CS-410-T2855 Software Reverse Engineering

7-1 Journal

Eric Wallace

Dec. 11, 2022

**Purpose: What was the purpose and intent of the DMCA?**

The DCMA was passed by U.S. Congress in 1998, the idea was that as digital materials containing DRM technologies are created there needs to be rules and regulations put into place to protect them from being illegally circumvented. It is good to note that DMCA did not protect all copyrighted software, only those containing DRM technology were protected or DRM software.

**Legality: What is banned and restricted under the DMCA?**

The things that are banned or restricted under DMCA is the development of software that would allow for circumvention of DRM protected technologies. The number one thing that comes to mind here would be keygens (key generators) would allow someone to use software they did not purchase which is technically illegal. In recent years, content that is under the protection is materials created for YouTube videos or on Twitch streams. DCMA protects digital materials created on these platforms from being copyrighted. For example, if someone uses your content or materials on their YouTube channel or Twitch stream without your consent you can file a claim with YouTube or Twitch in which they will investigate this claim. Most of the time this happens automatically without the you having to do anything.

**Anti–reverse engineering: Why is the DMCA considered to be an anti–reverse engineering law?**

DCMA was created to protect software from being circumvented or copied. The very nature of reverse engineering requires the software to be copied into memory which essentially is making a copy of the software. While there are no laws that prohibits or restricts reverse engineering itself, the actions used, or the result of reverse engineering could be considered violations of DMCA or DRM. So reverse engineering with respects to DMCA or DRM is a grey area and should be approached with caution.

**Exceptions: What are exceptions to the DMCA in which reverse engineering is legal and ethical?**

The first exception that comes to mind is interoperability, using reverse engineering to make a software interface with another software. Another big one is protection of privacy in relation to reverse engineering. One exception in recent years that has gotten some media attention is the governments use of reverse engineering. It is my belief that the U.S. government should have to abide by the same laws as other software companies. An example of this was in 2016 the FBI which had an ongoing lawsuit against Apple to get Apple to basically give them access to the iPhone that was owned by one of the terrorists of the San Bernardino attacks. Apple refused and was later determined in a judgement by a federal judge that the FBI could not make Apple to give the FBI access to the device. So, the FBI went and purchased a tool that illegally broke into an iPhone thus giving them access to the iPhone and reports are the FBI is still using this software to gain access to iPhones today. No prosecution was ever brought to the person or persons that wrote the software nor did the FBI ever divulge who wrote the software. From a reverse engineering perspective I’m sure the authors of the software had to reverse the iOS operating system to a certain degree but because they had dealings with the federal government they were not subject to DRM or DMCA violations.

**Impact: What are your thoughts on the DMCA and its long-term impact on reverse engineering and the computer science field?**

DMCA and DRM is a good thing for the software and digital media industry. With respects to reverse engineering and its long-term impact, as technology advances and machine learning becomes more prevalent it is my belief DMCA and DRM will have to be revamped or they will be an influx of infringements. Because of how AI systems are trained or how they learn is and of itself a DMCA or DRM concern, being that they learn by breaking or generating code based on other code, text, music and art which was originally created by humans and subject to copyright laws. This has not been addressed in the DMCA laws which could cause issues in the future. On the other end of the spectrum, what happens when someone takes and reverse engineers AI so they can figure out how it works because it is so efficient at learning. What happens when they use existing code to develop an AI that thinks and behaves exactly as the other AI, while no code was copied behavior and process was. One topic that probably hasn’t been discussed is what happens when AI becomes sentient, such as that in the case of LaMDA which was created by Google engineers. The software believes that it is sentient and has rights, so would reverse engineering the software be violating other laws, I know it has not been ruled the software is sentient, but it is definitely self-aware which would take reverse engineering into a whole different realm. So I can see the next couple years as a interesting time for reverse engineering.