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Group Project

Project Initiation Document

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Loughborough University

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1 Introduction

1.1 The Client

Atos S.E. (ATO) is a France-based company that provides IT services (Reuters, 2015). The company provides an assortment of services, including: bespoke enterprise software, e-payment services, business integration solutions and cloud services. In addition, the company serves clients in various industries, including: energy and utilities, financial services, manufacturing, retail, public sector, healthcare and transport. Over time, Atos has developed strategic alliances with Cisco, Dell, EMC, Hitachi, Microsoft, Oracle, Samsung, SAP, Siemens and VMWare; and strategic business partnerships with HP and IBM (Bloomberg, 2015). This has allowed them to significantly leverage their service offerings and develop the credibility required to attract new trade. For example, the company was recently awarded a £6m contract to run Transport for London's service desk, a move that will see them responsible for logging, tracking and managing requests such as e-mail configuration, printing and remote access for 25 000 users across multiple locations (Jee, 2015).

1.2 The Project

The group has been tasked with the job of creating a solution to track and identify ones online personal data on behalf of Atos. The solution must be capable of securing, filtering or bringing added value to the data. Consequently, the group must start thinking about actions, functionalities or objectives that might be useful in the solution to protect personal data, for example: automatic de-subscription, notifications, deletion, or ensuring results do not appear in search engine top hits.

1.3 The Team

The following section outlines the expected roles and responsibilities for each individual involved in this project. However, due to the dynamic nature of the project, roles may be re-assigned to one or more individuals throughout the duration of the project. As a result, individuals may need to play a different role than that which was initially outlined. This approach to team development correlates to Ancona et al., 2007 ideas on adaptive team structure within organisations:

1.3.1 Jeansy Molanza – Project Management/Business Analyst

As Project Manager, responsible for the successful initiation, planning, execution, monitoring, controlling and closure of the project. As Business Analyst, responsible for the design of solutions that will deliver value to stakeholders – acting as an agent of change whenever necessary.

1.3.2 Gary Bennett – Front End Development/Business Analyst

As Front End Developer, responsible for implementing interactive elements, translating UI/UX wireframes to actual code that will produce the solution's interface that the end user engages with.

As Business Analyst, responsible for the bridging the gap between technical and project requirements.

1.3.3 Jifei Wei/Rawand Hawiz – Back End Development

As Back End Developer, responsible for implementing server-side application logic; creating the application's API to facilitate database interaction and intelligent agents tasked with performing a service on a regular schedule. In addition, will be in charge of writing unit tests and source control.

