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D6.2 & D6.3 User Validation Plan & Analysis of Pilot Trials

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Table of contents

1	Introduction	8
2	SAMi2 Objectives	9
3	Test Environment Description	10
4	Functional Test.....	11
4.1	Scenario 1 – Halloween	11
4.1.1	Use Cases tested.....	11
4.2	Scenario 2 – 20 th November	14
4.2.1	Use Cases tested.....	14
5	System Test	19
6	User Test.....	24

List of Tables

Table 1 Test01UC3-Illegal Events.....	12
Table 2 Test02UC5-Post-Mortem Analysis	14
Table 3 Test03UC1- Escrache	16
Table 4 Test04UC2 - Gangs	17
Table 5 Test05UC4 – Hate Speech	19
Table 6 Capacity of the system.....	19
Table 7 Efficiency of the system.....	20
Table 8 Response time of the system	20
Table 9 Maintenance of the system	21
Table 10 Resilience of the system	21
Table 11 Scalability of the system.....	21
Table 12 Security of the system.....	22
Table 13 Quality of the system.....	23
Table 14 Implementation defects or “bugs”	23

Glossary

Acronym	Meaning
HIB	HI-Iberia
MCC	Madrid City Council
UC	Use Case

References

[Online] www.hi-iberia.es.

[SAMi2 - Project] D2.2 Use Cases

1 Introduction

The current deliverable describes the user validation plan of SAMi2 project, including the design and planning of tests. The results of the trials will be included in the following deliverable of this WP, D6.3 – Analysis of Pilot Trials.

2 SAMi2 Objectives

Social networking is one of the most popular online activities worldwide transforming OSNs in a mirror of society where both legal and illegal activities are present. Governments and safety and security officials have difficulties to prevent and detect these illegal actions organized through OSNs due to the sheer quantity of available data.

Among the current available social networks the chosen for SAMi2 is Twitter because it is perhaps the most paradigmatic and it has rapidly risen to prominence as a synonym for timely information for emergent news. Twitter's users compose short messages, limited to 140 characters, called "tweets" to express their opinions or views. These are often composed from sensor rich mobile devices which attach metadata such as timestamps or geo-location to the messages. Twitter provides APIs that allow programmers to tap into this rich "public" stream or the dataset stream or the dataset that is not marked by the authors as available for unrestricted publication in the website.

Parallel to technical growth, these general purpose OSNs have come to mirror the society at large. Over OSNs jobs are offered, items are bought and sold and other business information is exchanged. And in parallel to these legitimate activities, illegal activities are often discussed or planned. Government agencies and security forces have been monitoring OSNs for some years now in the search of evidence leading to early warning of organized crime such as money laundering or safety-threatening scenarios such as illegal demonstrations. This work is at the moment manual, labor intensive and thus expensive on the tax payers.

SAMi2 project was conceived as a potential helping tool for these police forces in automatizing parts of the OSN monitoring process. The main goals for the project are as follows:

- Provide a generic technical solution to crawl the OSNs and extract relevant pieces of information leveraging the most up-to-date technologies and approaches to ensure maximum efficiency and scalability.
- Ensure that the OSN user's rights of privacy and data ownership are observed and that ethical and legal provisions in the law or the OSNs Terms of Services are upheld.
- Enforce an end-user-centric perspective to produce a professional tool for use by security stakeholders rather than other tools geared for commercial or personal use.

So, in summary, the final objective of SAMi2 is to deliver a semi-automatic tool able of processing (in near real-time) open data gathered from OSNs in order to detect:

- Illegal actions planning such as fraud, crime, terrorism...
- Illegal content such as racist or xenophobic

3 Test Environment Description

After two of the three planned workshops for SAMi2 and according to the exchange of expertise, operational procedures and requirements on the part of MCC as well as other security forces, an initial pilot of SAMi2 has been created.

