
RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0



CS240 - BACHELOR OF INFORMATION TECHNOLOGY [HONS.]
CS248 - BACHELOR OF SCIENCES [HONS.]
MANAGEMENT IN MATHEMATICS
CS251 - BACHELOR OF COMPUTER SCIENCE [HONS]
NETCENTRIC COMPUTING
CS255 - BACHELOR OF COMPUTER SCIENCE [HONS]
DATA COMMUNICATION & NETWORKING

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Universiti Teknologi MARA Perlis Branch

**Research Exhibition in Mathematics and Computer Sciences
(REMACS 5.0)**

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)

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Preface

It is with great pleasure that we present this extended abstract book, titled "The 5th Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)". This book is a collection of research work in the fields of Computer Science and Mathematics, contributed by the final year students from Universiti Teknologi MARA, Perlis Branch. The aim of this book is to showcase the diversity and depth of research in these two interrelated fields.

Mathematics and Computer Science are two fields that have seen tremendous growth and advancement in recent years. With the rise of new technologies and the increasing demand for data-driven solutions, researchers in these fields have been working hard to develop new theories, algorithms, and models that can help solve some of the most pressing problems of our time. This book is a testament to their hard work and dedication.

The abstracts in this book cover a wide range of topics, including algebra, analysis, logic, computer architecture, algorithms, artificial intelligence, machine learning, computer network, netcentric computing and many more. The work presented here is both theoretical and practical, and has the potential to impact many areas of society, from finance and healthcare to education and security.

We hope that this book will serve as a valuable resource for future students in the fields of Mathematics and Computer Science. We also hope that it will inspire more students to pursue innovative and groundbreaking research in these two fields. Finally, we would like to express our gratitude to all the contributors for their hard work and dedication, without which this book would not have been possible.



RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

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EVENT SCHEDULE

8:00 – 8:30 am

- Registration

8:00 am – 12:00 pm

- FYP Project Presentation

12:00 - 2:00pm

- Lunch Break

2:15 – 2:35 pm

- National & Wawasan Setia Anthems
- Doa Recitation

2:35 – 2:45 pm

- Welcoming Address by Director of REMACS 5.0

2:45 – 2:55 pm

- Officiating & Closing Remarks from Rector of UiTM Perlis

2:55 – 3:00 pm

- REMACS 5.0 Montage

3:00 – 4:00 pm

- Awarding of Winners:
 - Best Poster
 - Best Project Award

- Photo Session

- End of Ceremony

Dress Code: Formal / Corporate

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EXTENDED ABSTRACTS

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
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WEB-BASED CARBON FOOTPRINT CALCULATOR FOR BAKERY FOOD WASTE

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Abstract

Carbon footprint for food is greenhouse gas emissions produced by growing, farming, processing, transporting, storing, cooking, and disposing of food. Carbon emission is carbon gas that released every time food is produced. The term “food waste” is food that completes the food supply chain until the final product and suitable for human consumption but discarded regardless of whether it is rotten or expired. Wasting food means that greenhouse gas emissions that been released during food production are being wasted. Bakery is the biggest contributor in the food industry that contributes to food waste. Therefore, this project developed BakerCFC (Carbon Footprint Calculator) for bakery food waste. BakerCFC allows bakeries to effectively monitor carbon waste. User interface design for BakerCFC using persuasive technology which are reduction, suggestion, conditioning, self-monitoring, and surveillance. The methodology used in developing BakerCFC is Waterfall Model that consists of five phases which are analysis, design, development, testing, and documentation. Development of BakerCFC was using Bootstrap. The evaluation consists of functionality and usability testing of BakerCFC involving bakery owners and expert users. Usability evaluation was conducted to bakery owners for them to evaluate carbon footprint and motivate behavior change for three weeks. Two phases of usability testing were conducted that involved pre-evaluation and post-evaluation. Web-based carbon footprint calculators with persuasive technology aims to change behavior of bakery owners in reducing food waste. BakerCFC helped in changing behavior as well as motivating bakeries to reduce food waste.

Keywords: *Carbon Footprint, Carbon Emission, Food Waste, Bakery, Persuasive Technology, Waterfall Model*

1. Introduction

Wasting food means that greenhouse gas emissions that are released during food production are being wasted, increasing the risk of climate change. The objectives of this project are to develop a web-based carbon footprint calculator for bakery food waste and to evaluate the effectiveness of a web-based carbon footprint calculator for bakery food waste using usability and functionality testing. The project’s scope is mainly to calculate the total carbon footprint of food waste and focuses on the bakery sector. This study conducted in three different bakeries for three weeks to monitor their carbon footprint of food waste and motivate behaviour change.

2. Methodology

This project applies waterfall model, which includes five phases consisting of analysis, design, development, testing, and documentation. BakerCFC was developed with Bootstrap and MySQL for database connectivity. For user interface design, BakerCFC uses persuasive technology, which includes reduction, suggestion, conditioning, self-monitoring, and surveillance. The evaluation of BakerCFC involved expert users, functionality, and usability testing. For usability testing, three users, which are bakeries, used BakerCFC for three weeks. The usability testing included pre-evaluation, which occurred in week one, and post-evaluation, which occurred on week three.

3. Results and Discussion

The evaluation of BakerCFC was conducted using expert review, functionality and usability testing. Expert Review conducted by two expert user using cognitive walkthrough. The suggestion given by expert user is to add input text for weight in calculator page to make it identifiable. Functionality testing is to examines all functions. For functionality, respondent successfully receives desired output. Next, usability testing where it used to evaluate how persuasive technology; conditioning, reduction, suggestion, self-monitoring, and surveillance, can change the bakery's behavior. For usability, it conducted to three bakeries owner on three weeks. During the first week, bakeries were evaluated on their knowledge of carbon emissions, carbon footprints, and the importance of reducing carbon footprint. After third week of use BakerCFC, bakeries completed a post-evaluation that includes information about bakery, understanding of the unit measurement, satisfaction of user interface, and other persuasive technology elements. For conditioning, user feel motivated when they see ranking, they get. Next, reduction, calculate carbon footprint process can be done easily. Moreover, suggestion, which suggestion given by BakerCFC easily to understand. For self-monitoring, BakerCFC allows users to view the amount of carbon footprint from previous days and weeks. Lastly, surveillance, update on bakeries details is needed.

4. Novelty of Research / Product

BakerCFC are significant to the bakery owners, which it is reducing operating costs and increasing profits. By measuring food weight, bakeries can determine the amount of carbon footprint generated by non-preferred foods. Bakery owners make behavior changes by reducing the amount of unsold and perishable foods and increasing the production of high-demand, durable food. In this way, the bakery sector can increase the profit margin. This web-based also significant in increased awareness of preserving the environment. The carbon footprint calculator for food waste opens opportunities to advocate for the long-term protection and conservation of the environment, thereby improving the lives of all living things, including humans. By analyzing the carbon dioxide emissions of waste, bakeries owner can develop strategies to ensure the earth's sustainability. Calculating carbon emissions is the first step in reducing carbon emission risks such as climate change.

5. Conclusion

In summary, BakerCFC could help bakeries in reducing food waste. Web-based carbon footprint calculators with persuasive technology aims to change behavior of bakery owners in reducing food waste. BakerCFC helped in changing behavior as well as motivating bakeries to reduce food waste.

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