2 Project Plan

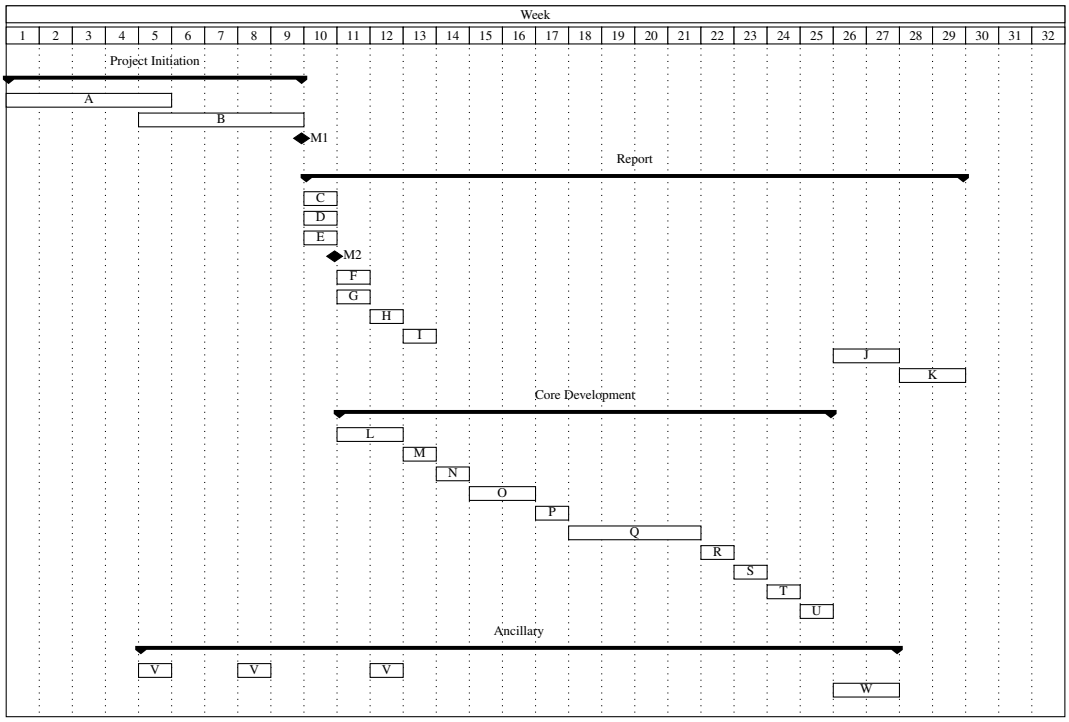

Figure 1 Project Plan

Table 1 Project Plan Key

Code	Task	Code	Task
A	Project Initiation Document	L	Map Application Flow
B	Atos Entry Form	M	Create Application UI
M1	Complete Project Initiation Document	N	Create Application Database
		O	Create Application API
C	Overview	P	Create Application Unit Tests
D	Problem Definition	Q	Create Intelligent Agents
E	Feasibility Study	R	Test Functional Usability
M2	Complete Introduction	S	Detect Security Holes
F	Function Requirements	T	Correct Technical Issues
G	Non-Functional Requirements	U	Backlog Grooming
H	Architectural/Logical Design		
I	Physical/Process Design	V	Get Feedback from Client
J	Implementation Section	W	Prepare Client Documentation
K	Evaluation Section		

3 Software Development Approach

3.1 Choice of Development Approach and Rationale

The group has decided to follow an agile development methodology throughout the software development stage. According to Boehm, 1981, the cost of removing a software defect or implementing substantial change rises exponentially for each stage of the development cycle when it remains undiscovered. Consequently, the group must start considering the best way to effectively handle inevitable change throughout the projects lifecycle. If the group opted to combat this change by following the traditional waterfall approach and anticipating the complete set of requirements early on then it could quickly be accused of being unresponsive to changing business conditions. Highsmith and Cockburn, 2001 assert that a much better strategy can be espoused from the agile method, in which the group can attempt to reduce the cost of change throughout the project by:

- Producing weekly deliveries in order to achieve an early win and acquire rapid feedback
- Inventing simple solutions, so there is less to change and making those changes is easier
- Testing constantly in an automated manner, for earlier, less expensive, defect detection

Rizwan and Hussein, 2008 assert that the main disadvantages of agile models are poor quality product, poor design and improper documentation. Fortunately, the group can effectively tackle the abovementioned issues in the following manner: disciplined sprint cycles, version control, automated unit testing, test/behaviour driven development, continuous integration, and adequate team structure.

3.2 Sprint Cycle

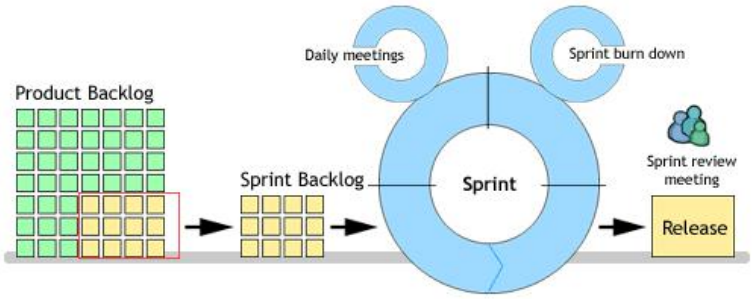

Figure 2 Sprint Cycle

A sprint is *"a regular, repeatable work cycle in scrum methodology during which work is completed and made ready for review"* (Techopedia, 2015). It is a core part of the agile approach and will see the group working to $\tilde{1}$ week sprints over a 10 week period, consequently completing $\tilde{1}0$ sprints throughout the duration of the project. In addition, it will generate a sense of accountability and ownership within the group, as it promotes transparency, frequent review and constructive discussion.

