant courses** I took like the **Computer Graphics**, Computer Vision, Machine Learning, Image Processing and Signal Processing. My knowledge in graphics and audio processing from courses taken coupled with the experience of related projects makes me suitable for the graphics for playstation job as per the requirements and description mentioned in the JAF. I wish to contribute to the ongoing projects in playstation development, **modern sophisticated graphics rendering** as well as building signal processing techniques for **efficient use** of system resources at Sony Japan. I will also be willing to contribute to **new emerging teams** or research projects and take up challenging projects in other related fields.

## Essay Format (Your own resume must be attached) (2/3)

### 2. Please describe your understanding towards Japan. What can you imagine as difficulty to be working in a foreign country with different culture and people? And how do you overcome them?(Less than 500 words)

I have always seen Japan as a country sitting at the zenith of technological development, actively driving the innovation in science. Japan has an unmatched contribution in the fields of robotics, computer science, games and anime. As a matter of fact, I have always been motivated to pursue research and development in Japan seeing amazing works like **ASIMO**, **AIBO** and **QRIO** all of which have come from Japanese firms. Japan has a great culture too, rich with **mythology, arts and ancient architecture**. I have always been fascinated by things ranging from superb anime films, Manga, beyblades and Pokemons to the desire of riding bullet trains and witnessing an excellent infrastructure despite the natural challenges.

It is always very fascinating to hear about the excellent work culture, **team spirit** and **integrity** found in the Japanese companies making me eager enough to work in a similar environment. I am especially attracted by the fact that Japanese firms give special attention to **minute details** and everyone in the firm acts in **harmony** to succeed.

It has always been great to hear about the **patriotism** and **discipline** followed by Japanese people. Living and working in such a environment would definitely give me an unmatched opportunity for **personality development** apart from a steep learning curve and opportunities to be a part of developing next disruptive technology.

In Fact, I would like to share that my primary school's logo was "**Kaizen - Quest for continuous improvement**" taken from the Japanese philosophy. I have also read about Sony's root philosophy of **KANDO**, aimed to deliver moving experiences to Sony consumers by **driving innovation and challenge**.

As an individual, I love taking up challenges, after all what else can be a better way to build memories in a lifetime. Working in Japan, would surely confront me with some initial challenges related to culture and language but that is exactly one of my **major motivations** to apply for job at Sony Japan, since it at the same time opens up new frontiers for self development and **cultural leaning**. **Difficulties exist till the time they are perceived as one.**

India as such is a land of diversity with highly diverse languages as one goes from north to the south. There are people from all over India at IIT Bombay. Working in projects and teams with students from diverse backgrounds has been a great pleasure and a learning opportunity. In summers 2018, I lived in Hyderabad, which has a whole together different culture and language but I was able to make new friends and adopt to the new place easily. Previous to this, I was a research scholar in USA and was confronted with new challenges in a foreign country. It was a great experience to enjoy a new eating cuisine. As a person, I have loved adventure and travel a lot. I think, all of my previous experiences of travelling and living in different areas have helped me to come out as a better and more independent individual, helping me to appreciate diversity and cultural differences.

I like to travel and explore new cuisines and it would be surely great to experience Japanese cuisine including sushi and ramen. Initially, language preferences in Japan may seem to be a trouble, but I am confident enough that I can **adopt** easily also assisted by the fact as told in Pre Placement talk that we would be **given a 2 months training** before departure for Japan. Hence I am **looking forward confidently** to the experience Sony Japan has to offer.

**3. Please describe what you want to achieve in the future, and expect to gain from working in Sony, from the position you are applying. (Less than 500 words)**

Leaving a mark on the way humanity develops by working on **disruptive technologies** is basically what I want to achieve in future. I see myself as head of a research group in a multinational firm working on fundamental problems in domains of graphics and computer vision. I have always dreamt of **seeding** a few research groups working on expanding fundamental domains in various fields by identifying current bottle necks in the classical approaches, substituting them with new tools like machine learning. Some specific problems on which I wish to work include developing rendering algorithms which **reduce the hardware requirements** for graphics making them accessible to more people and also working of more automation of augmenting virtual graphics with real world scenes for film creations.

I have always been an ambitious person looking for challenging work projects which require one to apply knowledge from multiple domains. I think that Sony is the perfect path for me to achieve my goals because of the kind of consumer centric innovation Sony is known for. Working with Sony Playstations and graphics development team will definitely give me an opportunity to know about the latest cutting edge technologies in the same domains. I hope to learn what exactly is involved in converting a research lab innovation or technology to a commercial product in an MNC. Working with Sony will surely help me to broaden my approach to solving problems and learning how to think of innovative solutions which are practically realisable and commercially viable. Sony seems the best for this because of its **motto** of serving the customers with **5 core principles** of curiosity, empathy, integrity, ambition and vision.

Apart from technical aspect, I believe that working at a MNC like Sony with people from all over the world would enable me to develop as a better team player and give me opportunity to learn multiple cultures at a one single place. Last but not the least, I wish to **explore and live in Japan** as a whole. It is obviously a major technology hub, a **temple** and an **abode of learning** for budding engineers.