Suprema accelerates fingerprint identification speed

Suprema Inc., a leading fingerprint solution provider, announced the release of a new firmware version 1.4 for SFM3000 and SFM3500 fingerprint identification module series. The new firmware features an addition of a fast mode that dramatically accelerates one to many fingerprint identification speed.

One to many identification is a very useful feature of fingerprint technology as it provides convenience without needing to enter PIN numbers or touch a card first before placing a finger. However, its deployment has been limited due to the technical barriers, matching speed and accuracy.

The use of a Suprema's new fast mode can accelerate the identification speed up to 10 times at the sacrifice of relatively small degradation of authentication accuracy. The following figure shows the average matching time for 1 to 1000 genuine matching.
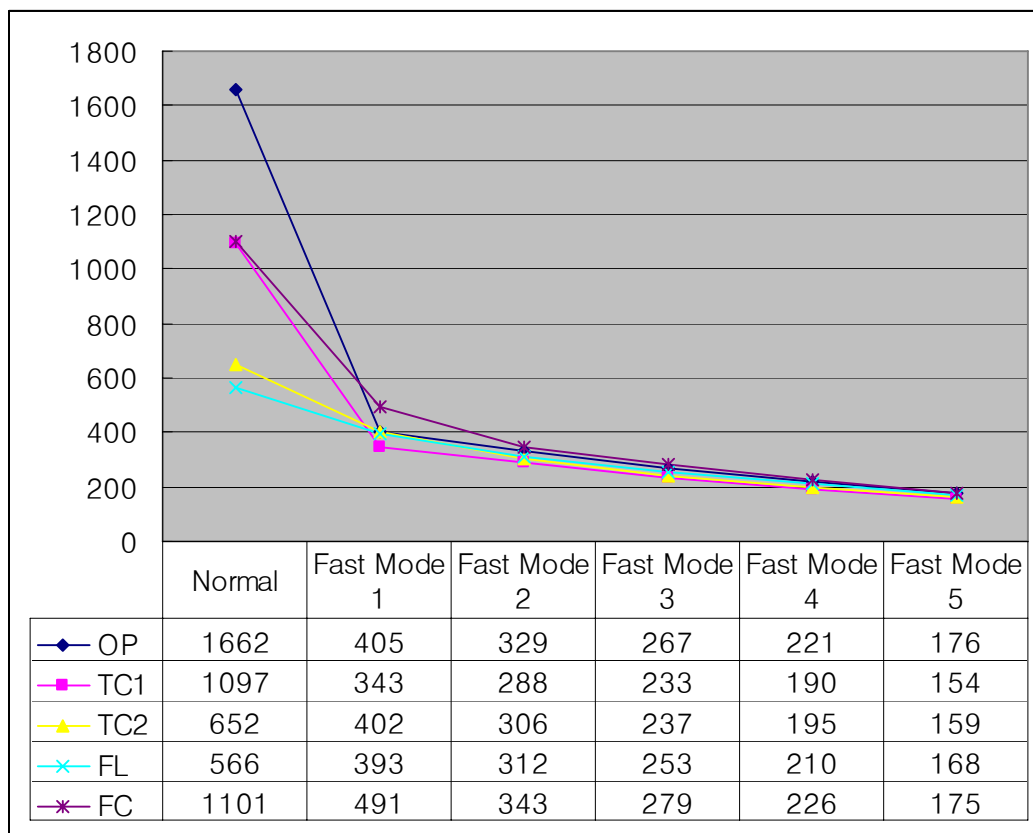

	Normal	Fast Mode 1	Fast Mode 2	Fast Mode 3	Fast Mode 4	Fast Mode 5
OP	1662	405	329	267	221	176
TC1	1097	343	288	233	190	154
TC2	652	402	306	237	195	159
FL	566	393	312	253	210	168
FC	1101	491	343	279	226	175

Figure 1. 1:1000 genuine matching time (msec)*

* The results are from Suprema's internal test and the values depend on test database.

The fast mode has 5 different levels from mode 1 to 5. From the genuine matching result of Figure 1, the followings can be said :

- In normal mode, matching time varies a lot with sensor types. For example, the matching time of OP is 3 times longer than that of FL.
- The use of fast mode dramatically accelerates matching speed, roughly from 5 to 10 times.
- Using the fast mode, matching time depends less on sensor types. See the matching time at fast mode 5.
- Even the use of fast mode 1 presents 3 ~ 4 times faster matching speed for sensors like OP or TC1.

The actual fingerprint identification composed of feature extraction process to generate a template from a live input fingerprint and a matching process to compare the input template with other templates in the database. The following table shows 1:1000 identification time including both feature extraction and matching processes.

	Feature Extraction	**Normal Mode**	**Fast Mode 1**	**Fast Mode 2**	**Fast Mode 3**	**Fast Mode 4**	**Fast Mode 5**
OP	*792*	2454	1197	1121	1059	1013	968
TC1	*675*	1772	1018	963	908	865	829
TC2	*483*	1135	885	789	720	678	642
FL	*506*	1072	899	818	759	716	674
FC	*815*	1916	1306	1158	1094	1041	990

Table 2. 1:1000 genuine identification time (msec)*

Compared with considerable gains in matching speed, performance degradation is relatively small. The following table shows the average FRR (false reject rate) in the use of the fast mode. The FAR (false acceptance rate) does not change with fast mode and only affected by security level. In this test, the security level is set to FAR of 1/100,000.

* The results are from Suprema's internal test and the values depend on test database.

	Normal Mode	Fast Mode 1	Fast Mode 2	Fast Mode 3	Fast Mode 4	Fast Mode 5
FRR	1.31	1.44	1.45	1.57	1.77	1.95

Table 2. False Reject Rate (%)*

From Table 2, the followings are observed:

- Fast mode 1 or 2 shows only a small degradation of FRR in spite of 3~4 times of improvement in matching speed for some sensors.
- The level of FRR degradation of Fast mode 5 can be also in an acceptable level for many applications considering its benefit of a fast matching speed.

Even though the performance degradation is not much, the fast mode does not need to be used in identification of small database, say less than 100 templates. In that case, the difference of matching time between a normal and a fast mode is not significant.

The new firmware V1.4 is freely available for upgrade to the customers of the SFM3000 and SFM3500 series modules and can be downloaded from Customer Download section in Suprema's website. (http://www.supremainc.com)

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