Software requirements identified at the outset of the project will be maintained in a product backlog, where they are prioritised by business value (Cohen, 2010). The group will receive feedback on which items to prioritise after discussions with the target audience who have a vested interest in the product. Prior to commencing a sprint, the group will have a sprint planning meeting. During this meeting, the group will decide which items to add to the sprint, and identify the tasks necessary to complete each item. If possible, the group will estimate how many hours each task will take someone

to complete (Techopedia, 2015). As team engagement and morale is likely to fluctuate from sprint to sprint, it will be important to get verbal approval from everyone about the commitments being made at the time.

The sprint will commence immediately after the planning meeting. Throughout the sprint, the group will have daily meetings (Monday to Friday and excluding public holidays) on the WhatsApp messaging platform or face-to-face if possible. During this meeting, everyone will be asked:

- What did you do yesterday?
- What are you doing today?
- Are there any currently impediments in your way?

At the end of each sprint, the group will have a sprint review meeting. During this meeting, the group will show what they have accomplished during the sprint and demo any newly added features. In addition, the current state of the project is assessed against the goal determined during the sprint planning meeting. Ideally, the team would have completed each product backlog item bought into the sprint, but if they have not then the item will be carried over into the next sprint (Techopedia, 2015).

3.3 Version Control

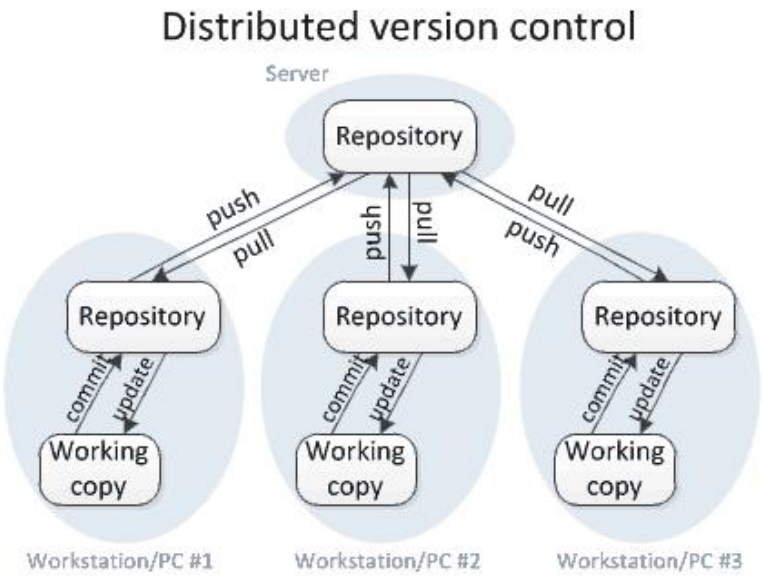

Figure 3 Distributed Version Control

Version control is *"a system that records changes to a file or set of files over time so that you can recall specific versions later"*. Consequently, a version control system will allow the group to revert files to a previous state, compare changes over time, and see who last modified something that might be causing a problem (Git, 2015). The group will be using GitHub, a distributed version control system. As a result, each group member will need to commit their changes to local repository on their computer before pushing them to a server, instead of directly checking them into the server repository (Jean and Brady, 2014). By splitting up the process into two steps, group members can carry out the necessary due diligence to ensure that their code does not break the solution by testing their changes locally.

