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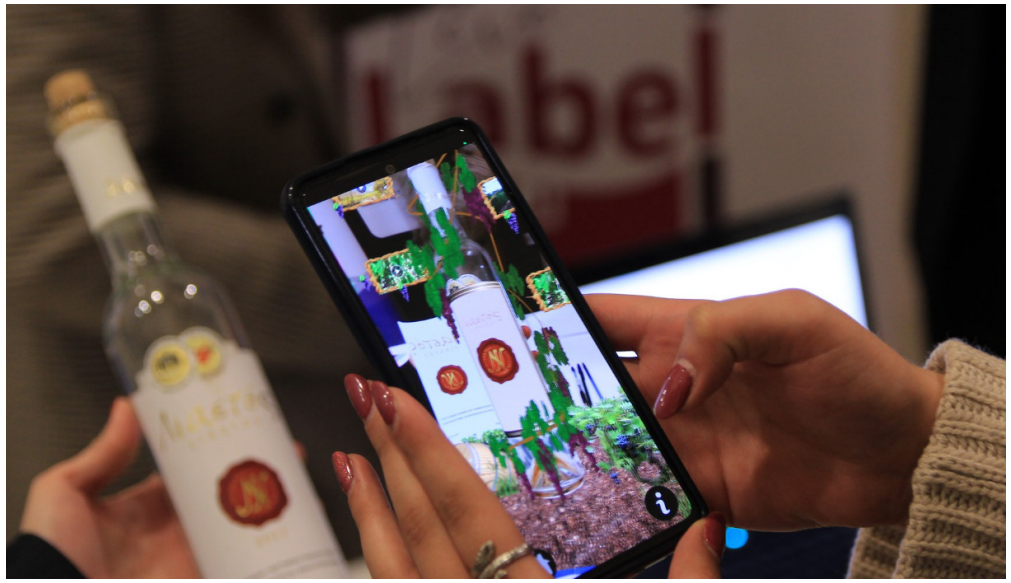
ΕΡΓΑΣΤΗΡΙΟ ΨΗΦΙΑΚΩΝ ΜΕΣΩΝ & ΣΤΡΑΤΗΓΙΚΗΣ ΕΠΙΚΟΙΝΩΝΙΑΣ
ΤΜΗΜΑ ΕΠΙΚΟΙΝΩΝΙΑΣ & ΨΗΦΙΑΚΩΝ ΜΕΣΩΝ ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ

Dept. Communication & Digital Media
UNIVERSITY OF WESTERN MACEDONIA

Wine Live Label: A Consumer-Oriented Augmented Reality Design for Wine Labeling



Georgios Lappas, Alexandros Kleftodimos, Michalis Vrigkas, Amalia Triantafillidou

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Presenter:

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IARIA

The Seventeenth International Conference on Digital Society
ICDS 2023
April 24, 2023 to April 28, 2023 - Venice, Italy

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Prof. Georgios Lappas is a Professor of Information Technology with emphases on Social Informatics and Political Informatics. He is the Director of the Digital Media and Strategic Communication Lab. He is member of board of the Research and Innovation Council of the Region of Western Macedonia. Authored more than 100 published papers in International Referred Journals, International Referred Conference Proceedings and Book Chapters. Served as Head of Department, Vice-Director of the MSc Programs "Public Discourse and Digital Media" and "Digital Games and Multimedia Development". He served as Program Committee member in more than 130 international conferences and member of editorial board in journals such as J of Information Technology and Politics, IJ of Entertainment Technology and Management, J of E-Government. He was the co-chair of 4 international conferences, member of organizing committee in 7 international conferences, publicity chair in 3 international conferences and session chair in more than 20 international conferences.

He participated in many national and EU funded projects. Currently is the coordinator of the project "Wine Live Label Innovative Augmented Reality Applications in Wine Product Labeling", implemented under the framework of the National and EU co-fund Range Action "Research-Create-Innovate" of the "Competitiveness, Entrepreneurship and Innovation" program. Currently he also coordinates the WP5 "Mixed Reality and Serious Games and Interactive Treasure Hunt to Promote Mountain Trails in Western Macedonia" action of the project "New technologies and innovative approaches in relation to Agri-nutrition and Tourism to enhance regional excellence in Western Macedonia (AGRO- TOUR)" of the action "SUPPORT OF REGIONAL EXCELLENCE" of the national and EU co fund program "Competitiveness, Entrepreneurship and Innovation"

His main research interests are in Social Informatics, E-Government, E-Democracy, Online Politics, Human-Computer Interaction, Digital Marketing, Online Reputation Management, Web Mining, Opinion Mining, Artificial Intelligence, Web Intelligence, Social Network Analysis.