This pilot is an initial roll-out of SAMi2 which only addresses certain functionalities of the set of extensions that this tool could provide in the future. These functionalities may be limited by the number of users who can access the system, the number of security forces involved, the needs of these security forces, or other restrictions as appropriate to the security or other domains. The purpose of this pilot project is the development of production and field tests, in a controlled and professional environment respectively.

Production tests will be performed within the dependences of Hi-Iberia. The aim is providing validated, stable and usable tests in a controlled environment to replicate bugs and ensure that the system is ready to move to the next stage: field tests. During the production phase, non-functional requirements of the system will be tested as well as some functional ones following the steps described in Test Scenario 1 – Halloween.

The validation phase will continue with a set of field tests within the premises of the Madrid City Council police. After a training session, MCC will be able to test SAMi2 for several days in their professional environment following the steps described in Test Scenario 2 – 20th November. The aim is ensuring the validity, usefulness and user experience that the system provides. After these tests, MCC will be allowed to answer the questions of the “User Tests” as well as report their experience with the platform, lessons learned and guidance upon next stages of the development.

SAMi2 has been designed to cover the needs of security forces in Europe in the prevention of activities that could lead to illegal actions. Thus, security forces and, specifically those that currently work with Online Social Networks, are the main targets of the project. SAMi2 is conceived as a solution to support security forces in these tasks, currently performed manually with an avoidable overuse of time for the required in-depth monitoring of the OSN by these professionals.

4 Functional Test

4.1 Scenario 1 – Halloween

Halloween is a yearly celebration that takes place on 31st October. As the 1st November is a bank holiday in Spain, the night of the 31st October people usually go out, organize parties at home or attend to discos which organize special events for this night. As it might be expected some illegal events emerge and some of them are organized through OSN. To detect all the relevant information on Twitter, SAMi2 will be working in the analysis of tweets.

4.1.1 Use Cases tested

Test Plan for Illegal Events	
Test Code	Test01UC3-Illegal Events
Type of test	Functional
Input	<ul style="list-style-type: none"> - <u>Prerequisites</u> <ul style="list-style-type: none"> ▪ Have some experience in the use of Online Social Networks (specially Twitter) ▪ Have some experience in the search of actions related with “Illegal Events” through Online Social Networks ▪ Be able to objectively discriminate relevant messages from these that are not relevant - <u>Inputs</u> <ul style="list-style-type: none"> ▪ Accurate search criteria including key words, concepts, location and period of time ▪ Tweets available in the net within the limits of the search criteria ▪ Previous evaluations of the profile by users
Description	
<p>The steps that must be followed to start with the detection of messages related with “illegal events” are:</p> <ol style="list-style-type: none"> 1. Authenticate on the system 2. SAMi2 shows the home page with a set of monitoring profiles. Several options can be chosen: <ol style="list-style-type: none"> a. Select an available profile for illegal events displaying the “profile” combo box and use it as provided. b. Modify the selected profile according to your preferences, e.g. adding new key words, concepts, etc., by selecting “Modify Profile” button. c. Create a new profile according to your preferences 3. After selecting the profile, define the area you want to cover with the search in the map or select one of the predefined areas. 4. Select “Next” 5. Select the period of time to cover with the search. A specific pre-defined period of time (e.g., last week) or a predefined one can be chosen. 	

6. SAMi2 shows a set of results.
 - a. Hovering the mouse over the displayed tweets places a location mark on the map on the right.
7. To inspect the details of a tweet, click on it. The original message will be opened in the Twitter page.
8. To filter the results, select one or several of the filters:
 - o Filter by person
 - o Filter by hashtag
 - o Filter by places mentioned in the message
9. Consult the statistics of the search to know which is the most mentioned hashtag, user and location (the biggest word in the tags cloud)
10. Also for each tweet:
 - a. The social graph analysis can be shown by means of two relational trees one for the users and one for the tweets
 - b. There is a link for accessing to the original tweet
 - c. Its location is pointed in the map
11. Evaluate the results to make the system learn:
 - o Press the right arrow of your keyboard to evaluate the tweet as positive
 - o Press the left arrow of your keyboard to evaluate the tweet as negative
 - o Press the up or the down arrow of your keyboard to navigate to the previous or next tweet.

