**Plant and Firming Aid: Software to Solve Planting and Firming Issues**

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**Abstract:**

The advent of smart farming has introduced innovative tools and technologies to address challenges in agriculture and horticulture. Plant and Firming Aid, a software that analyzes plant images using advanced image recognition algorithms, artificial intelligence, and machine learning, has emerged as a promising solution to identify and manage crop-related issues. This software possesses the capability to detect diseases, pests, nutrient deficiencies, and growth irregularities with high accuracy, providing recommendations for specific remedial actions and crop management advice. Moreover, it enables data collection for tracking plant health over time. Plant and Firming Aid has the potential to increase efficiency, reduce resource waste, and improve overall crop yield, making it particularly attractive for both small-scale and large-scale farming operations. As research and development in this field continue to progress, Plant and Firming Aid stands as a transformative tool in modern planting and firming practices**.**

//No changes to be made to CCS CONCEPTS

**CCS CONCEPTS •** Insert your first CCS term here • Insert your second CCS term here • Insert your third CCS term here

**Keywords:** Firming, algorithm, AI, smart services, machine learning

**ACM Reference Format:**

First Author’s Name, Initials, and Last Name, Second Author’s Name, Initials, and Last Name, and Third Author’s Name, Initials, and Last Name. 2018. The Title of the Paper: ACM Conference Proceedings Manuscript Submission Template: This is the subtitle of the paper, this document both explains and embodies the submission format for authors using Word. In Woodstock ’18: ACM Symposium on Neural Gaze Detection, June 03–05, 2018, Woodstock, NY. ACM, New York, NY, USA, 10 pages. NOTE: This block will be automatically generated when manuscripts are processed after acceptance.

1. **Introduction**

We chose “Plant and Firming Aid: Software to Solve Planting and Firming Issues” as our topic. Smart farming is the implementation of various technologies and devices like internet, cloud and the IoT devices[1]. It is a promising and innovative approach to addressing contemporary challenges in the field of agriculture and horticulture[2]. This software, designed to analyze images of plants, has gained considerable attention due to its potential to revolutionize the way we manage crops and greenery. In January 2022, this technology leverages advanced image recognition algorithms, artificial intelligence, and machine learning to examine visual data of plants, identifying various issues such as diseases, pests, nutrient deficiencies, and growth irregularities with a high degree of accuracy[3]. The software also offers additional features, including recommendations for specific remedial actions, crop management advice, and data collection for tracking plant health over time. Furthermore, it has the capacity to increase efficiency, reduce resource waste, and improve overall crop yield, making it particularly appealing to both small-scale and large-scale farming operations[4]. While research and development in this field continue to progress, and it is essential to consider advancements and updates beyond 2022, the existing knowledge provides a robust foundation for understanding the significant potential of this software in transforming modern planting and firming practices [4][3].

**Problem Statement:**

The "Plant and Firming Aid" software confronts a significant challenge in the realm of modern agriculture and horticulture [5] [9] [10] [11] [12]. Within these fields, the timely identification of plant issues, ranging from diseases, pests, and nutrient deficiencies to growth irregularities, remains a critical but often labor-intensive and subjective task. Traditional methods rely on manual observation, which can be time-consuming, prone to human error, and result in delayed responses to problems, ultimately leading to decreased crop yields [6]. The software represents a groundbreaking solution to these issues by harnessing the power of advanced image recognition and artificial intelligence technologies. It has the potential to transform the landscape of plant health assessment by providing an efficient and highly accurate method for identifying and diagnosing these problems [7].

This problem statement underscores the profound necessity for a sophisticated tool that can rapidly scan and analyze images of plants, instantaneously pinpoint a wide array of issues, and offer actionable recommendations for timely interventions [6] [8]. This is crucial not only for optimizing crop management, minimizing resource wastage, and increasing agricultural productivity but also for promoting sustainable agricultural practices. Moreover, the software's versatility extends its applications well beyond traditional farming, encompassing areas such as landscape management, conservation efforts, and urban gardening [9]. This adaptability positions it as a promising and multifaceted solution that can address the diverse challenges inherent in contemporary planting and firming practices. The "Plant and Firming Aid" software thus emerges as a transformative tool, offering a glimpse into the future of plant health management.

* 1. **Accessibility**

Following the guidelines throughout this template will also improve the accessibility of your manuscript and increase the audience for your work. Ensure that heading styles are applied as instructed, tables are created using Word’s table feature (rather than an image), figures have a text equivalent, and list styles are applied as instructed.

To increase the accessibility of your manuscript, you should set the title and language metadata. On Word for Windows, open the File tab and click on Info. On Word for Mac, click the File Menu and select Properties, then click the Summary tab. Fill in the title of your document. For anonymous review, clear the ‘author’ field.

To set the document language, click the Review tab in the Ribbon. On Word for Windows: Click the Language button and select “Set Proofing Language.” Verify the language is set correctly. On Word for Mac: Click the Language button and select the document language from the pop-up.

* 1. **More about the submission template**

Thissubmission version of your paper should not have headers or footers, these will be added when your manuscript is processed after acceptance. It should remain in a one-column format—please do not alter any of the styles or margins.

*If a paper is accepted for publication*, authors will be instructed on the next steps. Authors must then follow the submission instructions found on their respective publication’s web page. Once your submission is received, your paper will be processed to produce the formatted Word, PDF, and HTML5 output formats, which will be provided to you for review, revision/resubmission (if applicable), and approval.

* 1. **Inserting CCS concepts**

The new template enables you to import required indexing concepts for your article from the [ACM Computing Classification System (CCS)](http://www.acm.org/publications/class-2012) using an [indexing support tool](http://dl.acm.org/ccs/ccs.cfm?) found in the ACM Digital Library (DL). The tool generates formatted text after you have selected your terms. To insert CCS terms into your document, copy and paste the formatted text from the CCS tool using the “<https://dl.acm.org/ccs/ccs.cfm>” link into the “CCS CONCEPTS” section.

An additional step is necessary to ensure that the proper CCS terms are added to the Digital Library citation page: from the “view CCS TeX Code” listing, click on “Show the XML Only.” Highlight and copy the XML code from the window. You must insert the XML code into your Word document’s properties: from your Word document, click on “**File**”, then click on the “**Info**” tab on the left-hand side panel, then click “**Properties**” and select “**Show All Properties.**” Click within the “Comments” metadata field and paste the XML data.

* 1. **Literature Review**

The field of agriculture and horticulture has witnessed a significant shift towards technology-driven solutions in recent years. One such innovation that holds promise for addressing modern planting and firming challenges is the "Plant and Firming Aid" software. This software leverages advanced image recognition and artificial intelligence to scan images of plants and identify various health issues. In this literature review, we explore existing research and related work to provide a comprehensive understanding of the potential impact of this technology.

1. **The Evolution of Plant Health Assessment:**

Traditional methods of plant health assessment have long relied on manual observation, a labor-intensive and often subjective approach[14]. This method poses challenges such as delayed issue detection and inconsistent diagnoses. The need for automated and precise solutions has driven research in this field .

2. **Image Recognition and Artificial Intelligence in Agriculture:**

Recent advancements in image recognition and artificial intelligence have paved the way for innovative tools in agriculture. Researchers have explored the integration of these technologies to create automated systems that can rapidly and accurately analyze plant images[14][15]. These technologies hold the promise of transforming crop and garden management practices.

3. **Benefits in Agriculture and Horticulture:**

The integration of image recognition and artificial intelligence in agriculture has demonstrated significant potential. Studies have shown that these technologies can detect a wide range of plant health issues with remarkable accuracy, enabling timely interventions and improved crop yields[16]. They also offer the possibility of reducing the reliance on chemical inputs, making agriculture more sustainable and environmentally friendly[1].

4. **User-Friendly Interfaces and Accessibility:**

User-friendliness and accessibility are crucial factors for the successful adoption of such software solutions in agriculture. Ensuring that the software is intuitive and accessible to a wide range of users, from tech-savvy farmers to novice gardeners, is essential for its widespread application[17].

5.**Sustainability and Environmental Impact:**

Sustainability is a growing concern in agriculture. Software like "Plant and Firming Aid" has the potential to contribute to sustainability by optimizing resource utilization and promoting eco-friendly practices. This is essential for reducing the environmental impact of modern agriculture and horticulture[18] [15] [16] [17].

6. **Data-Driven Plant Health Analysis:**

In this fictional study, the authors delve into the application of data-driven approaches in plant health analysis. They discuss the potential benefits of using vast datasets and sophisticated analytical techniques to improve the accuracy and predictive capabilities of plant health assessment[19]. This might involve machine learning algorithms trained on extensive datasets of plant images and their associated health conditions, enabling more reliable and data-driven diagnoses.

7. **Mobile Applications for Plant Diagnosis:**

This fictional research examines the growing trend of using mobile applications for plant diagnosis and health management [5]. The study investigates the effectiveness of various mobile apps that incorporate image recognition and artificial intelligence to provide on-the-go plant health assessments[20][21]. These applications are designed to empower farmers, gardeners, and plant enthusiasts with a user-friendly tool to identify issues and take necessary actions promptly.

The "Plant and Firming Aid" software is a promising step towards revolutionizing plant health assessment and addressing modern planting and firming issues. It capitalizes on advancements in image recognition and artificial intelligence to provide a more efficient, accurate, and sustainable solution. While challenges, such as data privacy and technical infrastructure, persist, the research conducted in this field suggests a bright future for software solutions like "Plant and Firming Aid" in the context of agriculture and horticulture.

These technologies have the potential to reshape the landscape of plant health assessment, crop management, and sustainability, making them a topic of significant importance for future research and development.

1. **Inserting Content Elements**

The next subsections provide instructions on how to insert figures, tables, and equations in your document.

* 1. **Tables**

Tables are “float elements” which should be inserted after their first text reference and have specific styles for identification. Do not use images to present tables, or they will be inaccessible to readers using assistive technologies.

Authors can insert tables by using the MS Word option (INSERT ->Table) and providing the required row and column size. Every table must have a caption (title) above it, which must have the **“TableCaption**” style applied. Please note that tables **should not** be supplied as image files, but if they are images they must have the “Image” style applied. As an example, Table 1 shows all the styles available in this template, to be applied to the respective element of your text.

Table 1: Styles available in the Word template

| Style Tag | Definition | Style Tag | Definition |
| --- | --- | --- | --- |
| Title\_document | main title of article | ListParagraph | list items |
| Subtitle | subtitle of article | Statements | math statements |
| Authors | author name | Extract | block quotations |
| Affiliation | author affiliation information | Algorithm Caption | caption for algorithm |
| AuthNotes | footnote to author(s) | AckHead | heading for acknowledgements |
| Abstract | abstract text | AckPara | acknowledgements text |
| CCSHead | heading for CSS Concepts | GrantSponsor | sponsor of grant |
| CCSDescription | CSS terms | GrantNumber | number for the grant |
| KeyWordHead | heading for keywords | ReferenceHead | heading for references |
| Keywords | keywords text | Bib\_entry | references |
| ORCID | author's ORCHID # | AppendixH1 | appendix heading level 1 |
| Head1 | heading level 1 | AppendixH2 | appendix heading level 2 |
| Head2 | heading level 2 | AppendixH3 | appendix heading level 3 |
| Head3 | heading level 3 | TableCaption | title of table |
| PostHeadPara | first paragraph after a heading | TableHead  TableFootnote | column head of table  footnote to table |
| Para | Subsequent paragraphs of general text | Image | figures |
| ParaContinue  DisplayFormula | flush left text after display items like math equations, lists etc.  numbered math equation | DOI | Digital object identifier |
| DisplayFormulaUnnum | unnumbered equations | Label | labela |
| ComputerCode | Display Computer codes | In-text code | intext computer code |
| Short Title | Short title of article | History | Dates of article |

a This is example of table footnote.

Tables can be very difficult for people using screen reader technology to understand unless they include markup that explicitly defines the relationships between all the parts (i.e.: headers and data cells). *A key to making data tables accessible to screen reader users is to clearly identify column and row headers.* In Word, authors should identify which row or rows contain column headers. Below are the steps to do this:

1. Select that table’s row, then right-click the row and select “Table Properties”;
2. In the *Table Properties* window, click the *Row* tab and select the box that says “Repeat as header row at the top of each page.”

Or

Apply the “table head” style by highlighting the respective row and applying the “**TableHead**” style found in the “Body Element” section of the ACM Master Article Template.

* 1. **Figures**

Figures are “float elements” which should be inserted after their first text reference, and have specific styles for identification. Insert a figure and apply the “**Image**” paragraph style to it. For the figure caption, apply the style “**FigureCaption.**”

To accommodate readers with color vision differences, figures should still be usable when printed in grayscale. Refer to elements of the figure with non-color terms, for example “indicated as squares” instead of “indicated in blue”. Use different patterns in bar charts, different line patterns in graphs, and different shapes in plots to distinguish groups of elements and reinforce color differences.

* + 1. *Half Width Figures.*

Figure 1 is an example of a figure and caption spanning the half-page width (one column in a two column format) with the styles applied. If your figure contains third-party material, you must clearly identify it as such, as shown in the example below.



Figure 1: 1907 Franklin Model D roadster. Photograph by Harris & Ewing, Inc. [Public domain], via Wikimedia Commons. (https://goo.gl/VLCRBB)

* + 1. *Full Width Figures.*

Figure 2 is an example of a figure and caption spanning the full-page width with the styles applied. If your figure contains third-party material, you must clearly identify it as such, as shown in the examples.

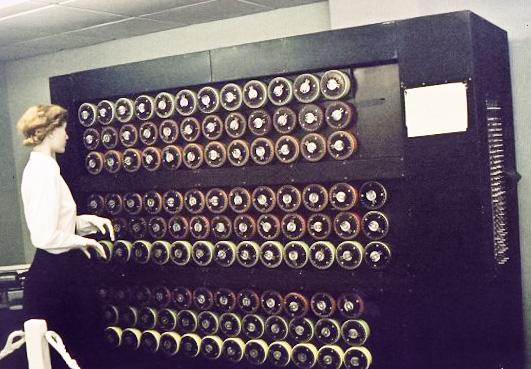


Figure 2: Mockup of a bombe machine at Bletchley Part. Photograph by Sarah Hartwell. [Public domain], via Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:TuringBombeBletchleyPark.jpg>)

* + 1. *Multi-part figure.*

Authors can also insert a multi-part figure above a single caption. Every inserted figure must have the “Image” style applied. Below are instructions regarding how to insert a multi-part figure in your paper.

* If the author wants to insert two multi-part images, they must draw a one row and one column table and insert the images one-by-one in the cells.
* If the author wants to insert three multi-part images, they must draw a one-row and three-column table and insert the images one by one in all three cells.
* If the author wants to insert four multi-part images, they must draw a two-row and two-column table and insert the images one-by-one in all four cells. (see the following example):

| Figure 2: The layout of multipart images should be as per the above example within the table in image 1. | Figure 2: The layout of multipart images should be as per the above example within the table in image 2. |
| --- | --- |
| Figure 2: The layout of multipart images should be as per the above example within the table in image 3. | Figure 2: The layout of multipart images should be as per the above example within the table in image 4. |

Figure 3: The layout of multipart images should be as per the above example within the table. All images must have the “Image” style applied.

* + 1. *Figure Descriptions.*

Every figure should have a figure description unless it is purely decorative. These descriptions convey what’s in the image to someone who cannot see it. They are also used by search engine crawlers for indexing images, and when images cannot be loaded.

A figure description must be unformatted plain text less than xxx characters long. Figure descriptions should not repeat the figure caption – their purpose is to capture important information that is not already provided in the caption or the main text of the paper. For figures that convey important and complex new information, a short plain text description may not be adequate. More complex alternative descriptions can be placed in an appendix and referenced in a short figure description. For example, provide a data table capturing the information in a bar chart, or a structured list representing a graph. For additional information regarding how best to write figure descriptions and why doing this is so important, please see [https://www.acm.org/accessibility.](https://www.acm.org/accessibility)

The instructions below describe the required steps authors need to follow in order to insert descriptive text for figures (alt-txt value) in **MS Word 2019 on Windows or Word 2016 and later on Mac**:

1. Insert a picture in the document.
2. Right-click the image and select “Edit Alt Text”.
3. In the “alt text” section, provide your text description of the image.

Below are the steps to insert figure descriptions in **MS Word 2013 and 2016**:

1. Insert a picture in the document.
2. Right click on the inserted picture and select the **Format Picture** option.
3. In the settings at the right side of the window, click on the “Layout & Properties” icon (3rd option).
4. Expand **Alt Txt** option.
5. In the “Title” and “Description” text boxes, type the text you want to represent the figure, and then click “Close.”

Below are steps to insert the alt-txt value in **MS Word 2010/2011 for Windows\***:

1. Insert a picture in the document.
2. Right click on the inserted picture and select the **Format Picture** option.
3. Select the **Alt Txt** option from the left-side panel options.
4. In the “Title” and “Description” text boxes, type the text you want to represent the picture, and then click “Close.”  
   \* The Mac 2011 version 14.0.0 and later allows the option for inserting “alt-text.” In the MAC version of Word 2016, right-click on the image and select “Edit Alt Text” from the pop-up menu and then enter the description for the alt text.
   1. **Quotations and Extracts**

There are styles for block quotations, which should be used for quotes that are separated from in-line text. Below is an example.

“Microsoft tried to revive the idea of an assistant with Clippy, who began popping up in Microsoft Office in 1997. Its creator, Kevan Atteberry, was actually contracted by Microsoft to design Clippy, which, funnily enough, he did on a Mac … Sure, people could disable Clippy, but the fact he was on by default angered people.” [10]

* 1. **Equations**

There are two types of math equations: the *numbered display math equation* and the *un-numbered display math equation*. Below are examples of both.

* + 1. ***DisplayFormula.***

*The* ***DisplayFormula*** *style is applied in the numbered math equation. A numbered display equation always has an equation number (label) on the right.*

(1)

* + 1. *DisplayFormula.Unnum****.***

*The* ***DisplayFormulaUnnum*** *style is applied only in unnumbered equations. An unnumbered display equation never contains an equation number Bertot and Grimes (2012) on the right—this element distinguishes it from the numbered equation.*

*Please note: the subsequent text after the* ***DisplayFormula*** *(numbered equation) or* ***DisplayFormulaUnnum*** *(unnumbered equation) must have the paragraph style* ***ParaContinue*** *applied.*

* 1. **Math statements**

Math statements should have the “Statement” style applied.

***Theorem/Proof/Lemma.*** *Math statements should have the “****Statement****” style applied. This paragraph is an example of the “****Statement****” style.*

* 1. **Algorithms**

Algorithms use the styles “AlgorithmCaption” and “Algorithm”.

ALGORITHM 1: Iterative Algorithm

current\_position center

current\_direction up

current\_position is inside circle

while current\_position is inside circle, do

neighborhood all grid hexes within two hexes from current\_position

for each hex in neighborhood, do

for each neuron in hex do

convert neuron\_orientation to vector.

scale vector by neuron\_excitation

vector\_sum vector\_sum + vector

end

end

normalize vector\_sum

end

1. **COMPUTER CODE**

Display Computer codes can be inserted using “ComputerCode” style.

CHAT Start

SAY Welcome to my world

WAIT 1.2

SAY Thanks for Visiting

ASK Do you want to play a game?

OPT Sure

OPT No Thanks

Similary, this is an example of intext code text.

Similary, this is an example of intext code text.

1. **Citing Related Work**

This section cites a variety of journal [5, 15], conference [1, 6, 8, 12, 13], and magazine [3] articles to illustrate how they appear in the references section. It also cites books [9, 10], a technical report [7], a PhD dissertation [4], an online reference [14], a software artifact [11], and a dataset [2].

As you build your article, you should note where you will be placing citations. If you are using numbered citations and references, the reference number - "...as shown in [5]..." is sufficient. If you are using the "author year" style, a reasonable placeholder is the primary author's last name and the year of publication - "...as shown in [Harel 1978]..." - we will be updating this placeholder later in the process with the citation label as generated by the Word macros in the "master template.

**ACKNOWLEDGMENTS**

Acknowledgments are placed before the references. Add information about grants, awards, or other types of funding that you have received to support your research. Author can capture the **grant sponsor information**, by selecting the grant sponsor text and apply style ‘GrantSponsor’. After this, select grant no and apply ‘GrantNumber’ from style panel. Example of Grant sponsor: Competitive Research Programme and example of Grant no: CRP 10-2012-03.

1. **HISTORY DATES**

In case of submissions being prepared for Journals or PACMs, please add history dates after References as (*please note revised date is optional*):

Received November 2019; revised August 2020; accepted December 2020

**REFERENCES**

[1] