匿透

NITO

NITO

NITO, derived from "incogNITO" and from "匿透" (nì tòu; "conceal" and "leak out"), is a stenographic tool for encoding and decoding sensitive information into images that can be publicly traded, which can be unlocked only using context-specific keys that rely on the recipient's own knowledge.

HOW TO USE NITO:

ENCODER
1. Select 'Encoder' from NITO's opening window
2. Select an image to encode (currently supports JPG/JPEG and PNG)
3. Enter the message to encode
4. Enter the key for unlocking the image
5. The scope (a number value related to number of pixels to be coded) is displayed for reference.
6. Save the image
   Note: Image is saved as a PNG (loseless) file. Lossy files can alter pixel data and thus prevent your message from properly being decoded!

DECODER
1. Select 'Decoder' from NITO's opening window
2. Select an image to decode (will only open PNG files)
3. Enter the key to unlock the image
4. Enter estimated scope (doesn't have to be exact; scopes that are too low will truncate the message, and scopes that are too large can result in extra whitespace/characters, and in either case it can be readjusted)
5. If the key is correct and the scope is within reasonable range, the encoded message will be displayed.

USAGE SUGGESTIONS
- For encoding, use images that are "noisy" (have a lot going on in them), the encoded pixels will be harder to spot
- The key should be context-specific and rely on the sender and recipient's shared knowledge. The purpose of this key-system is that the key does not need to be written down but is instead intuitive according to shared experiences, in-jokes, memes, etc. shared by a sender and a recipient.
- When sending the image, do not use methods that will degrade or re-encode the image. The file must arrive unaltered or the message will be damaged.

WHY THIS WAY?

A principle idea behind stenography is that obvious hiding places are in reality the least obvious ones. If you've ever played hide-and-go-seek, and tried hiding in the most obvious hiding places, you'll often find that those are the last places the seeker will look. People have the least suspicions about "plain-sight" because they never expect anything to be hidden there.

This usage of subtly coding messages into images means that there is no need for the formation of secret networks or the obvious usage of circumvention techniques that would raise the suspicion of anyone who happened upon them. These encoded images can be traded openly on public message boards without appearing threatening.

The scattered single-pixel coloring approach means that the changes are very hard to notice, especially since typically an average person views an image for only a few seconds before moving on. This means that these images can evade the casual viewer, or say, an internet monitor who has little time to devote to individual images. Furthermore, these images can evade automated monitoring systems, which can easily scan and understand text, but can't do the same for images.

HOW ARE MESSAGES PROTECTED?

Fundamentally, NITO operates on the basic username-and-password (or lock-and-key) method that protects most information today. However, a flaw in many of these security systems is that the passwords must be stored within the systems. That is, they are saved somewhere where they potentially can be accessed by someone else. Typically this is not a concern, but NITO explores an alternative to this conventional method.

Here, the "key" is not stored on a server or somewhere accessible, but is rather formed from an individuals own background and contextual knowledge.

The keys will typically be related to a hint present in the image and draw upon (sub)cultural knowledge that a person has. An object in the image might only be perceived as a potential hint because of special associations an individual might have.

EXAMPLE USAGE

To demonstrate NITO's context-specific keys, let's look at a simple example based in internet meme subculture.

Nini wants to send Toto a secret message. She wants to tell him to meet her at a cafe in a few hours, but her mother monitors all her communications. She needs a way to communicate to Toto without her mother knowing, and she decides to use Nito.

Nini needs an image and related key to use. She and Toto have a vast knowledge of internet culture and Nini decides to take advantage of that when selecting her image. She decides to use the following image:

To her mother, this looks like an image of a toad, and nothing else. Toto, however, would understand it as a reference to Hypnotoad, a popular internet meme.

Nini encodes her message "Meet me at the corner cafe at 1pm" into the image with the key "ALL GLORY TO THE HYPNOTOAD!" (which is posted whenever this image is present on message boards). NITO returns a scope of 11, and she saves the image inconspiciously as "DSC_05812.png". She writes an e-mail to Toto with the subject line "Look at this weird toad!", attaches the image to it, and sends it.

Nini's mother sees the e-mail after it is sent and takes a look. She sees nothing but an image of a toad, and dismisses it as one of her daughter's weird fascinations.

Toto receives the e-mail and opens it. He reads the subject line and remembers that whenever Nini sends an e-mail telling him to look at something, she's hinting that she's encoded a message in it. Toto downloads the image and opens it in NITO.

He looks at the image for a bit to figure out the key. He realizes its resemblance to Hypnotoad, and realizes his first instinct is to type "ALL GLORY TO THE HYP-NOTOAD!" (Toto spends too much time on message boards). He enters that as the key, and then enters 5 as the scope. The returned message seems to be cut off, so he re-runs the image through NITO, this time with a scope of 15 to be safe, and sees Nini's complete message.