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Cawangan Melaka

V-MIIEX

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VIRTUAL–MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION

ROAD TO COMMERCIALISATION

V-MIIEX BOOK

V - MIIEX BOOK
'ROAD TO COMMERCIALISATION'

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FOREWORD

ASSOC. PROF TS. DR MOHD RASDI ZAINI
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Welcome to Virtual-Melaka International Intellectual Exposition 2022 (V-MIIEX 2022). It is an honour for me on behalf of UiTM Melaka Branch to thank all of you for joining the programme and we are proud to inform you that this is the 12th year consecutively, UiTM Melaka Branch is organizing this exposition.

V-MIIEX 2022 is a platform to improve the commercialization collaboration among industries and communities and at the same time, we also give the opportunity to academicians and students to share ideas and increase their potential innovation products with the industries and communities through their projects. This exposition also serves as a platform to cultivate and upload the nation's innovation culture by presenting new ideas and research by young people, especially from academia, universities, college, high schools, and primary school students.

The economy and development of the country faced a challenging phase in 2021 due to the Covid-19 pandemic. We faced changes in business, education, society, and lifestyle. However, the pandemic proved to be a blessing in disguise as it somehow gave people ideas which would be beneficial to improve their lifestyle and solve problems that might occur in the future. Besides, the new digital landscape also inspires more innovation and new ideas that contribute to various activities such as business and industries. As a university that encourages the "Research, Innovation and Commercialization", this exhibition is organized to encourage more commercialization of products that are beneficial to scholars, industries, and communities to tackle such issues to improve our present and future life.

Since 2009, UiTM Melaka Branch has successfully become the organizer for this innovation exposition. We are not only successful in organizing the exposition, but I would proudly say that we have also successfully embarked on commercialized products. With the number of participants for this year's exhibition, we believe that more commercialized products will be produced in line with the theme for this year, "Road to Commercialisation".

This exposition would never happen without dedication, teamwork, and commitment. A round of applause should be given to the committee teams as the backbone of this exposition. Their hard work, effort, and time made this exposition possible.

Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition, we hope that this collaboration never ends here.

Thank you.

FOREWORD

DR. NUR HAYATI BINTI ABD RAHMAN
Deputy Rector Research & Industrial Linkages
Universiti Teknologi MARA (UiTM) Cawangan Melaka

It is a great pleasure to welcome all the participants and presenters to the Virtual Melaka International Intellectual Exposition (VMIIEX 22). I am delighted that through this periodic event, we managed to bring together scholars and professionals from various fields to engage through this virtual platform where ideas and breakthrough are discovered and leveraged for commercialization potential.

Since 2009 UiTM Cawangan Melaka has held twelve Invention and Innovation Design competitions and this year we are very honoured to have the second year of VMIIEX organized in digital platform. This has proven that despite the global challenges due to the recent pandemic, it is never an issue for UiTM Melaka to continuously organize this yearly prestigious event and to support the ministry's aspiration in leveraging creativity and innovation in the new norm.

VMIIEX 22 is organized with no sole objectives of accomplishing the University's KPI but instead we are determined to make this programme as the place to help heighten commercialization collaboration in research and innovation with the industry and community through joint exhibitions from various external organizations.

Our aspiration is to also provide exposure and opportunities to academic staff as well as students from public and private universities to engage in direct excellent scholarly activities with the industry and community through activities that can be measured and assessed. As for the Research and Industrial Linkages Office of UiTM Melaka, this exhibition is seen as the platform that can encourage active collaboration and knowledge transfer with industries; objectively to support various activities that will benefit all stakeholders from the various government agencies, local and international universities, industries and communities.

Through the theme of "Road to Commercialization" this year, V-MIIEX 22 is committed to have this event as a boulevard to inspire and cultivate creativity and innovation to the numerous levels of inventors through exposure on latest technologies, astonishing ideas and creative designs with great potential to be commercialized. For this year, we proudly introduce a special category which is the "Endemic Challenge" as the provision to the government of Malaysia's goal of moving towards the endemic.

To ensure that the competing products in this exhibition is not exclusively for the purpose of competition, V-MIIEX 22 is dedicated for the commercialization of highly potential innovation products, which is attained through its active collaboration with tailored needs industries. The commercialization effort was not for income generation purpose only but it aimed to spearhead the development of quality products in line with industrial needs and community benefit.

Therefore, it is a great honour for me on behalf of the Research and Industrial Linkages Office as well as the organizing committee to have all participants in this competition and I would like to express my highest gratitude especially to the Rector of UiTM Melaka and all strategic partners and sponsors for supporting the event.

To finish, I sincerely wish VMIIEX 22 a remarkable success. I believe that this will not be the only collaboration between UiTM Melaka and the respective partners and linkages, but a beginning of a long and fruitful cooperation in future.

Thank you very much.

FOREWORD

WAN HASMAT WAN HASAN
Project Director V-MIIEX 2022
Universiti Teknologi MARA (UiTM) Cawangan Melaka

Assalamualaikum and Warmest Greetings.

