THE EVOLUTION OF THE SIMULATED SIGNATURE BY THE FORGER

Pàvlos Kipouràs ⓘ
Scuola Forense di Grafologia (SFG), Napoli, Italy
Scuola Superiore di Perizie (SSP), Prato, Italy

ABSTRACT

Forgery is a very common case of Forensic Document Examination which might refer to several further distinctions of expertise between handwriting and signature. The imitation of a signature could come into effect in different methods or ways, depending on the type of document, the forger's ability and other factors connected to the historical parameters of the case. The ability of the forger to reproduce morphologically the authentic specimen is even related to the range of his graphic variation, his training in forging the specific specimen or other various factors that could affect not only his graphic expression, but also his choices in applying forgery. In cases of long-lasting professional collaboration, the imitation of a person's signature with his consent for a long period of time is a quite often phenomenon. Apart from the legal validity of such signatures, the evolution of the forged signature by the forger is not to be excluded, since the consent deliberates psychologically the forger, diminishes his anxiety and leaves space to a less accurate reproduction of the original specimen. In these cases, there are more parameters to be taken into consideration and the time of habitual execution of the forged signature is crucial, since the repetitive imitation can result in different variations of the original signature's model. The eventual modifications are studied in a practical case which presents several complications.

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1. INTRODUCTION

The Forensic Document Examiner's (FDE) report is always related to a complexity of factors to be taken into consideration, which are not necessarily connected to the technical and theoretical aspect of each particular case. Apart from the lab inspection of the documents, preferably in their original form, there are many other factors which could orientate the expert's work hypothesis, which should be taken into consideration, examined and cross checked according to the material available (questioned documents and comparative specimens of handwriting or signatures according to the case). It is commonly known that every writer presents a range of graphic variation in every representation of his handwriting or signature [3]. The amplitude of this inevitable variability [4, 11] depends on the cultural level of the writer, his age, his clinical condition in the suspected period, his professional occupation, eventual external factors which affected the graphical production in the particular historical moment of writing a text or signature (such as body's posture, climatic conditions, medication or an exceptional fact could have affected the usual handwriting such as f.e. writing in a bus or train in movement).

Apart from these elements, there is further particular information to be taken into consideration in many cases regarding the personal relations between the parties involved, which deal with the historical connection between them. These relations could indicate other peculiarities of the case which are often decisive to orientate the investigation in a certain direction. Nevertheless, historical events, scientific data, forensic findings and common sense delimit the frame of investigation of every specific case. Undoubtedly, the method used is the (commonly accepted and applied) comparative method, used worldwide in Forensic Document Examination. All deductions are the result of comparison between authentic samples and specimens traced by imitation. The technical term usually used is 'forgery', which, apart from the graphological aspect of comparison between suspected signature and comparative material, also refers to the intent of the forger to defraud [8] in its legal aspect.

2. IMITATION WITH CONSENT

Imitation of a signature is a very common case of forgery in everyday life. The main forger's purpose is the morphological reproduction of the authentic specimen, to deceive the recipient of the

document in practice. Forging is usually an act of fraud, but sometimes it could also aim in facilitating several bureaucratic procedures. In such cases the consent of the original signer is quite often in reproducing the original model or squiggle. For reasons of velocity of execution or easier imitation, forgers usually prefer the squiggle. When a forger practices for a long period of time the imitation of a person's signature's model with his consent, we can notice either slight or severe differences of the form of the final traced signature. Are there specific consequences in the forged signature or squiggle? Which factors could affect the result?

Imitation can be effected by several methods, traditional-mechanical ones, digital ones or even freehand. In the present study we refer to freehand simulation of another person's signature [12]. It is called 'freehand' because the hand remains free from restraints in tracing the model, such as previously traced guidelines [5]. The accelerated rhythm of life in modern societies has created new motives of imitation for practical purposes. The imitation or forgery of a person's signature with his consent in several official or bureaucratic documents is a very often case in practice. On such occasions, the professional role of a certain individual along with the personal relation developed in a mutual collaboration, results in the application of this imitation for a long period of time. One of the most usual cases refers to signing fiscal or bureaucratic documents of a company which deal with its organizing or administrative function and continuity, such as documents deposited to public services of financial control.