Expected Output for acceptance	Tweets containing information related to illegal events taking place on the 31 st October at night. Illegal events include illegal parties, overcrowded parties, groups of people drinking in the street
Functionalities to be validated	<ul style="list-style-type: none"> - Detection of tweets including illegal events and key words in the profiles - Use of semantics to semi-automatically broaden the search to related items to the ones provided in the profile (e.g., 'party' would trigger the search of 'celebration'). - Use of social graph analysis to identify relationships between current author and other messages authors – retweets in the case of Twitter - Accuracy of SAMi2 in the detection of tweets posted in a certain region - Identification of the locations cited in the message - Identification of the time instants mentioned in raw text - Latency of the system - Capacity of helping in the prediction of future actions

Table 1 Test01UC3-Illegal Events

Test Plan for Post-Mortem analysis	
Test Code	Test02UC5 – Post-Mortem Analysis
Type of test	Functional
Input	<ul style="list-style-type: none"> - <u>Prerequisites</u> <ul style="list-style-type: none"> ▪ Have some experience in the use of Online Social Networks (specially Twitter)

	<ul style="list-style-type: none"> ▪ Have some experience in the search of actions related with “Illegal Events” through Online Social Networks ▪ Be able to objectively discriminate relevant messages from these that are not relevant <p>- <u>Inputs</u></p> <ul style="list-style-type: none"> ▪ Accurate search criteria including key words, concepts, location and period of time ▪ Tweets available in the net within the limits of the search criteria ▪ Previous evaluations of the profile by users
Description	
<p>As the tweets will be stored in the server, the steps that must be followed to start with the detection of “illegal events” once they have taken place is the same as in the previous test:</p> <ol style="list-style-type: none"> 1. Authenticate on the system 2. SAMi2 shows the home page with a set of monitoring profiles. Several options can be done now: <ol style="list-style-type: none"> a. Select an available profile for illegal events displaying the “profile” bar. b. Modify the selected profile according to your preferences, e.g. adding new key words, concepts, etc., by selecting “Modify Profile” button. c. Create a new profile according to your preferences 3. After selecting the profile, define the area you want to cover with the search in the map or select one of the predefined areas. 4. Select “Next” 5. Select the period of time you want to cover with the search. You can select a specific period of time or select a predefined one. 6. SAMi2 shows a set of results. <ol style="list-style-type: none"> a. Hovering the mouse over the displayed tweets places a location mark on the map on the right. 7. To inspect in detail a tweet, click on it. The original message will be opened in the Twitter page. 8. To filter the results, select one or several of the filters: <ol style="list-style-type: none"> a. Filter by person b. Filter by hashtag c. Filter by places mentioned in the message 9. Consult the statistics of the search to know which is the most mentioned hashtag, user and location (the highest one) 10. Also for each tweet: <ol style="list-style-type: none"> a. The social graph analysis can be shown by means of two relational trees one for the users and one for the tweets b. There is a link for accessing to the original tweet c. Its location is pointed in the map 11. Evaluate the results to make the system learn: <ol style="list-style-type: none"> a. Press the right arrow of your keyboard to evaluate the tweet as positive b. Press the left arrow of your keyboard to evaluate the tweet as negative c. Press the up or the down arrow of your keyboard to navigate to the previous or next tweet. 	