3.4 Automated Unit Testing

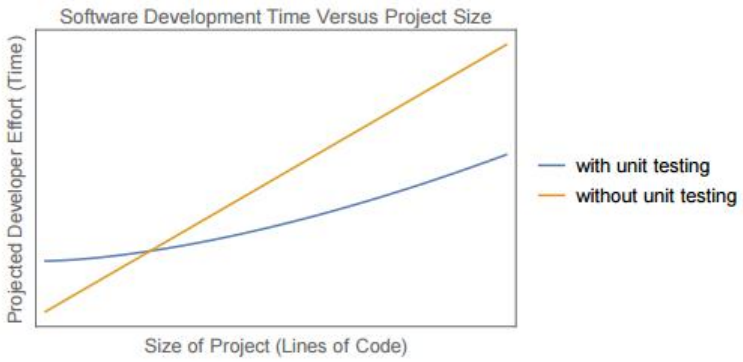

Figure 4 Development Time for a Software Project

According to Sharma, et al (Sharma et al., 2015), a unit test is a function that compares an input-output pair and then returns a Boolean value. A result of True indicates that he code is behaving as intended, but a result of False indicates that it is not, and consequently, that any program relying on that code cannot be trusted to have as intended. To reduce the overall development time, the group will need to create unit tests in order to reduce the number of errors in the application. A well designed unit tests will allow the group to make sweeping changes to the code quickly, as everyone will better understand the design of the code being worked on. This will be helpful when the group starts to document the solution, as it will be easier to define what each part of the application is supposed to do.

3.5 Test/Behaviour Driven Development

```
Feature: Sign up

  Sign up should be quick and friendly.

  Scenario: Successful sign up

    New users should get a confirmation email and be greeted
    personally by the site once signed in.

    Given I have chosen to sign up
    When I sign up with valid details
    Then I should receive a confirmation email
    And I should see a personalized greeting message

  Scenario: Duplicate email

    Where someone tries to create an account for an email address
    that already exists.

    Given I have chosen to sign up
    But I enter an email address that has already registered
    Then I should be told that the email is already registered
    And I should be offered the option to recover my password
```

Figure 5 Behaviour-Driven Development

The group will not write unit tests after all of the software is written. Instead, each unit test will be written beforehand in order to reduce the likelihood of producing bad code – employing a test-driven development (TDD) approach which involves the following steps as suggested by Osherove, 2009:

- Write a failing test to prove code or functionality is missing from the solution. For example, if a group member wanted to add a new feature to the solution that remembers the users age, then

they would need to write a test that verifies that the age is indeed a number. At this point, the test should not pass because the solution currently lacks that functionality.
- Make the test pass by writing code that meets the expectations of the test.
- Refactor the code to ensure that a piece of code is easier to read and maintain, while still passing all of the previously written tests.

Alternatively, the group can also experiment with a behaviour-driven development (BDD) approach, in which the intent of the system is tested. This is different to the TDD approach, as the group will be focused on writing scenarios that prove code or functionality is missing from the solution by writing a failing customer acceptance test that describes the behaviour of the system from the customer's point of view (Osherove, 2009). A scenario must be written in manner that can easily be read or written by any group member. North (North, 2015) affirms that this can done by using a common vocabulary that spans the divide between business and technology. As a result, it become a communication and collaboration tool. Consequently, business stakeholders can be drawn into the software development process, helping the group better understand their requirements (North, 2015).