It is very often in practice to find out that signatures of the person(s) that legally represent a firm in its bureaucratic function are not genuine, but imitated f.e. by the accountant of the firm or someone of the responsible employees of the financial or even legal department (depending on the public bureau in which the document should be deposited). The use of the imitated specimen of the original signature usually happens with the consent of the person who is legally assigned to sign, as f.e. the legal representative of the company. In these circumstances it is very common that after a long period of practice the forger/imitator achieves a particular automatism [9] in imitating the original signature, which leads him to evolve the forged model in an individual way by applying several morphological or even qualitative changes in the original signature's model, which might be compatible or not with his own (the forger's) original specimen. A very common preference in these cases is the use of a squiggle more than a more extended in length signature, because it is easier, quicker in the execution, and less indicative or characteristic of the forger's hand. The danger of recognition of the imitation and the difficulty of the task to be performed is considerably reduced in case of a short signature such as a squiggle. An amplified range

of variation [15] of the original signer is also in favor of the forger, since there is a wider field of satisfying compatibility to the original specimen. Such copied signatures could be rather difficult to be proved simulated [5].

Particular attention should be given to initial or ending strokes which are rather individual characteristics. Such strokes may contain even on-air movements of the pen, not imprinted on the surface of the paper because of lack of contact between the point of the pen and the paper. They can be decisive in order to distinguish between fake and original specimens from the aspect of forensic diagnosis. In addition, the quality of the line, relative speed of writing, ratios of the various parts of the signature or of the particular morphemes [13] are further sources of problem of the forger in order to create a satisfying copy of the original.

After a long period of training in practice, forgers very often come to a signature's model, which may be morphologically different to the original specimen. This morphological evolution usually becomes automated and arrives in a formal aspect, which may be slightly or even significantly different to the genuine signature's model. By practicing, our own graphical characteristics become more and more automated. This is valid not only for our own handwriting, but even when we try to imitate another person's handwriting or signature. Practicing leads to automated intricate movements, which become more individual and formulate personal graphical habits [16].

Imitation as a graphic procedure is quite complicated and a successful result is rather difficult to achieve, because the writing task does not flow from unconscious habit [14]. The mechanism of imitation is divided into 3 main stages according to the **ElAdApp** Model [10]:

The **El**imination stage (suppressing of the forger's own habits in handwriting);

The **Ad**option stage (the forger tries to simulate the signature or handwriting of another person);

The **App**lication stage (the forger has practiced extensively trying to suppress his own habits in handwriting and to imitate the genuine item, before producing the final document where he has to apply contemporaneously the above 2 stages).

The consent of the original signer permits wider margins of graphical expression of the hand. Consent could be either oral or written. If written, it is easier for the forger to defend himself in an eventual

penal procedure, since the consent is equivalent to permission or authorization to do so. An oral consent is less easy to be proved in case of judicial involvement. Nevertheless, the consent allows to the forger wider margins of action, since he is not feeling so restricted in remaining as close as possible to the morphology of the specimen to imitate. According to his own range of graphic variation, to this graphical skill and fluency, but even to his individual ability to reproduce the forged signature, he may gradually abandon the original model due to his psychological freedom deriving from the consent. Under these circumstances, there could arise several eventual modifications or alterations of the original model.

If we have the opportunity to examine different specimens throughout time, we could notice a graduated diversion which is more intense in the latter specimens. Forged specimens of the beginning tend to be more closely attached to the original model in the morphological aspect. Later, there appear slight differences, which might be related less to the form and more to the qualitative aspects of tracing. It is the stage of minor effort to eliminate one's own individual graphical habits. Then, the morphological compatibility between original and forged signature is further reduced and new forms appear, that might be compatible either to the original signature of the forger or to a completely new model of his inspiration. The possible direction of orientation of the forger in this ideological conception of the new signature's model is quite unlimited. Diachronic execution of the habitual reproduction of the imitation is rather a factor of increase of the differences along with the psychological deliberation of the consent. The forger could finally arrive in a completely irrelevant morpheme, extremely diverse from the original specimen.

