

Table 1

The results of computing the value of mean shift between hashes of the obfuscated and source code malware

| File number in the dataset | Source code hash values                  | Obfuscated source code hash values       | Percentage of malware samples computed using only convolutional neural networks |    |     | Percentage of malware samples computed using mean shift method in convolutional neural networks |    |     |
|----------------------------|--|--|---|----|-----|---|----|-----|
|                            |  |  | Training epoch  |    |     | Training epoch  |    |     |
|                            |  |  | I   | II | III | I   | II | III |
| 1.                         | a9ae58a87140f9dd969c905df68d9dd4f6cf4400 | ef7fafa0af86dd06e11d400dc97a69d0c1d40cad | 39  | 42 | 41  | 34  | 35 | 32  |
| 2.                         | e1077e747c9486dce1afda8d0c078fef00a901fa | 081cdfaf6f1a00fa5a5dfa678a5daf5c0eadcadf | 42  | 46 | 42  | 30  | 30 | 31  |
| 3.                         | d86c9caf861effdfcf76fc556594f551f89edd6  | 7d8405d6dfcecaaa084eef91aed9c5dcd94855d5 | 42  | 44 | 43  | 32  | 34 | 35  |
| 4.                         | ad7dfda18edc004d5181a57e48a757acded94444 | 78fe95d0ad5faca4f815ddfc09dd7d67ef59c5f6 | 35  | 37 | 34  | 27  | 29 | 28  |
| 5.                         | 8aa1dfd67a46f95fc7fa4154a1ad61a8e0d49fd8 | ad5dff1e58d956d7a51e9f4acf76fd9f05df1dc  | 30  | 34 | 31  | 30  | 28 | 29  |
| 6.                         | dc990c540fc50deaf0cdc178101aa107acaef9fe | fd9a969ed8f8ecc7ce57c54cf9de5ffcf0d6a8e  | 37  | 42 | 46  | 29  | 31 | 32  |
| 7.                         | a1f7dffdd08fcd6f985c0494a9cef75f0f4ac6d  | f7fd9edf4ac6ead485ad5e7c1a9f9f1fff0fddaa | 42  | 44 | 41  | 34  | 35 | 32  |
| 8.                         | 9efa06fa6567ae9554da5fc51daf9c9c084f06e0 | f7fd9edf4ac6ead485ad5e7c1a9f9f1fff0fddaa | 30  | 34 | 32  | 30  | 32 | 33  |
| 9.                         | 4f5ec656d8ddade66da408854a41caea98c0f44f | f5cd09a85a44df10fad1ea9c4d0dc564fca19191 | 42  | 41 | 43  | 40  | 38 | 37  |
| 10.                        | 5fd9a04af48f68967844f4d145f56f001ad4aa89 | f7a56efa4acaef54d0994c0d78641d5e5ff5aaaf | 49  | 52 | 50  | 42  | 40 | 41  |
| 11.                        | 95a56dfdfd7c8550afa8aad474916aa6fe58aa15 | f7a56efa4acaef54d0994c0d78641d5e5ff5aaaf | 55  | 52 | 53  | 48  | 48 | 44  |
| 12.                        | aececa9dcd9fd5dd9c0559ad6dafa84aff74ad   | 51168e0cd4a45f61cf058f4a7d1cd4aaa48098ae | 55  | 56 | 51  | 48  | 49 | 52  |
| 13.                        | 14791ec8ec19ca5f4f67c54f008a84f9eea89f09 | 497a16d6dd757f05fa884994c71aea880e87ad18 | 62  | 60 | 61  | 55  | 55 | 54  |
| 14.                        | dafa0a8c0ad8ea8aade6f06f9e8589ee1cf10af9 | c6ca0e98e0a66c458f8fad54aec47455f850aa91 | 38  | 36 | 35  | 30  | 31 | 32  |
| 15.                        | c91e176518a7e4d450edcd8d45aff1a1af178d40 | 7ad0cc0f4aa8c767fac7f0a4f7ec19dafa60ec9e | 19  | 20 | 22  | 15  | 16 | 14  |
| 16.                        | 04a66940a08ac7ada0cdf19f8da8169d0cd56c09 | 5da88a7dcdcf90ff9871eae5af8dda617d7fa0a  | 34  | 36 | 37  | 30  | 32 | 33  |
| 17.                        | 67a4ad69af60a994d7769e4a40dd0c8a59cd19a0 | fa9d6a049a1d9d7d1d6ad07f1a1a87fd6a5ef55a | 42  | 43 | 44  | 32  | 33 | 30  |
| 18.                        | cdcdacddde871ecef1da0cac8caf4559eeca084  | 817c64fed505fde58ddd1a881dc65fe10ad50ad0 | 42  | 45 | 42  | 30  | 35 | 34  |
| 19.                        | 4d0dfc70a1f01ec50a1f64ca5d5de6df18d5787d | f8ac177d7949d8f4f56f1cce4f91d0599f41e95d | 42  | 43 | 45  | 34  | 35 | 36  |
| 20.                        | d0a5c475ffca97d7df90895ea1ffed769506fe54 | 818a59add9456d488f6864d46c146d9d9f0d8ad  | 46  | 49 | 48  | 40  | 41 | 42  |