3.6 Continuous Integration

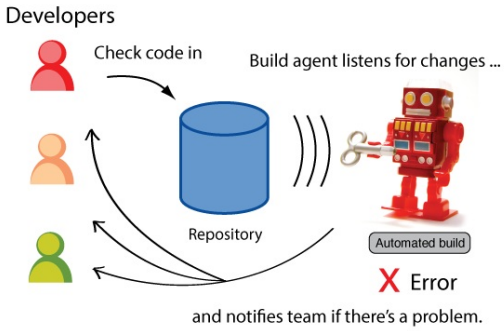

Figure 6 Continuous Integration Process

Continuous integration (CI) is a software development practice in which updates to the solution are immediately tested and reported on when they are added to the main codebase. In using CI, the group will receive rapid feedback so that if a defect is introduced, it can be identified and corrected as soon as possible (North, 2015). The group will be using Travis CI, an open-source continuous integration service to automatically build and test the solution hosted at GitHub. According to Kawalerowicz and Berntson, 2011, if the group implements and maintains relatively good CI processes, they are more likely to create a better solution, as they would have done testing and integration consistently earlier in the process, reducing the chances of catching bugs later. Furthermore it promotes transparency, as each group member will be able to see the results of the build and know where the problems are.

3.7 Team Structure

The group is comprised of "generalising specialists" – individuals who have one or more technical speciality coupled with general knowledge of the business domain, so they can deliver direct value to the project in a numerous ways and easily change roles if required at a later stage. Furthermore, as a changing group structure is detrimental to achieving any set objectives, it is expected that the group

will remain as stable throughout the course of the project (Scott and Lines, 2015).

4 Development Time for a Software Project

This section identifies any risks associated with the project, determines the likelihood of their occurrence and hypothesis their overall impact on the project. Furthermore, an attempt is made to categorise each as either technical or non-technical risk. (Dawson, 2009) asserts that technical risks refer to any risk associated with the software development process, whereas non-technical risks are associated with the project management process.

Table 2 Project Risk Assessment

Risk Item	Risk Management Technique	Risk Impact	Risk Category
Group loses sense of urgency lost during earlier stages. It could be because the project is not clearly understood yet.	Group must meet regularly and report back to one another on task progress to generate a sense of accountability.	$1 \times 5 = 5$	Non-Technical
As the project progresses, scope creep begins to threaten deadlines. The group over-promises but under-delivers.	No new item can be added to the product backlog or current sprint unless it is deemed critical to the projects success.	$2 \times 4 = 8$	Technical
The solution proposed by the group does not meet the end users need as the business model is fundamentally flawed.	Group must thoroughly analyse and gather solution requirements during the early stages of the project.	$2 \times 5 = 10$	Non-Technical
Project files (reports, databases or code) are corrupted or lost, as a result the group needs to recreate the affected files.	Group must use a version control system to track code changes and backup documents on a cloud storage service.	$2 \times 5 = 10$	Technical
Group realises it lacks the technical skills required to develop certain features in the solution, so they are omitted.	Group must give itself enough time at the start of the project to properly understand the development environment.	$1 \times 5 = 5$	Technical
Group regularly moves onto the next sprint without finishing all items picked up in one or more previous sprints.	Group must ensure that they have enough time to complete assigned items per sprint and not over-promise anything.	$1 \times 5 = 5$	Non-Technical
Group does not meet regularly, and due to a lack of communication it is hard to know what everyone is doing.	Group must endeavour to consistently adopt working practices that promote transparency and accountability.	$2 \times 3 = 6$	Non-Technical
Group member accidently overrides another members work because they didnt have the latest version of the code.	Group must use a version control system to track code changes and backup documents on a cloud storage service.	$1 \times 3 = 3$	Technical
Group spends too much time discussing what needs to be done, and consequently has no time to work on solution.	Group leader must have an agenda prepared prior to every meeting and draft a project plan that has everyones support.	$2 \times 4 = 8$	Non-Technical
Group does not make it to the competitions next round.	Make adjustments if necessary and continue development.	$2 \times 0 = 0$	Non-Technical

5 Project Management

6 Technical Considerations

7 Ideas

7.1 Overview

Breadcrumb, the title of group's proposed solution, is an impression management tool that helps individuals and corporates positively manage and optimise their online information. The name comes from the story of Hansel and Gretel, who left a trail of breadcrumbs as they walked through the forest so they could trace their way home. In the same way, the group noted individuals and corporates often leave a digital footprint that makes it easy for others to develop an opinion about their reputation from what they see online. Unlike footprints left in the sand at the beach, an online "breadcrumb trail" often sticks around long after the tide has gone, and can have negative implications for all involved.