We have to point out that signature and handwriting are continuously subject to evolution and variation to every single writer [7]. Since this axiom is valid for every individual, it covers not only the cases of authentic production of handwriting, but it is present as a tendency even in simulated specimens. Evolution is a stable characteristic of human nature and this is the reason why the forger can't deviate from this path. Evolution can be meant even from a negative perspective. Elderly people are usually less fluent in their handwriting execution because of several malfunctions of the neuromuscular system due to age or clinical problems. Imitation of such a signature with grapho-pathological characteristics is much more complicated and difficult, since the forger is usually younger as the social and professional collaborations indicate in practice. Employees who are rushing to organize tasks are usually younger people to whom the usually older employers assign bureaucratic tasks. Even pharmaceutical treatments could affect the quality or morphology of an original signature, which can be transitory. Learning to copy a specimen of this kind though, may affect the conception of the original model following that pattern

even after the cure of the original signer. Forgers following and learning a certain copy will not easily change the initial pattern, since they are not likely to re-examine the model to imitate. Once acquired, the pattern remains quite stable, even because of the effect of different kinds of psychological biases [1].

The procedure of imitation encompasses the graphic gesture of the forger. The morphological reproduction of the model demands a particular series of muscle movements of the body parts involved in handwriting. The order of the brain to the body to execute a particular task in order to write involves not only the brain, but even the upper part of the body (shoulder, hand, fingers), till the material production of graphic traces on the surface of the paper. Copying the original pattern presupposes the initial observation and analysis of it by the simulator. On many occasions the forger has managed to identify the morphemes and shapes to reproduce, but he has not ideologically conceived sufficiently the sequence of movements required for a successful simulation. According to phychomotor theory, forging is an untrained motor task which is accomplished through visual feedback, so as to identify the shape characteristics [6]. The sequence of the strokes though and the clockwise or anti-clockwise direction of tracing the lines in every specific part of the signature is not always successfully diagnosed by the forger. Clockwise movements demand the motivation of several muscles while anti-clockwise movements activate other muscles or groups of them [10]. If there are intrinsic faults in simulation due to the lack of accurate analysis of the model to imitate in the initial phase (in the first chronological phase of the suspected period), then a quite altered model can become the starting basis of the evolution of the forged sample, which, undoubtedly, will increase the discrepancies between the standard signature's model and the forged one. The evolution of the forged model acquires a completely autonomous route. It is something like a clone of the original one, which follows a separate process of evolution, especially because the forger is liberated by the psychological necessity of commitment to the original model, as a result of the consent of the original signer.

We have to take into consideration the fact that handwriting, then, can be abnormally affected by several external factors without the writer intentionally giving thought to it. The acquired graphic skill and ability to apply handwriting as a process of defining ideological meanings by writing words, decreases or completely disappears the anxiety of how individual letters are formed [5]. This is valid even in the normal handwriting or signature of the forger, so it could be a further parameter of influence for him, since the fact that he is not obliged to follow the model because of the consent of the original signer allows a more intense automation. Hence, the factors of diversification become more and more numerous.

The aforementioned aspects and thoughts are examined in the following case study.

3. CASE STUDY

3.1 The historical data. A businessman, owner of a company which, apart from other activities deals with the management of hotels, collaborates for almost 20 years with an accountant, which is responsible for all the fiscal documentation of the financial management of the company. With the consent of the president of the company, the accountant imitates his signature in every necessary document, when the president is not present. The original signer uses 2 kinds of signing models; an extended one and a squiggle. In the beginning, the accountant tries to imitate the extended specimen, which is more complicated and more difficult to reproduce. After a while, for reasons of simplicity and fast execution, the accountant starts copying the squiggle. Because there is no conflict between them, the accountant is not trying so hard to imitate the genuine specimen, but he starts evolving and simplifying the original squiggle by elaborating the model in his own personal way. In the beginning of the financial crisis the businessman is in economical difficulty and gets a loan of 60.000€ by his accountant, in a condition of a high interest. After the full repayment of the amount, the accountant presents 10 exchange rates of 60.000€ each, and claims and amount of 600.000€ starting a legal prosecution both in penal and civil procedure. After the nomination of a court's expert to decide whether the suspected signatures are genuine or not, the accountant presents to the Expert a certain quantity of documents, which were supposed to have been signed by the president and which, in fact, were signed by him on behalf of the original signer. Of course, these documents were signed by the accountant before the suspected period, with the oral consent of the businessman, because of the mutual confidence between them due to their collaboration for more than 10 years in that time. The accountant even presented to the FDE expert documents in which the imitated squiggle is authenticated by the police, because of the fact that, very often, since the police officer knew in person both the accountant and the businessman, if the last one was on a trip, the accountant was reproducing the president's squiggle and the police officer was confirming the originality of the signature, in documents of procedural bureaucratic value and interest. When these specimens were provided in the expert's comparative material, he couldn't exclude them, because they had an undeniable proving inference of originality. So, apart from the legal actions to be taken in order to indicate the 'construction' of false evidence, the Technical Advisor had to prove the forgery of the authenticated specimens, by