Expected Output for acceptance	Tweets containing information related to illegal events taking place on the 31 st October at night that were solved by the police officers but were reallocated or postponed.
Functionalities to be validated	<ul style="list-style-type: none"> – Detection of messages in the social networks to know if a conflict was removed on time or if, instead, it was postponed. – Accuracy of SAMi2 in the detection of tweets posted in a certain region – Identification of the locations cited in the message – Identification of the time instants mentioned in raw text – Relevance analysis – analysis of the most recent messages received but not forgetting their relationships with past related messages – Use of semantics to semi-automatically broaden the search to related items to the ones provided in the profile (e.g., ‘party’ would trigger the search of ‘celebration’). – Use of social graph analysis to identify relationships between current author and other messages authors – retweets in the case of Twitter – Latency of the system

Table 2 Test02UC5-Post-Mortem Analysis

4.2 Scenario 2 – 20-N

20-N is a symbolic abbreviation used to denote the date of death of two of the best known and controversial figures in 20th-century Spanish history. The first date, 20 November 1936, near the end of the first year of the Spanish Civil War, marks the execution of José Antonio Primo de Rivera, the founder of the nationalist party, Falange Española, who became extolled as a cult figure during the years of the post-Civil War Estado Español led by Francisco Franco. The second date, 39 years later, is 20th November 1975, when Generalissimo Franco himself – having ruled Spain for close to four decades as its *caudillo* (Spanish for leader) – died following a lengthy illness.

This date continues to be commemorated by far-right groups which mark it by organizing public demonstrations especially in Madrid and in the area around the burial site for both Franco and Primo de Rivera (Valle de los Caídos, near Madrid). These public demonstrations usually lead into other related illegal activities that are organized through Online Social Networks like “escrache”, fights between far-right and far-left groups and hate speech.

4.2.1 Use Cases tested

Test Plan for Escrache	
Test Code	Test03UC1 - Escrache
Type of test	Functional

Input	<ul style="list-style-type: none"> - <u>Prerequisites</u> <ul style="list-style-type: none"> ▪ Have some experience in the use of Online Social Networks (specially Twitter) ▪ Have some experience in the search of actions related with “Escrache” through Online Social Networks ▪ Be able to objectively discriminate relevant messages from these that are not relevant - <u>Inputs</u> <ul style="list-style-type: none"> ▪ Accurate search criteria including key words, concepts, location and period of time ▪ Tweets available in the net within the limits of the search criteria ▪ Previous evaluations of the profile by users
Description	
<p>The steps that must be followed to start with the detection of messages related with “escrache” events are:</p> <ol style="list-style-type: none"> 1. Authenticate on the system 2. SAMi2 shows the home page with a set of monitoring profiles. Several options can be done now: <ol style="list-style-type: none"> a. Select the “Escrache” profile displaying the “profile” bar b. Modify the selected profile according to your preferences, e.g. adding new key words, concepts, etc., by selecting “Modify Profile” button. c. Create a new profile according to your preferences 3. Modify the profile, e.g. adding new key words, concepts, etc., select “Modify Profile” button and modify the profile according to your preferences. 4. If you do not want to modify the profile, select the area you want to cover with the search in the map or select one of the predefined areas. 5. Select “Next” 6. Select the period of time you want to cover with the search. You can select a specific period of time or select a predefined one. 7. SAMi2 shows a set of results. <ol style="list-style-type: none"> a. Hovering the mouse over the displayed tweets places a location mark on the map on the right. 8. To inspect the details of a tweet, click on it. The message will be opened in the Twitter page. 9. To filter the results, select one or several of the filters: <ol style="list-style-type: none"> a. Filter by person b. Filter by hashtag c. Filter by places mentioned in the message 10. Also for each tweet: <ol style="list-style-type: none"> a. The social graph analysis can be shown by means of two relational trees one for the users and one for the tweets b. There is a link for accessing to the original tweet c. Its location is pointed in the map 11. Consult the statistics of the search to know which is the most mentioned hashtag, user and location (the highest one) 12. Evaluate the results to make the system learn: <ol style="list-style-type: none"> a. Press the right arrow of your keyboard to evaluate the tweet as positive b. Press the left arrow of your keyboard to evaluate the tweet as negative 	

c. Press the up or the down arrow of your keyboard to navigate to the previous or next tweet.	
Expected Output for acceptance	If the detection of foreseen “escraches” is achieved, the test can be assessed as OK.
Functionalities to be validated	<ul style="list-style-type: none"> - Capacity of using semantics to catch tweets related with the organization of “escraches” - Capacity of adaptation of the system to the results expected by the user in the search of “escraches” - Accuracy of SAMi2 in the detection of tweets posted in a certain region - Latency of the system - Capacity of helping in the prediction of future actions - Use of social graph analysis to identify relationships between current author and other messages authors – retweets in the case of Twitter