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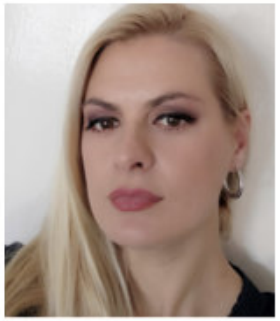

Amalia Triantafillidou

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Current projects of the Digital Media and Strategic Communication Lab:

- "Wine Live Label Innovative Augmented Reality Applications in Wine Product Labeling", implemented under the framework of the National and EU co-fund Range Action "Research-Create-Innovate" of the "Competitiveness, Entrepreneurship and Innovation" program.

- "Mixed Reality and Serious Games and Interactive Treasure Hunt to Promote Mountain Trails in Western Macedonia" action of the project "New technologies and innovative approaches in relation to Agri-nutrition and Tourism to enhance regional excellence in Western Macedonia (AGRO- TOUR)" of the action "SUPPORT OF REGIONAL EXCELLENCE" of the national and EU co fund program "Competitiveness, Entrepreneurship and Innovation"

Submitted Projects under evaluation:

- HORIZON-CL2-2023-DEMOCRACY-01-04: The Emotional Politics of Democracies
- ERASMUS-EDU-2023-PI-FORWARD: Partnerships for Innovation - Forward-Looking Projects - Digital education

Research Focus of the Lab:

Augmented Reality and Virtual Reality (Metaverse), Digital Media and Campaigns, Digital Marketing, Big Data and Web Intelligence, E-Government, E-Democracy, Information Technology and Politics, Digital Media and Journalism, Digital Media and Education, Digital Media and Culture, Social informatics, Crisis and Disaster Communication, Digital Transformation / Smart Cities, Online Reputation Management, Market Research and Polls

Overview

- Problem definition
- AR in Wine labelling
- AR Design for WineLiveLabel
- User Experience and Evaluation of WineLiveLabel
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Introduction

Problem Statement

- AR technology used in the marketing sector of the wine industry
- Creating innovative consumer-oriented experience with augmented “live” wine labels
- Interaction with AR may be used to provide new experiences and affect communication outcomes

Motivation

- Use of AR technology to promote winemaking companies to influence consumer preferences
- Examine the impact of AR applications embedded in wine labels on consumers’ experience and their subsequent perceptions and intentions

Solution

- Consumer-oriented approach used to evaluate the wine-label AR application by examining its impact on consumer experience dimensions
- Increase of users' satisfaction with the application help them form positive attitudes and purchase intentions
- AR technologies may provide new business models in the marketing sector of food and beverages to enhance user experience, develop positive attitude of costumers to the products and increase purchase intentions towards the products

The importance of AR

Investments in AR technology made by technology giants such as Google, Microsoft, and Facebook

- Google Glasses, Microsoft HoloLens and Oculus,
- Software platforms such as ARToolKit [1] and ARcore [2]

Use AR/QR code labels as digital watermarks to detect counterfeit products and secure the production line

- Reduced lost revenue from smuggling
- Improved product value by protecting the company's trademarks and copyrights
- Improved customer confidence in the business

[1] ARToolKit, https://github.com/artoolkit
[2] ARCore, https://arvr.google.com/arcore

The characteristics of AR applications

- Combines the real and the virtual
- It is interactive and real-time
- The information provided is three-dimensional

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The impact of AR in the wine market

With the introduction of AR in the wine market [1]:

- The line between e-commerce and traditional commerce becomes thinner than ever
- Winemakers report increased profits and sales
- Consumers can get access to the information they need, in the way they want

Reasons to invest in AR technology-based applications

- Increase the competition between wine companies (innovation and novelty)
- A wine company can spread its product to all corners of the globe through advertising
- Develop a closer relationship with the potential customers of a wine business
- AR provides additional product information

[1] L. Penco, F. Serravalle, G. Profumo, and M. Viassone, Mobile augmented reality as an internationalization tool in the 'Made In Italy' food and beverage industry, Journal of Management and Governance (2020)

AR in Wine Products

- The wine industry uses AR technology to target a larger portion of potential customers and make wine labels more enticing
  - Consumers want to learn more about the label they want to buy

- Wine companies allow customers to point their smartphone at the wine bottle and then an AR application provides detailed information about the quality of the brand