It gives me an enormous pleasure, on behalf of the organizing committee to welcome all participants and presenters to the Virtual -Melaka International Intellectual Exposition 2022 (VMIIEX '22) with the theme "Road to Commercialisation". We are honoured and glad to welcome all participants to this biennial event.

This is the second time that we have organized this biennial event virtually. V-MIIEX 22 is an innovation competition, in which, innovation products, ideas and systems related to various science and technological fields are exhibited as a solution for the presented problems.

V-MIIEX22 expectantly will be a platform that gathers experts from academies, scientists, and researchers, locally and internationally, to contribute towards the growth of scientific and technological knowledge in each participant's specialisation and expertise.

The competition also serves as a platform to give fresh exposure to the various level of inventors, as well as to encourage the culture of innovation design focused on latest technologies and related to new norms technologies and inventions due to COVID-19.

V-MIIEX 22 is also hoped to be an avenue for gathering and disseminating the latest knowledge on ideas and acquisition of innovation among the participants. It is hoped that the competition will be able to open the mind of the participants towards latest technologies and design. It is also in line with the government's aspiration to encourage innovation activities in Malaysia.

As a final note, I would like to congratulate my fellow committee members for their tremendous effort, which have been critical to the event's success. In addition, I would like to thank our co-organizer, event sponsors and supporters. Optimistically, we wish that all new knowledge that is discovered, invented, or innovated will drive towards our future sustainability.

Thank you.

ABOUT V-MIIEX

The world after COVID-19 is unlikely to return to the world that was. Despite the challenging pace during the pandemic, the strong rebound is expecting in this exciting year 2022. Malaysia is welcoming the great prospects ahead with positive impact on the country's economy and development. Hence, the hope for greater opportunities motivates for more creative thinkers to come up with innovative ideas that can be put forward to be harnessed to overcome similar problems in the future. V-MIIEx 2022 is one of these platforms which contribute relevant ideas that could help communities of all walks of life cope with this pandemic.

UiTM has identified research, innovation, and commercialization to be among the core components and strategic effort towards becoming a well-known and prominent university. Aside from realizing this goal, with these components and efforts, fostering the development of knowledge, generating financial stability of the university, and producing knowledgeable academicians are also potentially achievable.

By having invention and innovation competition yearly, UiTM Cawangan Melaka is confident that it could further enhance creative and innovative abilities among staff and students. In support of the government notion which upholds the importance of innovation, UiTM Cawangan Melaka has taken the initiative of organising the Virtual Melaka International Intellectual Exposition (V-MIIEx).

In instigating and nurturing the continuous culture of inventing and innovating, this event is an ideal platform for lecturers, administrative staff, students, and the public to showcase and commercialize their products or prototypes as well as novel ideas. The first IID which was held nationally in UiTM Cawangan Melaka in 2009, has successfully gathered and displayed more than 37 inventions and innovations. Accordingly, to continue this strong passion towards inventing and innovating, the IID competition should be continued and celebrated.

With that, the Division of Research and Industrial Linkages will be organising its 12th IID competition, the Virtual - Melaka International Intellectual Exposition (V-MIIEx 2022) with the theme, 'Road To Commercialisation'. V-MIIEx 2022 hopes to welcome 200 competing products to be showcased and commercialized, at the same time, attract attention of related and matching industry.

Objectives

1. Encourage and instill passion towards inventing and innovating among UiTM Cawangan Melaka staff, students and academicians of local and international higher education institutions;

2. Highlight distinguished talents of skillful inventors and exhibit intellectual products, inventions and innovations among local and private tertiary institutions, government and private agencies, including international participants;

3. Become an effective Business Matching platform for participating research products, matching industries and partnering government agencies;

4. Recognise, inspire and promote invention and innovation products to be patented and commercialized;

5. Increase passion towards inventing and innovating through research and boost interests of government and non-government agencies to obtain consultancy services from a line up experts of higher education institutions and UiTM Cawangan Melaka.

Automatic Gnetum Nut's Puncher Machine Using Pneumatics Pressure

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Abstract

Indonesia produces a large number of gnetum nuts, and mostly they are processed to be chips. Gnetum chip is one of Indonesia's favorite food. Gnetum chip is not only marketed in Indonesia, but they have been exported to various countries including the Netherlands, United State of America, and the Middle East. Mostly gnetum chips are produced traditionally by the home industry and MSMEs. The existing machines to produce gnetum chips are not equipped with an automatic system; hence they still require significant operator involvement. This invention used a pneumatics pressure as a power driver. Pneumatic cylinders are used to push the gnetum nut onto the flattening base, and to move the puncher rod during the flattening process. The pusher rod put the gnetum rod to the base, and simultaneously remove the flattened nut to the basket. The machine has been tested, which was carried out to determine the parameters used for programming the machine, such as punching time and pneumatic pressure, and for checking the capacity of the machine. The test results show that the most effective punching time is 5 seconds at a pressure between 5-7 bar. In 5 seconds, the machine can change the gnetum nut into a chip shape with a thickness in between 1,20-1,45 mm. The capacity of the machine in processing gnetum nut has also been tested. The results showed that this machine can process 528 gnetum nuts into chips shape gnetum per hour. This machine is suitable for small to medium industries.