Table 3 Test03UC1- Escrache

Test Plan for Gangs	
Test Code	Test04UC2 - Gangs
Type of test	Functional
Input	<ul style="list-style-type: none"> - <u>Prerequisites</u> <ul style="list-style-type: none"> ▪ Have some experience in the use of Online Social Networks (specially Twitter) ▪ Have some experience in the search of actions related with “Gangs” through Online Social Networks ▪ Be able to objectively discriminate relevant messages from these that are not relevant - <u>Inputs</u> <ul style="list-style-type: none"> ▪ Accurate search criteria including key words, concepts, location and period of time ▪ Tweets available in the net within the limits of the search criteria ▪ Previous evaluations of the profile by users
Description	
<p>The steps that must be followed to start with the detection of messages related with “gangs” events are:</p> <ol style="list-style-type: none"> 1. Authenticate on the system 2. SAMi2 shows the home page with a set of monitoring profiles. Several options can be done now: <ol style="list-style-type: none"> a. Select the “Gangs” profile displaying the “profile” bar b. Modify the selected profile according to your preferences, e.g. adding new key words, concepts, etc., by selecting “Modify Profile” button. c. Create a new profile according to your preferences 	

3. Modify the profile, e.g. adding new key words, concepts, etc., select “Modify Profile” button and modify the profile according to your preferences.
4. If you do not want to modify the profile, select the area you want to cover with the search in the map or select one of the predefined areas.
5. Select “Next”
6. Select the period of time you want to cover with the search. You can select a specific period of time or select a predefined one.
7. SAMi2 shows a set of results.
 - a. Hovering the mouse over the displayed tweets places a location mark on the map on the right.
8. To broaden a tweet, click on it. The message will be opened in the Twitter page.
9. To filter the results, select one or several of the filters:
 - a. Filter by person
 - b. Filter by hashtag
 - c. Filter by places mentioned in the message
10. Also for each tweet:
 - a. The social graph analysis can be shown by means of two relational trees one for the users and one for the tweets
 - b. There is a link for accessing to the original tweet
 - c. Its location is pointed in the map
11. Consult the statistics of the search to know which is the most mentioned hashtag, user and location (the highest one)
12. Evaluate the results to make the system learn:
 - a. Press the right arrow of your keyboard to evaluate the tweet as positive
 - b. Press the left arrow of your keyboard to evaluate the tweet as negative
 - c. Press the up or the down arrow of your keyboard to navigate to the next or previous tweet.

Expected Output for acceptance	If the detection of foreseen “gangs fights” is achieved, the test can be assessed as OK.
Functionalities to be validated	<ul style="list-style-type: none"> - Capacity of using semantics to catch tweets related with the organization of “gangs fights” - Capacity of the social graph analysis to help in the detection of tightly-knit groups or cliques of related users. - Capacity of adaptation of the system to the results expected by the user in the search of “gangs fights” - Accuracy of SAMi2 in the detection of tweets posted in a certain region - Latency of the system - Capacity of helping in the prediction of future actions

Table 4 Test04UC2 - Gangs

Test Plan for UC Hate Speech	
Test Code	Test05UC4 – Hate Speech
Type of test	Functional
Input	- <u>Prerequisites</u>