Source: J. O. Álvarez Márquez and J. Ziegler, Improving the shopping experience with an augmented reality enhanced shelf," in Proc. Mensch und Computer - Workshopband, Regensburg, Germany (2017)

LivingWineLabels www.livingwinelabels.com
The Family Coppola https://www.thefamilycoppola.com/en/store
Treasury Wine Estates https://www.tweglobal.com

AR in Wine Products

Winerytale: A platform that allows to create and manage an AR experience for a wine-label

Australian wine brand 19 Crimes: An AR experience about the history of Australia's founding as an English criminal colony

emBRAZEN winery brand: An AR experience to the customer by celebrating the women of the past

Winerytale, Augmented reality wine labels for every winery, https://winerytale.com

Cheers to the infamous - 19 Crimes. https://www.19crimes.com

EMBRAZEN Wine https://www.embrazen.com

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What can a virtual wine-label contain?

- Videos that record the procedures followed by the winery company for the production of wine (e.g., harvesting, crushing and pressure, fermentation, maturation, and bottling, distribution)
- Digital narratives such as stories about wine products in video or animation format
- Information in text form (such as wine ingredients, calories, storage temperature)
- Short 2D/3D animation clips depicting a live character animation onto the bottle-labels and mainly aim to impress the consumer

Information about a story in wine products

- The location and the place of production of the wine product
- Myths and traditions associated with the area of production
- The producer himself and his family tradition
- The production process: grape collection, distillation, storage, production techniques, facilities, quality assurance, and certification procedures
- Consumer testimonials

[11] P. Mora and F. Livat, Does storytelling add value? The case of Bordeaux fine wines. In the customer is NOT always right? Marketing Orientations in a Dynamic Business World 187-191, Spring

Characteristics of a memorable story

- What stories are behind the brand name, labels, logos, and varieties of wine?
- What values and characteristics make the brand stand out from the competition and what do they have in common?
- What makes the wine region unique? What are the stories of the area?
- What do others say about the brand name?

[12] C. Bonarou, P. Tsartas, and E. Sarantakou, E-Storytelling and Wine Tourism Branding: Insights from the "Wine Roads of Northern Greece", in Proc. Wine Tourism Destination Management and Marketing, 77-98 (

The Algorithm of the WineLiveLabel App

Input: Image scanned by a mobile device.

Step 1 Input image: The real-world digital content is captures using input devices, such as a smartphone camera.

Step 2 Image processing: The original received image is aligned and colour and brightness processing is performed using image processing algorithms.