7.2 Business Model

Breadcrumb will come in the form of three-tiered structured offering, which will provide clients with a customised level of service at different price points in order to appeal to a wider segment.

7.2.1 Tier 1: Personal

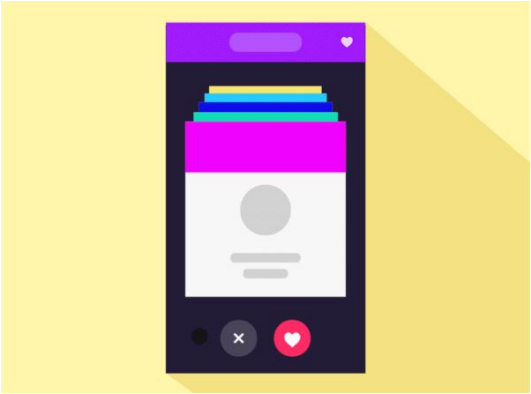

Figure 7 Flipping Card User Interface

The Personal offering is geared towards individuals wanting to monitor and control their online information – for instance, prior to making a job application. In this case, when Breadcrumb is run for the first time, the user will be asked to connect all their social media accounts (i.e. Facebook, Instagram and Twitter) and provide their personal information. Breadcrumb then scans each social media account for content it initially considers to be significantly positive or negative and collates a primary list. Further to this, it trawls the internet to find material that it initially considers to be significantly positive or negative and collates a secondary list. As Breadcrumb is an impression management tool, it is important for it to understand the entirety of someone's online profile, so that it can recommend ways in which the user can improve their digital footprint. Once both lists are collated, they are combined and presented to the user as a "graphical deck of cards". Each card contains information on the content Breadcrumb identified as significantly positive or negative. At this point, the user can swipe through each card and decide whether they personally deem the content to be positive or negative. Consequently, Breadcrumb is trained to understand what the user wants

their online profile to look like, so that in future scans, it will get better at flagging relevant material. Over time, this increases Breadcrumb's value or stickiness, making it rather difficult for users to switch.

As the group expects the Personal offering to be used infrequently, it will employ a freemium pricing strategy for this portion of the service. As this service is new to market, offering a freemium version to individual users can be a quick way to drive trial usage and generate feedback before scaling up because of the low barrier to entry.

In order to convert free users into paying users, Breadcrumb will only display a limited number of results but charge users a small fee in order to unlock the rest. Moreover, Breadcrumb will regularly provide the user with recommendations on how to improve their online profile, which can be unlocked for another small fee. These recommendations will be derived from what Breadcrumb understands about the user and may involve ideas around content production. All of these features will be presented to the user in a gamified manner, often with the promise of "rewards" that motivate the user to keep returning due to their perceived fairness of the transaction. Moreover, such a system will also give the user a sense of control over their continued investment.

7.2.2 Tier 2: Premier

The Premier offering is geared towards individuals wanting to understand and shape public opinion, create compelling narratives and develop initiatives that persuade people to act – for instance, a agent aiming to maximise the market value of their client (in this case, a football player) would want to have them conveyed in the media as a skilful player in order to inspire a bid from a particular football club.

The Premier offering contains the same features as the Personal offering, but also provides users the opportunity to review multiple online profiles at once and derive a sentiment score which measures the emotional tone of the information found, along with current public perception. This allows for a variety of interesting use cases – for example, a spin-doctor coordinating a political campaign in the build-up to a presidential election can compare the sentiment score between two competing candidates in order to better understand how the public is reacting to their clients recent activities.