	<ul style="list-style-type: none"> ▪ Have some experience in the use of Online Social Networks (specially Twitter) ▪ Have some experience in the search of actions related with “Hate Speech” through Online Social Networks ▪ Be able to objectively discriminate relevant messages from these that are not relevant <p>- <u>Inputs</u></p> <ul style="list-style-type: none"> ▪ Accurate search criteria including key words, concepts, location and period of time ▪ Tweets available in the net within the limits of the search criteria ▪ Previous evaluations of the profile by users
Description	
<p>The steps that must be followed to start with the detection of messages related with “Hate Speech” events are:</p> <ol style="list-style-type: none"> 1. Authenticate on the system 2. SAMi2 shows the home page with a set of monitoring profiles. Several options can be done now: <ol style="list-style-type: none"> a. Select the “Hate Speech” profile displaying the “profile” bar b. Modify the selected profile according to your preferences, e.g. adding new key words, concepts, etc., by selecting “Modify Profile” button. c. Create a new profile according to your preferences 3. Modify the profile, e.g. adding new key words, concepts, etc., select “Modify Profile” button and modify the profile according to your preferences. 4. If you do not want to modify the profile, select the area you want to cover with the search in the map or select one of the predefined areas. 5. Select “Next” 6. Select the period of time you want to cover with the search. You can select a specific period of time or select a predefined one. 7. SAMi2 shows a set of results. <ol style="list-style-type: none"> a. Hovering the mouse over the displayed tweets places a location mark on the map on the right. 8. To broaden a tweet, click on it. The message will be opened in the Twitter page. 9. To filter the results, select one or several of the filters: <ol style="list-style-type: none"> a. Filter by person b. Filter by hashtag c. Filter by places mentioned in the message 10. Also for each tweet: <ol style="list-style-type: none"> a. The social graph analysis can be shown by means of two relational trees one for the users and one for the tweets b. There is a link for accessing to the original tweet c. Its location is pointed in the map 11. Consult the statistics of the search to know which is the most mentioned hashtag, user and location (the highest one) 12. Evaluate the results to make the system learn: <ol style="list-style-type: none"> a. Press the right arrow of your keyboard to evaluate the tweet as positive b. Press the left arrow of your keyboard to evaluate the tweet as negative 	

c. Press the up or the down arrow of your keyboard to navigate to the previous or next tweet	
Expected Output for acceptance	If the detection of “hate speech” is achieved, the test can be assessed as OK.
Functionalities to be validated	<ul style="list-style-type: none"> - Capacity of using semantics to catch tweets related with the organization of “hate speeches” - Capacity of adaptation of the system to the results expected by the user in the search of “hate speech” - Accuracy of SAMi2 in the detection of tweets posted in a certain region - Latency of the system - Capacity of helping in the prediction of future actions - Use of social graph analysis to identify relationships between current author and other messages authors – retweets in the case of Twitter

Table 5 Test05UC4 – Hate Speech

5 System Test

These tests will analyze non-functional features of the system.

Capacity of the system	
Non-functional feature to be tested	Processing Capacity
Description	The system is formed by a cluster with 3 nodes: one master node and two worker nodes. The processing capacity of the system can be broadened by adding new nodes to the cluster
Results	<ul style="list-style-type: none"> - Which is the current processing capacity of the system? <i>Due to SAMi2 has only deployed in the Halloween scenario, the current processing capacity has been enough for the realization of these trials.</i> - Do you think that this processing capacity is enough for the purpose of SAMi2? <i>Although the processing capacity has been enough for the above mentioned trials, in the future more processing capacity will be required in order to provide more accurate results when in-depth searches that involve high varied volumes of data, at higher velocity are carried out.</i>

Table 6 Capacity of the system

Efficiency of the system	
Non-functional feature to be tested	Efficiency

Description	Resource consumption (memory, disk and workload of the processor) for a given search
Results	<ul style="list-style-type: none"> - Do you think that the memory consumption is adequate? <i>Any memory consumption issue has been detected</i> - Do you think that the disk usage is adequate? <i>Any problem with the disk usage</i> - Do you think that the workload of the processor is adequate? <i>As mentioned in the above table, as the processing capacity of the system is adequate, any issue with the workload of the processor has been detected.</i>