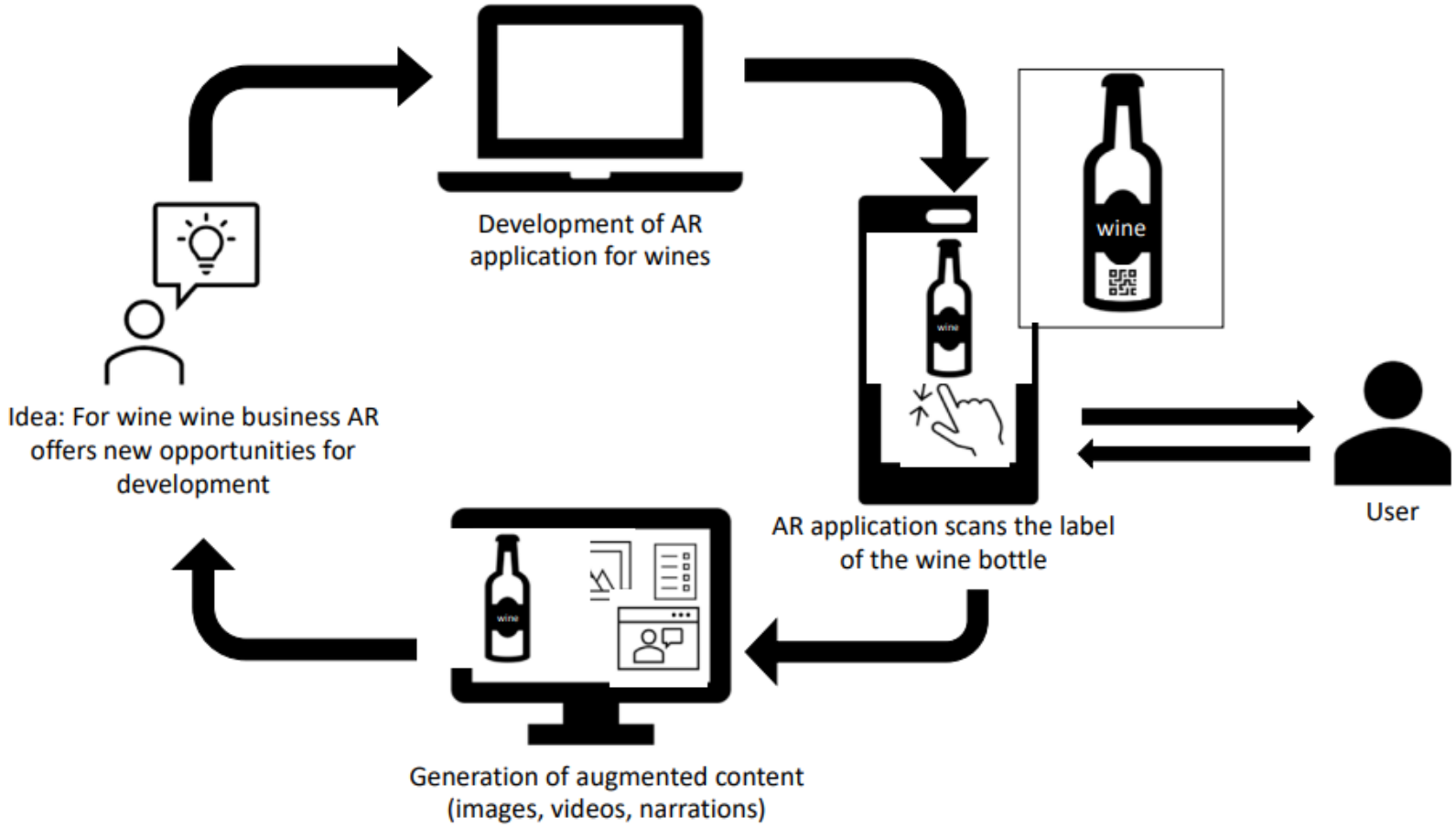
Step 3 Computer vision: Image analysis algorithms are performed to identify the patterns of the AR code image or the bottle label and recognise the brand and type of wine.

Step 4 Create AR content: Create or retrieve the user-targeted digital synthetic content based on the recognised input image.

Step 5 Performance phase: This step contains the combination of synthetic content mixed with the real-world image which is then presented to the user through the AR application.

Output: An integrated AR application.

The Workflow of the WineLiveLabel App



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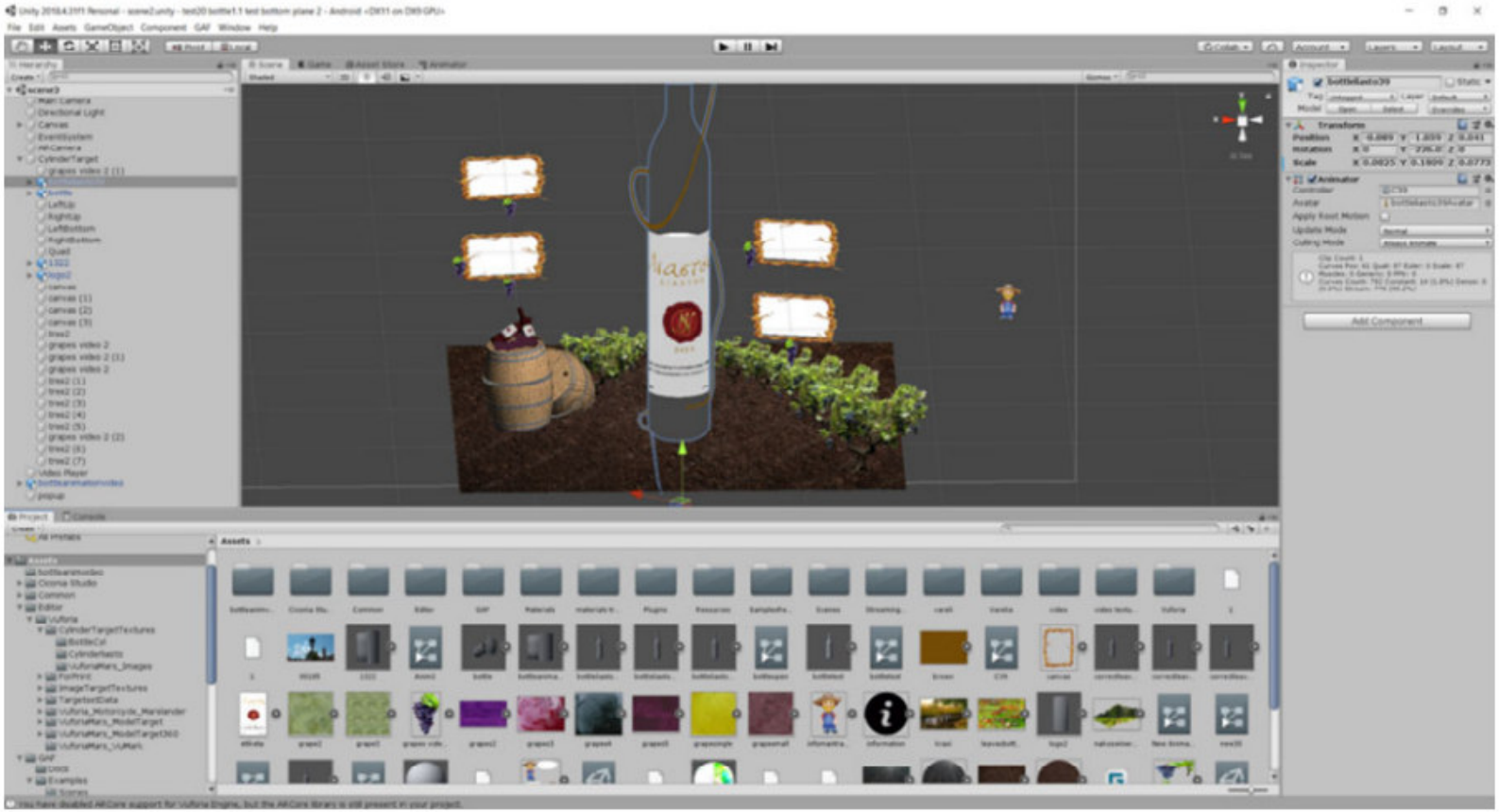
The WineLiveLabel App