Keywords: Automatic machine, Gnetum nut, Puncher machine, Pneumatics pressure

1. INTRODUCTION

Indonesia is an agricultural country where the agricultural sector is one of the pillars of national economic growth. Therefore, the development of agricultural products into derivative industries needs to be continuously encouraged and supported. Furthermore, the processing of agricultural products needs to be supported so that the products are not only sold directly to the consumer but could give added value. The activities to process agricultural products to increase the added value, produce marketable products, and increase storage duration and income are called agroindustry [1]. Some agro-industry products that have succeeded increase added value of the product significantly, such as breadfruit chips [1], coconut/palm sugar [2], tempe chips [3], corn chips [4], cassava chips [5 - 6], and gnetum chips [7].

Gnetum chip is still one of the favorite traditional snacks. The high production of gnetum chips and the tendency to continuously increase the production rate, as well as the increasing public interest in consuming gnetum chips, make the industry of this product has a good prospect. Therefore, assistance from various parties so that this industry keeps growing and developing is needed. However, the industries of gnetum chips in Indonesia are still dominated by small industries or home industries. There are very few industries on a medium scale.

Several studies have been performed to support the production of gnetum chips that have been

carried out [8 - 10]. Ardiyanto & Salahudin [8] developed a machine using a 0.5 HP electric motor as a power driver to move a pressing pipe. This mechanism was aimed so that gnetum, which enters the table, could be flattened by the pressing pipe. Another study to develop a gnetum nut pressing tool using a rolling system was also conducted by Radhityo et al. [9]. They developed a pressing tool. The roller of the machine was constructed using stainless steel and driven by an electric motor. The electric motor was connected to the pulley, and the pulley is linked to the roller. When the motor rotates, the roller also rotates to press the gnetum nuts with a pressing roller speed of 19 rpm. A pressing machine using a different driver system for the gnetum chip was developed by Rusman [10]. The machine was actuated using a hydraulic system.

From the explanation above, it could be concluded that pressing gnetum nut into chips shape was mostly done manually. Several tools and machines, which were developed, are only able for helping the pressing process of gnetum nuts to make them thinner and wider. All the developed machines were operated manually because they still require significant operator involvement. So the impact of the existing machines is still very limited.

Therefore, in this invention, gnetum puncher machine is actuated using pneumatics pressure. Instead of using a pressing system, this machine employs a punching system to change the shape of the gnetum nut. This machine has pusher rod to place gnetum nuts on a punching base automatically, which is also actuated by a pneumatic cylinder. When the pusher rod places the gnetum nuts to the punching base, at the same time it removes a chip shape gnetum nut on the base, which is obtained from the previous process, to the basket. The end side of the pusher rod was designed as a shovel shape tool so that it could perform both tasks at the same time. After the nut is located on the base, the pusher rod returns to its start position, and then the puncher rod moves down to punch the nut. Thus the process could be operated automatically, and the operator's involvement in the process could be reduced significantly.

2. OBJECTIVE

The purpose of this machine is to provide technology for small and medium industries in producing gnetum chips. By using this machine, it is expected that the process of flattening gnetum chips can be carried out more quickly and continuously. The flattening process reduces the need for an operator and minimizes human touch. Thus, the use of this machine could also improve the cleanliness of the resulting product. In addition to flattening gnetum, this machine can also be used to flatten other products, such as jengkol chips or corn chips. For different products, it needs small adjustments in the hopper and pusher shapes.

3. NOVELTY & INVENTIVENESS

The mechanism and system developed in this machine are novel compared to the existing machines as explained in the Introduction. The machine is equipped with six timers for controlling the movement of pneumatic cylinders. There is also an infrared sensor for detecting the existence of gnetum nuts. When the sensor detects the gnetum nut, then the process continues, otherwise, the process stop. Another invention in this machine is the shape of the pusher rod. The pusher rod was designed so that it could push the nut to the flattening base, and at the same time remove a flattened nut from the flattening base.

4. PRACTICALITY & USEFULNESS

To ensure the machine could fulfill the objective, then several tests have been conducted. The aims of the test are for determining the parameter used in the control system and for checking the machine's performance. Based on the test result, several conclusions can be taken, such as, the developed machine is proven could be used to punch gnetum nut into chips shape automatically. The automatic system has succeeded in significantly reducing the involvement of the operator. The test on machine capacity has been carried out and the results show that this machine could process 528 gnetum nuts per hour.

5. CONCLUSION

The invention has been developed and then followed by several tests. The test proves that the objective of this machine could be achieved. The machine can operate automatically and continuously as long as the gnetum nut exists at the hopper. By using this machine, the operator only needs to input the gnetum nut in the hopper, and then the machine works automatically until the nut is finished.

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