Table 7 Efficiency of the system

Response time of the system	
Non-functional feature to be tested	Responsiveness
Description	The responsiveness for the SAMi2 application
Results	<ul style="list-style-type: none"> - How much time does the system spend in given accurate results after the selection of a predefined profile? <i>The responsiveness of the system is quite dependent of the set of tweets stored, i.e. the selection of the period of time since when analyzing tweets. For the Test01UC3, we selected a period of time starting in July 2015 and finalizing the first of November 2015. This did not give us too many accurate results after 15 minutes. This is the case when more time was spent in giving results.</i> - How much time does the system spend in training a new profile? <i>Only a few minutes have been required for training new profiles.</i> - Is it necessary a lower time of response for the system? <i>The results should be close to real time; 15 minutes are far away from real time.</i>

Table 8 Response time of the system

Maintenance of the system	
Non-functional feature to be tested	Maintenance

Description	This parameter concerns how the system in use can be kept from failing and restored after failure and the enhanced or updated without compromising the usage.
Results	<ul style="list-style-type: none"> - Time taken to diagnose and fix problems identified within SAMi2 – <i>Not addressed in the trials in Hi-Iberia</i> - Effort taken to make required enhancements to SAMi2 – <i>Not addressed before project end</i> - Effort required to make adaptations to changes in environment – <i>Not addressed in the trials in Hi-Iberia.</i>

Table 9 Maintenance of the system

Resilience of the system	
Non-functional feature to be tested	System recovery qualities following failures
Description	SAMi2 is able to recover under fault thanks to the replication of data provided by Mongo DB which keeps different copies of the data on different nodes
Results	<ul style="list-style-type: none"> - How does the system act after fail-stop failures of the worker nodes? <i>The system works well after fail-stop failures of the worker nodes. Spark provides failure tolerance.</i> - How does the system act after fail-stop failure of the central node? <i>The system works well after fail-stop failures of the central nodes. Spark provides failure tolerance.</i> - How does the system act after disk failure? <i>This non-functional feature has not been addressed.</i>

Table 10 Resilience of the system

Scalability of the system	
Non-functional feature to be tested	Scalability
Description	Capability of SAMi2 to be enlarged in order to accommodate a growing amount of work. SAMi2 will be able to accommodate a growing amount of work or data by adding new nodes to the cluster
Results	<ul style="list-style-type: none"> - Do you think that SAMi2 is easily scalable? <i>The architecture of SAMi2 has been designed with the aim of making it able to handle a growing amount of work.</i>

Table 11 Scalability of the system

Security of the system	
Non-functional feature to be tested	Security
Description	<ul style="list-style-type: none"> - Authentication and authorization to log in SAMi2 - Data could be encrypted however this would slow down the processing of data.
Results	<ul style="list-style-type: none"> - Do you think that the software complies with security requirements? <i>Currently the system only covers the protection of each user's session through authentication and authorization. If in the future more security capabilities are required, they will be correctly addressed.</i> <i>The possibility of adding encryption of data was thought, however this would slow down the analysis of data.</i> - Do you think that these security requirements are enough? <i>According to the results of the trials at internal level, current security requirements are enough.</i>

Table 12 Security of the system

Quality of the system	
Non-functional feature to be tested	Quality of the system
Description	Resulting performance in relation to effort
Results	<p>Given a certain set of tweets:</p> <ul style="list-style-type: none"> - How many of them are assessed as “good” and “bad”? <i>From 100 results, 14 of them were assessed as “bad”, 12 of them were not assessed and 74 were assessed as “good”.</i> - Which is the error rate of the system? <i>From 100 results, 14 of them were assessed as “bad”. Thus, we have a 14% error rate.</i> - Which is the error rate of the system after evaluation? <i>After this initial search, several searches were carried out and after each search, an evaluation. The error rate after each search was:</i> <ul style="list-style-type: none"> • 14% • 10% • 12% • 8% • 7% <p><i>This makes an average error rate of 10,2%. Thus, it can be deduced that the error rate has been improved after</i></p>

