2ND INTERNATIONAL WORKSHOP ON THE INTERNET FOR FINANCIAL COLLECTIVE AWARENESS & INTELLIGENCE (IFIN 2017)

In conjunction with the 4th International Conference on Internet Science (INSCI 2017)

22 November, Thessaloniki, Greece

REPORT

Organized by the PROFIT Project

(http://projectprofit.eu/)

PROFIT

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Executive Summary

The 2nd International Workshop on the Internet for Financial Collective Awareness & Intelligence (IFIN 2017) was held at Thessaloniki, Greece, in conjunction with the 4th International Conference on Internet Science (INSCI 2017), on Wednesday 22nd November, and lasted from 11:10 to 16:30. It was organized by CAPS Project "PROFIT: Promoting Financial Awareness and Stability", which has received funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under grant agreement no 687895.

The IFIN Workshop aims at initiating a multidisciplinary dialogue on how we can use the Internet in order to promote financial awareness and capability among citizens. This year, IFIN consisted of two parts:

- Presentation of the PROFIT project and platform
- Presentation of related work and discussion with the participants

Under the first part, key ideas from the PROFIT project were presented and discussed. Additionally, the under-development PROFIT platform and its key features were presented to the participants and they were encouraged to use the platform themselves. Afterwards, the participants were encouraged to provide their opinion and suggestions regarding the platform features and services in a discussion, led by the project coordinator.

Under the second part, contributions from the scientific community focused on the particular field, were also presented upon acceptance through an open call for papers and the audience was encouraged to discuss their ideas and views on a "roundtable" style discussion.

The X participants of the workshop came from a highly multidisciplinary background; they consisted of experts and professionals, as well as academics and researchers in the financial sector and economics, computer science and IT, data visualization, social sciences, education, etc. The audience also varied greatly in age, comprising young researchers/professionals in their late 20s, as well as more mature participants.

The particular workshop helped initiating a fruitful and interdisciplinary discussion on various issues, including the use of the Internet and Web 2.0 tools for promoting financial literacy, technology adoption by the wider public, recent technological developments and their applications in financial markets (e.g. cryptocurrencies), the PROFIT financial awareness platform functionalities and services, , etc.

Introduction - Background

IFIN 2017 aimed at presenting the most recent works in the area of financial collective awareness and intelligence based on web resources and social media with an emphasis on user generated content.

The new socio-economic landscape that has prevailed in the post-crisis world involves changes in the financial, labour and pension markets along with changes in the public finance decisions and the political sphere. Nevertheless, impediments such as the documented existence of cognitive limitations by individuals when it comes to the processing of large volumes of information, the documented widespread financial illiteracy even within developed economies - including those of the European Union - , and the great volume of information coming from the Web, identify the need for appropriate methods and tools to extract and process such information, create new knowledge and present it to the users.

Towards this goal, IFIN encourages papers on analysis, retrieval, aggregation and presentation of financial data from the internet and social media (including user generated content), on forecasting models exploiting the market sentiment to identify market trends and threats, on financial literacy assessment and education tools, on financial awareness technological platforms, as well as on personalised services and decision support financial applications (including gamified platforms, personal finance and financial literacy assessment tools).

Accepted papers could be published as extended versions in the series Lecture Notes in Computer Science (LNCS) by Springer. Research topics of interest for this workshop included, but were not limited to:

- Financial web data retrieval, analysis and presentation
- Financial forecasting models based on web data
- Financial literacy assessment & education web tools
- Financial awareness technological platforms

It should be mentioned that the First International Workshop on the Internet for Financial Collective Awareness and Intelligence (IFIN 2016) took place on September 12, 2016, in conjunction with INSCI 2016, at Florence, Italy. Revised papers from the IFIN workshop were published by Springer, together with revised papers from the First International Workshop on Internet and Social Media for Environmental Monitoring (ISEM 2016). The papers of the two workshops, although targeting different goals, aim at developing platforms promoting awareness on different but critical sustainability issues.