Example of the development of the wine ‘live’ label using Unity and Vuforia Engine

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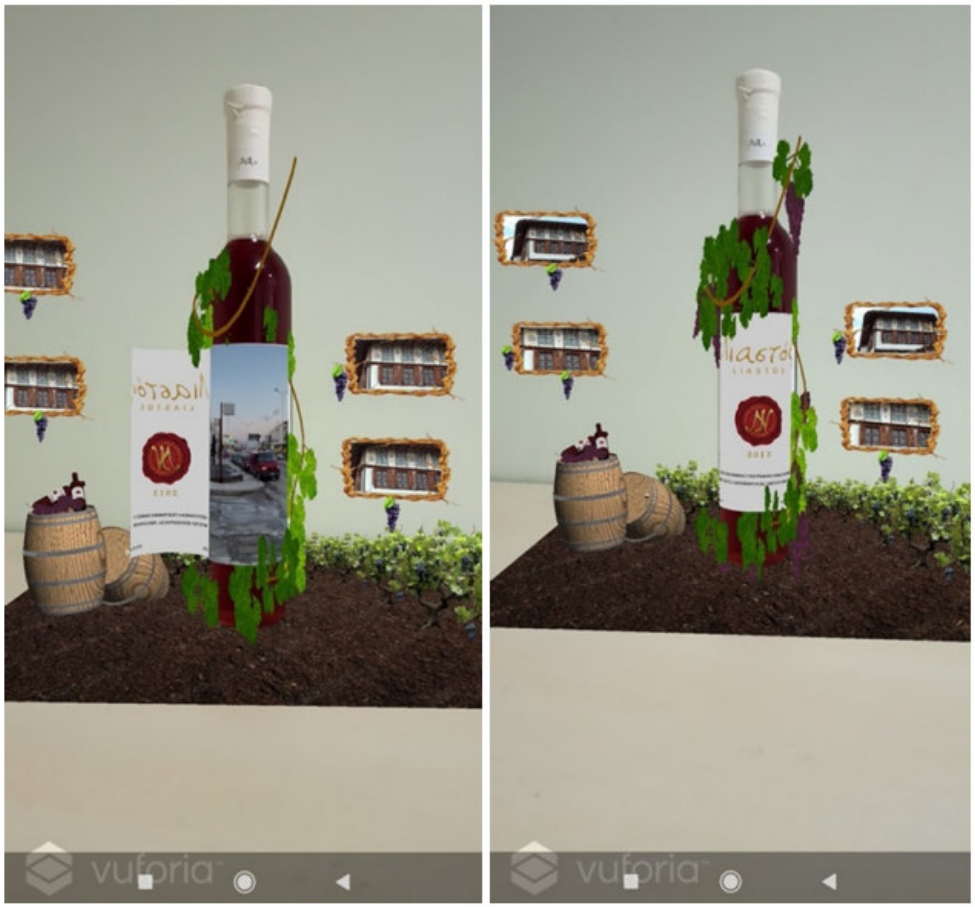

(a) (b)

Different instances of the wine 'live' label application:

(a) The device camera focuses on the bottle label and the "virtual door" opens revealing a hidden video content.