	<i>evaluation. However, more searches are required to get totally reliable results.</i>
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Table 13 Quality of the system

Based on the system tests, the following bugs have been identified:

Implementation defects or “bugs”			
Feature to be tested	Bugs in code		
Description	Error in SAMi2 that causes it to produce incorrect or unexpected results.		
Results	Bug ID	Description	Result
	#1	When selecting a period of time in the calendar, messages were selected till the day previous to the date selected as final.	Latest results belonged to the 12.00 pm of the day previous to the day selected.
	#2	The threshold of the neuronal network was too low.	A lot of noisy results were provided.
	#3	Profiles over-completed.	Inaccurate results.
	#4	Profiles under-completed.	Very general results.
	#5	Connections for PostgreSQL queries were open and not closed.	The system crashed because it reached a point when no more connections were afforded.
	#6	All the results of a search were shown at the same time	Results took a very long time to be shown. Pagination was implemented so only 100 tweets were shown at the same time. If the user requires it, more tweets are charged.

Table 14 Implementation defects or “bugs”

6 User Test

The aim of this section is to gather the results of the SAMi2 tests from the user point of view. The objective is to identify the feedback of users who have been involved in the testing phase in order to analyze the suggestions, comments and ideas provided by the users in order to improve the final version of the prototype.

The questionnaire provided to the Madrid City Police was:

1. Is the service use consistent with the goals and motivations? Does the system provide consistent results with the search profile?

In some situations the results provided are not related with the term of search: only partial results are shown. In addition, these results do not match with the results obtaining when launching the same search directly over Twitter using human resources.

2. For what purposes the user is going to use the service?

The main purpose for using the service is easing the monitoring of Social Media making use of semantics and the processing capabilities provided by distributed processing through Big Data. This will allow reducing the number of police officers currently in charge of this.

3. Is the service useful?

Very useful.

4. Are there some situations where the service is especially useful?

In addition to prevent or detect actions that could endanger the security of people, it is possible to measure the level of security of a specific area to detect where more police presence is required. Through the location analysis provided by SAMi2, two types of location information can be extracted; location where the message was posted and location cited in texts. Thus, it could be possible to check the level of security of a certain area, analyzing messages posted or related to this specific zone.

5. Has the service improved the previous method? How?

It allows saving time while monitoring social networks. However, this is not completely true because it is always required the presence of a person verifying the consistence of the results and evaluating them for every specific profile of search.

6. Is the system easy to use?

The system is very easy to use. It provides a very user-friendly interface.

7. What are the possible usability problems and their solutions?

No usability problem.

8. How much time does it take to provide results?

For specific profiles of search the system takes a lot of time, i.e. at least 10 minutes since results are provided. This is quite far from real-time latency.

9. Do the results improve after the system training and evaluation? How?

Not too many searches over the same profile of search have been carried out to detect well and with accuracy the improvement after training and evaluation.

10. Do you think some progress regarding the extensibility of the service is necessary?

It will be required to allow the work of SAMi2 with other tools currently used by us (police) in our daily work.

11. Does the system fail? How often? What are the typical failures?

Not important fails have been detected

12. How long does the failure management take? Is it reasonable?

Not important fails have been detected

13. Is the social analysis useful? Does it help to detect troubling users?

As the API provided by Twitter does not give access to all the tweets, the social analysis is not very useful because some of the tweets of the thread of tweets are missing.

14. Has the system contributed to the detection of illegal events?

Not for the moment.

15. Are there ideas for improvements? Which?

Main improvements are related:

- *Access to all the tweets available in Twitter*
- *Analysis of multimedia content – face and location recognition*

16. Do you think the SAMi2 product will be a reality? Will it be useful for the security forces?

We think that SAMi2 could become a reality. However, lot of improvements are still pending and after the project end lot of improvements are required, e.g. the processing of multimedia content.