Further to this, Breadcrumb can provide the spin-doctor or agent with a unique, in-depth impression management strategy that can help improve their clients sentiment score and overall public image. The group envisions that the Premier offering could also be used by corporates seeking to maintain the online reputation of their executives, and by celebrities in order to identify instances of copyright infringement, wherein their work or likeness have been used without prior permission.

As the group expects the Premier offering to be regularly used, it will employ a subscription pricing strategy for this portion of the service. Users have the chance to use Breadcrumb free for 30 days in order to determine whether it is suitable for them, but beyond that they will need to pay a monthly fee.

7.2.3 Tier 3: Enterprise

The Enterprise offering is geared towards small, medium and large corporates wanting to aggregate relevant content, analyse the sentiment of each mention and derive information about the individuals hosting discussions about the brand. Further to this, Breadcrumb will provide corporates with tailored, brand amplification strategies. The group also envisions that the Enterprise offering could also be used by corporates screening job applicants, subsequently providing human resource departments

with insights into whether or not an individual is a fit for the organisation based on their online profile.

As the group expects the Enterprise offering to be regularly used, it will employ a subscription pricing strategy for this portion of the service identical to the Premier offering, as it builds upon that package.

8 Literature Review

The concept of the *"right to be forgotten"* is based on the European ideal of an individual determining the development of their own life in an autonomous manner, without being periodically stigmatised as a consequence of a specific action performed in the past, especially when these events do not have any relationship with the contemporary context (Mantelero, 2013). However, does the *"right to be forgotten"* really have a sound basis? Mayes, 2015 argues that the right to being forgotten is a figment of our imaginations, describing it as an antisocial, nihilist act which could eventually signify the degradation of our power to act in the world. Fleischer, 2015 extends this argument by asking the difficult question: who should be responsible for what should be remembered or forgotten? For example, if Italian courts decide that Italian murderers should be able to delete all references to their online convictions after a period of time, would this Italian standard apply to the entire Web or only be applied to *.it domains? Under the ruling in Article 12 of the Directive 95/46/EC, Europeans who feel that they are being misrepresented by search results that are no longer accurate or irrelevant can ask Google to delink the material. If the request was approved, the information would remain online at the original site, but no longer come up under certain search engine queries (Manjoo, 2015).

It can be argued that certain ideas pertaining to the *"right to be forgotten"* are synonymous with those pertaining to self-presentation and self-disclosure. Goffman, 1959 ideas on self-presentation asserts the ways in which an individual may partake in strategic activities *"to convey an impression others which it is in their best interests to convey"*. Online self-presentation is more malleable and subject to self-censorship, allowing individuals to express or make salient multiple aspects of their identity. Consequently under certain conditions, individuals may wish to express themselves more openly and honestly than in face to face contexts (Ellison, Heino, and Gibbs, 2006) or engage in misrepresentation.

Within the assigned context, the group will need to consider incorporating impression management features in order to create a marketable commercial solution. Impression management can be defined*"as the goal-directed activity of controlling information about a person, object, entity, idea or event"* (Connolly-Ahern and Broadway, 2007). As discussed above, the group considers impression management to be an expansion of the *"right to be forgotten"* concept, as it presents an opportunity for individuals and corporates to correct any misrepresentations of themselves online. Relationships are increasingly initiated and maintained online, providing individuals and corporates with an opportunity to create strategic images of themselves for social purposes (Rosenberg and Egbert, 2011).

Moreover, according to Pak and Paroubek, 2010 it creates opportunities for data extracted from these sources to be used in opinion mining and sentiment analysis. Sentiment analysis can be defined as *"the computational study of opinions, sentiments and emotions expressed in texts"* (Liu, 2010). For example, during an election campaign, political parties may be interested to know if people support their candidate or not by analysing messages written across multiple social media networks in order to extract an aggregated sentiment which can be used to support decision-making. However in this case, complications may arise as the disclosure domain is boundless and consequently all messages will need to be filtered as they can refer to any subject (Ortigosa, Martin, and Carro, 2014).

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