(b) The "virtual door" closes and the 2D animation of the vine branches progressively appears.

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User Experience Evaluation

To evaluate the AR application and test the study's objectives, a survey was conducted with a self-administered questionnaire through a convenience sampling approach

- Questionnaires were delivered during the Hotelia exhibition (https://www.hotelia-expo.gr/) in Thessaloniki, Greece (November 18-20, 2022) that was directed to professionals in the field of hotel equipment, as well as catering and coffee services.
- Seven university students approached attendees of the exhibition and asked them to participate in the survey.
- Participants that agreed to take part in the survey, were first shown the application by scanning the label of the wine bottle. After they completed the questionnaire.
- 325 questionnaires were completed, whereas 306 were used in subsequent analysis due to incomplete data.
- Scales developed regarding user experience and user attitude for the wine. All scales exhibited satisfactory internal reliability (Cronbach's alpha exhibited the 0.70 threshold).

User Experience Evaluation

Sample Characteristics

Gender	Percent	Age	Percent
Males	52.3%	18-25	28.1%
Females	46.1%	26-35	27.1%
Other	1.6%	36-45	15.4%
		46-55	19.3%
		56-65	8.8%
		66 +	1.3%
Education		**Monthly Income**	
Primary Education	0.3%	Up to 800 euros	27.2%
Secondary Education	18.5%	801-1500 euros	45.2%
Bachelor	52.8%	1501-2000 euros	12.0%
Master	27.1%	More than 2001 euros	15.3%
Ph D	1.3%		

Sample Demographics

User Experience Evaluation

Sample Characteristics

- Respondents' wine consumption, 26.5% were characterized by low consumption levels (up to 1 time per month), 42.2% by medium consumption (2 to 3 times a month), and 31.4% by high consumption levels. Moreover, 27.1% of the re-spondents were low wine product spenders (up to 20 euro), 59.8% were moderate spenders (21 to 40 euros), and 13.1% were characterized as high spenders (more than 41 euros).
- 75.8% of respondents evaluated themselves as high in familiarity with using applications on their smartphones, and 59.5% of the sample had more than one ap-plication on their smartphones. Moreover, 57.7% of respondents indicated that they do not search frequently via their smartphones for information about wine, 22.6% of them search in a moderate frequency, and 19.6% of the sample search extensively through their smartphone for wine related information