comparing them not only to the original ones but even to the other squiggles produced by imitation, indicating the different evolution of the forged squiggle in relation to the genuine one.

3.2 Authentic and suspected specimens. The morphological aspect of the genuine signature and squiggle is the following:
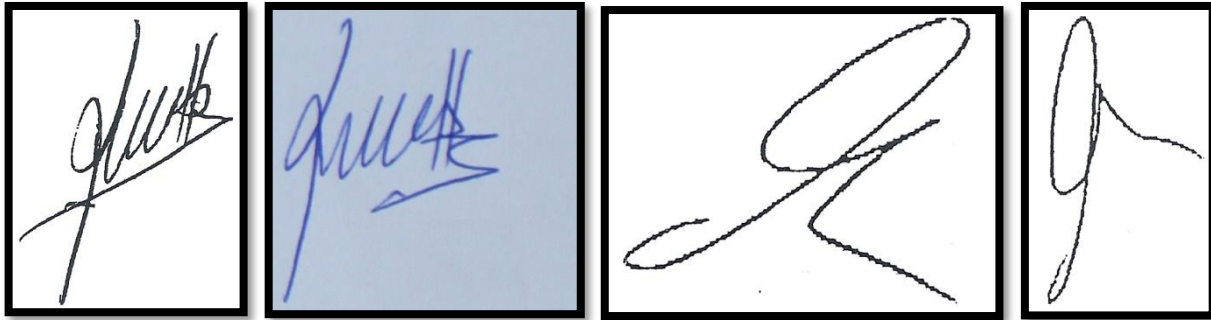

Fig.1. the original signature (2 specimens on the left) and squiggles (2 specimens on the right).

The 10 suspected specimens are the following:

Fig.2. the suspected squiggles.

The specimens of the accountant imitating the original squiggle are the following:
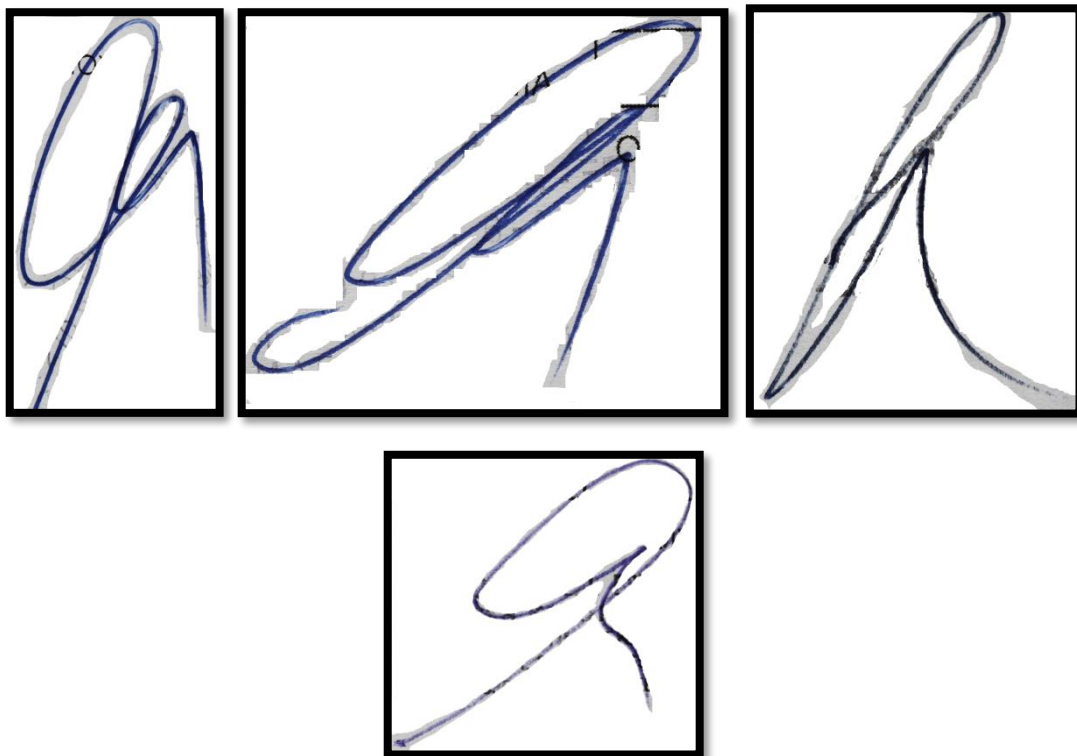