As already mentioned, IFIN 2017 was organized by the EU-funded project called PROFIT: Promoting Financial Awareness and Stability, which aims to develop a web platform towards promoting financial awareness and improving the financial capability of citizens and other market participants. The objectives of the platform would be: (a) to raise financial awareness and support better decision making, (b) to create collective financial intelligence, and (c) to empower use participation and interaction. This platform will be designed and pilot-tested with the aid of the members and partners of the European

Federation of Ethical and Alternative Banks (FEBEA), an institution committed to the responsible banking and finance agenda in Europe.

Built on open source components, the under-development PROFIT Platform will incorporate the following functionalities:

- Financial Education, providing specialized & personalized financial educational toolkits available to the wider public.
- Crowdsourcing tools, such as advanced crowdsourcing tools to process financial data, extract & present collective knowledge.
- Recommendation systems, in particular a novel personalized recommendation system catering to particular users' needs & interests.
- Forecasting models, such as advanced forecasting models exploiting the market sentiment to identify market trends & threats.

It should also be mentioned that the PROFIT community consists of:

- The Core Consortium: 6 core members and 6 associated members bringing different expertise across accounting and finance, economics, education, information technology, and computer/software engineering.
- The User Forum Members: 22 relevant PROFIT stakeholders and experts that provide the project with their valuable feedback and advice.
- The Affiliate PROFIT Community: the wider community around the project, formed by related projects, research activities and stakeholders (future users of the PROFIT platform).

You can read more regarding the IFIN workshop and the PROFIT Project on their respective websites: http://ifin-workshop.iti.gr and http://projectprofit.eu.

1st Part: Presentation of the PROFIT Platform

The participants were first welcomed by Dr. Anna Satsiou from CERTH who made a short introduction to the IFIN workshop and the PROFIT project, elaborating on its goals and current achievements. Next, the under-development PROFIT platform was interactively demonstrated to the audience by Katerina Katmada (CERTH). Participants were asked to create an account on the platform and explore its current functionalities. They were also encouraged to comment on the platform's features or any issue they might face. Afterwards, a discussion on the current and envisioned features of the PROFIT platform took place, led by the project coordinator Miroslav Konency (EEA) and Katerina Katmada (CERTH). The participants asked several questions regarding the current and future functionalities and provided valuable feedback and interesting ideas regarding future developments and improvements. Their varied backgrounds (e.g. data visualization – programming, education, design, social sciences, etc.) contributed in discussing the added value and possible services of such a platform in a more holistic approach.

More specifically, the audience commented on the general usability and overall appearance on the platform in a positive way, even though they asked for more feedback to be provided to the users when using specific features, such as the financial educational toolkit. For example, user score on tests could be visible and helpful messages to guide users through the learning material could be available on the platform. Small additions like that could structure the learning process and provide users with a clear path of progression on the platform. Moreover, they suggested giving users positive feedback in a gamified manner and rewarding their actions on the platform (in a quite similar way to what has been envisioned for the PROFIT platform). Participants were also interested in learning more regarding the privacy of a user's data on the platform and the ability to delete them, as well as the educational material: what it will include, if is going to be relevant to each country's legislation and taxation system, etc.

Their valuable feedback was documented in order to be discussed among the PROFIT consortium and consider future improvements to the PROFIT platform.

2nd Part: Presentation of Research Work

Under the second part of the workshop, research work was presented. As regards the presentations, these were highly multidisciplinary and consisted of the following:

- ***Technology Adoption and Social Innovation: Assessing an Online Financial Awareness Platform.*** The purpose of this paper is to present the factors that should be taken into consideration when assessing the level of acceptance of an ICT solution by the general public, as well as the innovating impact that such solution is expected to have at the level of society in the European Union. This involves the integration of social and technical skills and expertise, in order to gather the necessary feedback from the users in a clear and concise way. The final goal is to provide an online service that improves the quality of life and work of its users. In order to do so, such service needs to be capable of performing in a way that is as effortless as possible for the user, who will in turn be motivated to use it repeatedly. Moreover, the content of the online service must be able to address a social need in a way that is more efficient and novel than what has been available until then. Presented by Gian-Luca Gasparini (FEBEA).