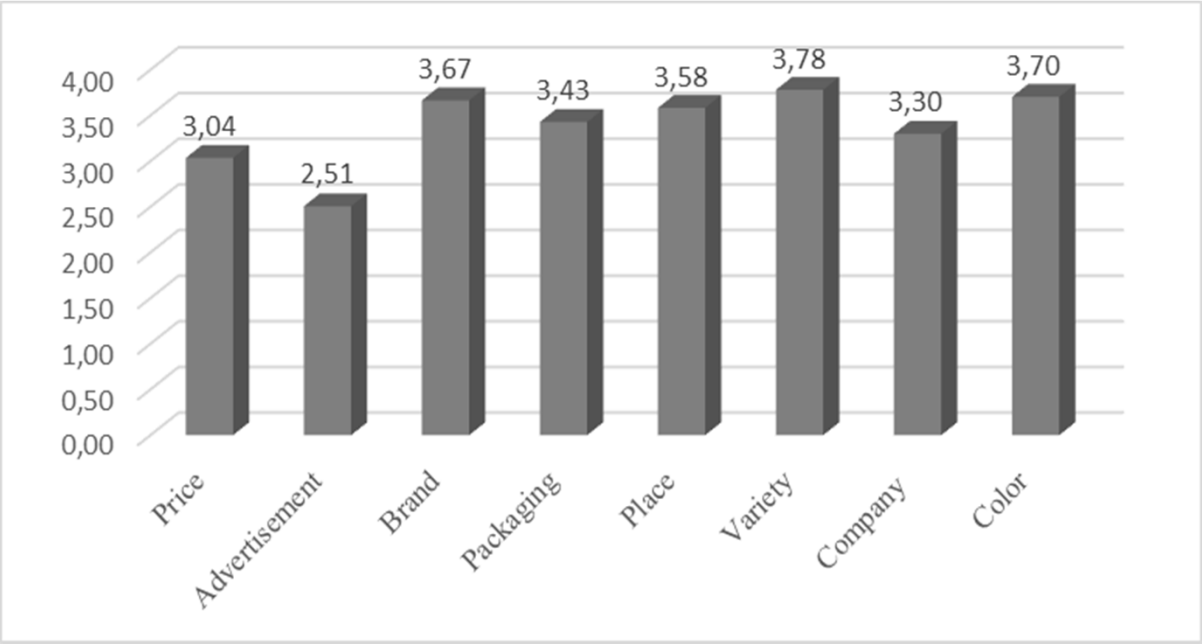
User Experience Evaluation

Sample Characteristics

- 75.8% of respondents evaluated themselves as high in familiarity with using applications on their smartphones, and 59.5% of the sample had more than one application on their smartphones.
- 57.7% of respondents indicated that they do not search frequently via their smartphones for information about wine, 22.6% of them search in a moderate frequency, and 19.6% of the sample search extensively through their smartphone for wine related information.
- Respondents' expertise in wine, the majority of them were characterized by low (68.6%) and moderate experience (24.5%).

User Experience Evaluation

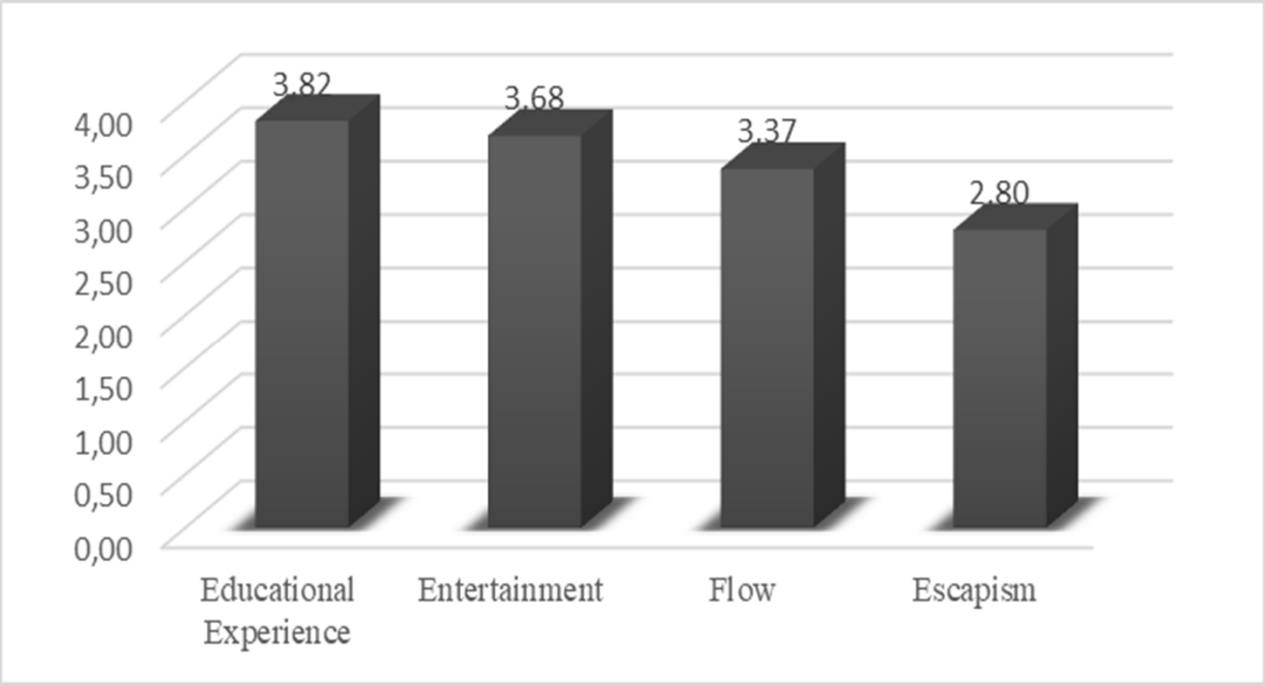
Factors affecting wine choice



Respondents rated as the most important factors when choosing wine: the grape variety (M=3.78), the color of the wine (M=3.70), and the brand name (M=3.67).