Fig.3. the simulated specimens.

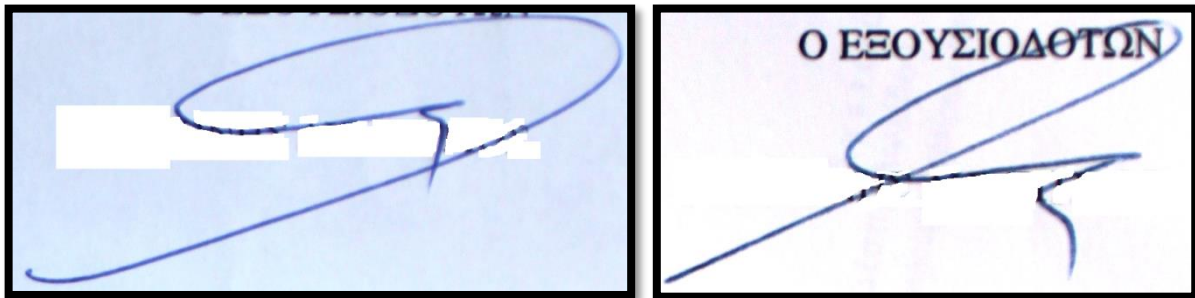The specimens made by the accountant and authenticated as squiggles of the president are the following:

Fig.4. authenticated simulated specimens.

We can see the compatibility between the imitated squiggles and the suspected ones, but our aim in this study is to diagnose the differences between the genuine squiggle and the evolution of the imitated one.

3.3 Differences between the evolved specimen and the genuine one. Differences do exist, although the slight difference in the morphological appearance between the forged and the original specimens could raise the hypothesis whether the forged ones are alternative expressions of the genuine hand within the margins of its natural graphical variation. We notice the following discrepancies:

Different proportions in the analogical aspect of the expansion of the signature in the vertical and horizontal vector in each morphological component of the forged model,

Different ratio between the first and the second form or part which constitute the squiggle,

Elimination of the dots or small traits in the final part of the genuine squiggle,

More intense inclination of the imitated squiggles,

Different grade of convergence of the axes between the 2 parts of the squiggle,

Different rhythm of execution (velocity),

Different distribution of graphic pressure (due to the different neuromuscular structure).

4. CONCLUSIONS

In every expertise we have to take into consideration 2 very important factors:

- The **historical data of the case** which can orientate our investigation in a safer direction,

- The **range of graphic variation of a hand's graphic expression** during the suspected period as defined by the comparative material.

In case of habitual imitation of a forged signature, the forger can arrive in an evolution of the genuine specimen, which could be adapted or not in his own graphical characteristics. The changes vary in every particular case depending on:

- the **forger's ability** to reproduce the forged specimen,

- **his own range of graphic variation**,

- the **period of time** of training because of the reproduction of the forged signature,

- the **quantity** of the forged signatures he has to sign,

- the **conditions** under which he is signing using the forged specimen (signing in his office or in public services in front of other persons, under pressure of time).

The most common differences regard:

- differences which have to deal with the **ratio of the forms**,

- **inclination**,

- **velocity of execution and rhythm**,

- factors of adaptation to **his own ideological achievement of the imitated signature**, which may lead to a partial reproduction of his own form of signature,

- differences of distribution of the **graphic pressure**.