- ***On the Educational Curriculum in Finance and Technology.*** Recent technological developments have enabled a wide array of new applications in financial markets, e.g. blockchain, cryptocurrencies, crowdfunding, peer-to-peer lending, robo-advising, big data, cloud computing and artificial intelligence. While traditionally comprising of computer programs and other technology used to support or enable banking and financial services, the new fintech sector is often seen as entailing disruptive potential to the financial industry and markets. At the same time, employers and experts have identified notable skills gaps to the training and experience of graduates and employees who are likely to be employed in fintech occupations. Such exist for both graduates stemming from the social sciences such as finance and business and the computer science background. The authors attempt a first inquiry into the educational curriculum in finance and technology, aiming to inform this modern educational agenda. The particular paper is focused skills shortages, as identified by firms and experts, and examines the state-of-the art by some of the first educational programmes in fintech. Presented by Georgios Panos (University of Glasgow - Adam Smith Business School).

- ***A Novel Lexicon-based Approach in Determining Sentiment in Financial Data Using Learning Automata.*** In this paper, a new lexicon-based approach is presented which is based on supervised learning. The introduced model is able to create a new lexicon based on annotated textual data and then it applies that lexicon to determine the sentiment in new, not-annotated data. The proposed method seems able to work well with financial data while supporting accurate decisions. Presented by Ioannis Pragidis (DUTH).

- ***A hybrid recommendation system based on density-based clustering.*** This work presents a hybrid recommender system that combines collaborative filtering and a content-based approach for Top-N item recommendation. To address the data sparsity problem, density-based and graph-based clustering approaches are applied so as to identify groups of similar entities (users and/or items). The proposed method exploits the formed clusters to identify the most relevant features and uses them to perform item recommendation. Evaluation experiments are

performed using MovieLens datasets and the experimental results indicate improvements in the performance over non-cluster based recommendation approaches. Presented by Theodora Tsikrika (CERTH).

- ***Aalto Observatory on Digital Valuation Systems.*** New technologies, including blockchain and smart ledger technology, are able to support the use of shared and "open" financial accounting, to individuals and institutions alike. The transparency of financial data could lead the public towards greater understanding of the financial systems, thereby empowering them in their financial decision making. Alongside of specialists and decision makers' capabilities, our project most pressingly calls for engaging the public into the process early on. Multidisciplinary competencies and academic collaboration are needed to take relevant action to investigate, imagine, and to foster novel ways for value creation. For this, the authors are forming the Aalto Observatory on Digital Valuation Systems, and in this paper they propose a series of empirical experiments, entailing a search for deeper understandings of functions in monetary systems. Presented by Jenni Huttunen (Aalto University)

Lastly, the roundtable discussion has been led by Georgios Panos, Professor of Finance in the Adam Smith Business School (University of Glasgow). Prof. Panos, a financial and labor economist, initiated the discussion

Annex: Workshop Agenda

IFIN 2017

2nd Int. Workshop on the Internet for Financial Collective Awareness & Intelligence

WEDNESDAY 22TH NOVEMBER

AGENDA

11:10 - 11:30	Presentation of the PROFIT project, goals and achievements so far	Anna Satsiou (CERTH)
11:30 -12:45	Presentation of the current version of the PROFIT platform. Hands-on session with participants who are asked to test it and provide their feedback	Katerina Katmada (CERTH)
12:45 - 13:10	Discussion with participants on the current and envisioned features of the PROFIT platform	Miroslav Konency & Peter Hanenack (EEA)
13:10 - 14:15	*Lunch Break*	

Presentation of Research Work

14:15 - 14:35	Technology Adoption and Social Innovation: Assessing an Online Financial Awareness Platform	Gian-Luca Gasparini (FEBEA)
14:35 - 14:55	On the Educational Curriculum in Finance and Technology	Georgios Panos (University of Glasgow - Adam Smith Business School)
14:55 - 15:15	A Novel Lexicon-based Approach in Determining Sentiment in Financial Data Using Learning Automata	Ioannis-Chrysostomos Pragidis (DUTH)
15:15 - 15:35	A hybrid recommendation system based on density-based clustering	Theodora Tsikrika (CERTH)
15:35 - 15:55	Aalto Observatory on Digital Valuation Systems	Jenni Huttunen (Aalto University)
15:55 - 16:15	Conclusions and Discussion with participants	Georgios Panos (University of Glasgow - Adam Smith Business School)

Room Zefyros - CERTH Premises, Central Management Building

Register for **free** at ifin-workshop.iti.gr

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