User Experience Evaluation

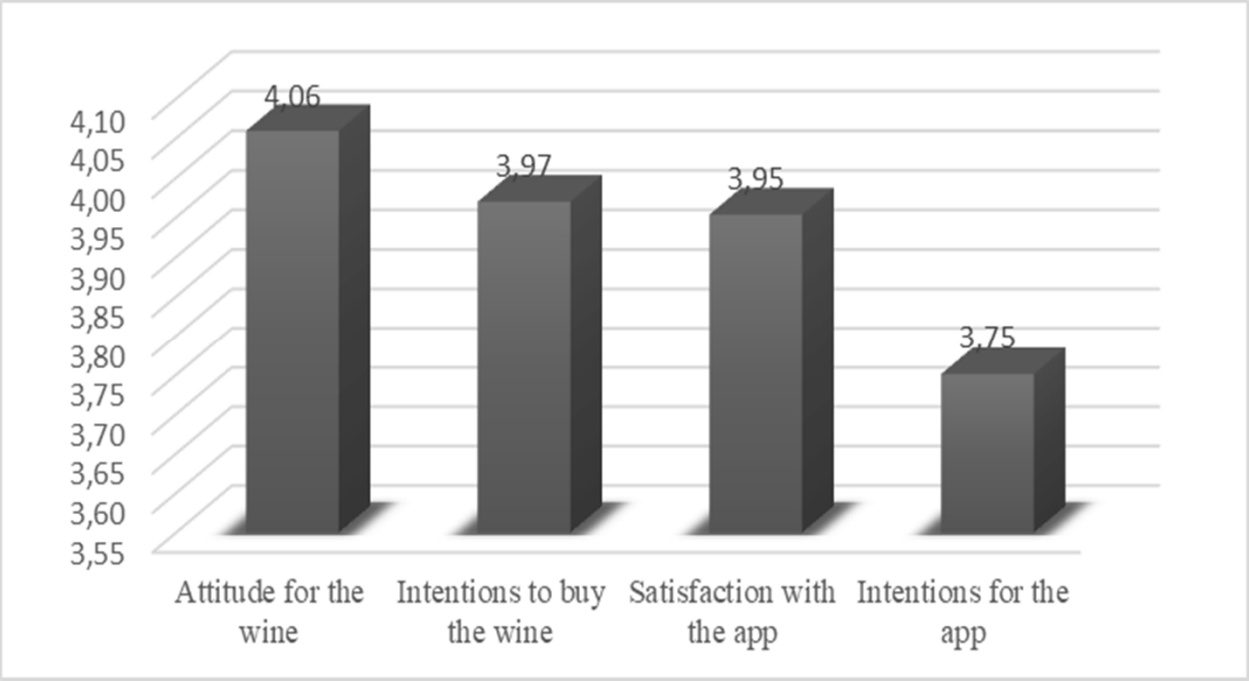
User Experience with WineLiveLabel Application



Evaluating the user experience dimension concerning the AR wine label application, respondents rated the AR experience as highly educational (M=3.82) and entertaining experience (M=3.68). Flow was experienced in a moderate level by participants (M=3.37) while escapism was experienced to a lesser extent (M=2.80)

User Experience Evaluation

User satisfaction, attitude, and intentions



Participants showed a positive attitude for the wine (M=4.06) and high intentions to buy the wine (M=3.97). Moreover, they were highly satisfied with the application (M=3.95) and exhibited moderate to high intentions to re-use the application (M=3.75).

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User Experience Evaluation Revealed

- AR wine live label application induced the entertainment and educational dimensions of consumer experience, while feelings of flow and escapism were triggered by the AR application to a lesser extent to respondents => Positive feelings and new knowledge can be generated through wine AR label applications
- Increase of respondents' satisfaction with the application and in turn help them form positive attitudes and purchase intentions for the wine
- AR may provide new business models in the marketing sector of food and beverages to enhance user experience, develop positive attitude of costumers to the products and increase purchase intentions towards the products.

Conclusions

AR wine labels offer a new level of opportunity for the wineries to showcase creativity in marketing strategies

AR-enriched wine-label can be considered as a game of change

AR technology may deliver success to a wine product

Acknowledgments

- This work has been co-funded by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH-CREATE-INNOVATE (project code: T2EDK-03856)

- All statements of fact, opinion or conclusions contained herein are those of the authors and should not be construed as representing the official views or policies of the sponsors