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We have to notice that the forger usually and logically tries to remain as much as possible close to the original morphology, so as to be able for him to present a signature which could be considered genuine. That is the reason why we, initially, do not expect a completely different morphological aspect between the genuine specimen and the forged one [2]. The simulator will endeavor to reproduce the signature model as pictorially as possible [12]. The consent of the original signee though allows a vast field of graphic expression from the psychological aspect. The forger, deliberated by the necessity of reproduction creates a mixture of both qualitative and morphological elements which contain not only characteristics of the model to imitate, but might also belong to his own graphic nature, or result as a consequence of his inspiration. Further investigation from this perspective in different cases is necessary. When a forger is left free to act, the product of his imitation cannot be restricted to certain rules or expected findings.

REFERENCES

[1] M. Allen, Foundations of Forensic Document Analysis, Theory and Practice, Wiley Blackwell, 2016, p.11-12.

[2] A. Bravo. Variazioni Naturali e Artificiose della Grafia, (Urbino : Libreria Girolamo Moretti, 1998), p. 136.

[3] A. Bravo. Variazioni Naturali e Artificiose della Grafia, Urbino, Libreria Moretti Editrice, 2005, p. 33, with reference to : Girolamo Moretti. Perizie Grafiche su base Grafologica, (Verona, L'albero, 1942).

[4] A. and P. Cristofanelli., Grafologicamente, Manuale di Perizie Grafiche, (Roma : CE.DI.S. EDITORE, 2004), p. 231.

[5] D. Ellen, The scientific Examination of Documents, Methods and Techniques, 2nd edition, Taylor & Francis, 2003, p.31, 34, 37.

[6] K. Franke, Analysis of Authentic Signatures and Forgeries, Computational Forensics, 2009, Vol.5718, p.150-151.

[7] J. Gideon, A. Kandulna, A.A. Kujur, D. Ad, R. Kumundha, Handwritten Signature Forgery Detection using Convolutional Neutral Network, www.sciencedirect.com, Procedia Computer Science 143 (2018) 978–987.

[8] H. Harralson, Developments in Handwriting and Signature Identification in the Digital Age, Elsevier, 2013, p.6,

[9] R. Hubber and A.M.Headrick, Handwriting Identification: Facts and Fundamentals, 1999, CRC Press, Ch.5, par.28,

[10] P. Kipouràs, Evidence for a 3-stage Model for the Process of Free-hand Forgery of Signatures and/or Handwriting, IJISET - International Journal of Innovative Science, Engineèring &

Technology, Vol. 8 Issue 1, January 2021 ISSN (Online) 2348 – 7968, http://ijiset.com/vol8/v8s1/IJISET_V8_I01_23.pdf, p.238-249.

[11] P. Kipouràs, C. Kosmidis, D. Skarpalezos**,** Why Two Genuine Signatures are never Identical in Practice: Evidence and Scientific Explanation, IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 8 Issue 4, April 2021 ISSN (Online) 2348 – 7968, https://www.ijiset.com/articles.html**,** https://ijiset.com/articlesv8/articlesv8s4.html**,** https://ijiset.com/vol8/v8s4/IJISET_V8_I04_18.pdf, p.157-173.

[12] L. Mohammed, Forensic Examination of signatures, Academic Press, Elsevier, 2019, 50-60, 65.

[13] R. Morris, Forensic Handwriting Identification, Fundamental concepts and principles, Academic Press, 2000, p.109.

[14] S. Slyter, 1995, Forensic Signature Examination, Charles Tomas Publisher, p.7.

[15] N. Stergiou, L. Decker, Human Movement Variabilty, Nonlinear Dynamics, and Pathology:Is there a connection? Hum Mov Sci. 2011 October ; 30(5): 869–888. doi:10.1016/j.humov.2011.06.002.

[16] L. William, Forensic Laboratory Handbook Procedures and Practice, Second Edition, Humana Press, p.372.

ABOUT THE AUTHOR

Pàvlos Kipouràs – Ph.D. in Law, Faculty of Law & Commerce at Eduvos, in East London, South Africa. Advocate of the High Court of South Africa.
e-mail: kippaolo@gmail.com
ORCID ID: https://orcid.org/0000-0002-4021-7584
Google Scholar ID: https://scholar.google.com/citations?hl=en&user=h_w4XXAAAAAJ

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