Summary of SUB-PROJECT 1 activities: Experimental development of emerging technologies in the field of deep learning on big data at the level of online social networks and study of their impact at the level of users (AI Media)

- Summary 2018-

Stage 1-1: Exploratory research to identify the needs and expectations of potential users of the AI Media software application that will use deep learning algorithms and convolutive neural networks to identify the logos of brands or companies that appear in images or media clips posted on online social networks, blogs or forums

Activity 1-1-1: Identify potential users and their expectations of the AI Media app

In order to identify potential users of the future AI Media platform and their expectations of its capabilities, we have conducted a quantitative research based on an online questionnaire (https://goo.gl/forms/VE4baWq03A5ggJxs2, sent to representatives of 160 digital agencies http://www.topinteractiveagencies.com whose contact details are presented in the deliverable: **Data base_digital agencies.**

Activity 1-1-2: Market analysis of existing solutions similar to AI Media and a Best Practices Guide for AI Media app

The development of the AI Media app aims to directly address the factors that determine success in social media campaigns that focus on a product/service, that is based on customer needs. Through such campaigns, the product can become one of the best marketing channels to grow the business in social media, i.e. it proposes a modern and creative approach based on measurement and testing. AI Media adds a lot of testing, experimentation and measurement to get something totally different from the way marketing is normally applied. The AI Media app, using Machine Learning algorithms, will use image recognition tools and identify feelings caused by influencers' posts in different blocks of content analyzed. This will take into account a wealth of data related to context, location, content analysis of feelings, which can be made possible by carrying

out quantitative analyses based on qualitative content resources, using predominantly Machine Learning algorithms.

AI Media should consider three types of models:

- Classification - predict the unique class an image should be clustered in. The purpose of an image classification model is to predict the class in which an image most likely falls. The predictive response from this type of model returns the first five classes sorted by probability in descending order. Probabilities in that response go up to 1.
- Multi-label classification - predicts multiple classes in which an image is placed. The goal of a multi-label model is to predict multiple classes in which an image most likely falls. This type of pattern predicts probabilities for multiple classes based on what an image contains. The response to the prediction returns all labels in the model sorted by probability in descending order. In a multi-label model, the response to prediction returns labels and probabilities; but those probabilities don't reach 1.
- Object identification – identifies objects in an image. For each object you identify, it would return the coordinates of an edge box around the object in the image, a class label, and a probability that the object in the binding box would match the class label. Some object detection scenarios include the location of product logos in images An object detection model is different from a multi-label model. A pattern with multiple labels returns the probability that certain objects are contained in an image. Instead, an object detection model identifies the location of specific objects within an image.

The AI Media app could be used to extend a marketer's vision beyond keyword identification, to detect attributes about an image, such as detecting your own logo, as well as competing brands in a customer's photo. This way, we can use these attributes to learn more about the customer`s lifestyles and preferences.

The AI Media app could also be used as a statistical monitoring and analysis system, for example to track whether the targeted brand or products have been placed in accordance with the manufacturer's requirements in social media, out reach and content marketing campaigns.

Deliverable: ***Study 1 AI Media***

Activity 1-1-3: Conducting qualitative and quantitative research among stakeholders involved on their actual expectations and intent to use the AI Media app

In order to identify the needs and expectations of potential users of the AI Media app, we conducted quantitative research on a sample of 100 respondents (managers and employees from online marketing agencies around the world, as well as freelancers with expertise in this field).

The research involved assessing the perceptions of potential users of the future AI Media platform on the capabilities we want to integrate into AI Media, divided into 3 clusters: image analysis in Social Media content, audience analysis, and analysis of the feelings of social media users.

The results suggest that most respondents' perceptions converge on the idea that the functionality of AI Media software is perceived to be more necessary than implied. One possible explanation is as follows: Social Media marketers are looking forward to developing innovative software based on emerging AI technologies that will bring new features that are currently unavailable to the market.

The results of the study were presented and discussed in a focus group organized within the project, attended by members of the project implementation team and representatives of eight online stores in the South-East region.

Deliverable: ***Report concerning the needs and expectations of AI Media users***

Activity 1-1-4: Establishing behavioral models for the different categories of users of the AI Media application to determine the priority functions and modules to be developed for the AI Media application

Social media is an untapped source of Big Data, using modern analytics techniques to establish behavioral patterns for different categories of users of the AI Media app. Interpreting this chaotic flow of information is one capability of artificial intelligence, and in particular of the machine learning algorithms.

Since images become the preferred means of social media communication, understanding user-shared information and applying this knowledge to marketing strategies can lead to a considerable competitive advantage. This analysis has implications both in understanding user behavioural patterns and for better targeting the target audience. Understanding how different keywords are clustered shows

marketing managers that they can create cross-sales campaigns or items that can be included in the product promotion campaign on social media.

Deliverable: ***Study 2 AI Media***

Aactivity 1-1-5: Formulating the functional and non-functional requirements of the AI Media app

To meet FutureWeb project requirements, the AI Media app is designed as a web service. There will be requests from users in a given format and will receive responses following the processing of requests.

The app will offer the following services:

- *Identify logos in pitures and video*

The service will accept as an input parameter an image or a movie, which will later be processed, and will receive in response whether or not a brand/logo of the proposed ones has been identified. Initially, several reputable logos will be proposed, which will then be identified in several images or movies.

The app will be able to add a new logo that will be taken into account later in the analysis. To do this, a new company whose logo will be added to the system will need to provide a set of images (over 100) with a mark in the logo area. The marking of logos in images sent by companies will have to be in the form of rectangles that are identified by the pixel coordinates of the upper left corner and the length (pixel size of the horizontal side) and width (pixel size of the vertical side). These marks can be sent separately to a text file, where the file name, x coordinate, y coordinate, length, width for each image will be passed on each line. In addition to the logo marking, it will be specified what type of physical product the logo has on it. The operation to add a new logo to the system will be done manually by an operator.

- *Geolocation recognition*

Geolocation information will be extracted from the metadata of images or extracted from the context of social media posts.

- *Social context*

To return details on the social context, a fixed number of social states/situations will be defined in the system. The system, by analyzing the incoming images, will attempt to identify one of the initially defined states. If such a status has been identified, it will be returned to the user.

- *Analysis of feelings*

The system will analyze the feelings of people identified in media images or clips that contain the logos defined in the system. A fixed number of sentimental states will be defined for this. After analyzing the images, if people are identified in the images containing their logos, they will be associated with a sentimental state of the defined ones.

- *Social context recognition*

The app will allow analysis of the text in which a brand name appears and will attempt to recognize the context about customer feelings and intentions. The analysis text will come from comments, forums or social networks. To return details on the social context, a fixed number of social states/contexts will be defined in the system.

Deliverable: ***Study 3 AI Media***

Stage 1-5: Widespread dissemination of project results

Activity 1-5-1: Widespread dissemination of project results (through scientific workshops and conferences, marketing offers and articles in publications of wide interest at local and national community level)

- ✓ Action to inform the local scientific and business community about the highly dynamic framework of social media, the need to manage an increasing amount of information about products and brands with implications for user behaviour.
- ✓ Action to inform the student community, as future entrepreneurs, employees, and users of the resulting application within the Future web project.
- ✓ Dissemination at the academic community level on the role of emerging technologies on online social networks.
- ✓ Dissemination of best practice guide content on international use of emerging technologies, useful tools for managing online social networks.
- ✓ Dissemination within conference participants: teachers, researchers, PhD students, business representatives of the results of the market study in order to implement the AI Media application.
- ✓ Business awareness of the benefits of the AI Media app.
- ✓ Information at the local community level through the conclusion of a partnership with the Competition Council – Galati branch.

Deliverable: ***Plan to promote project results***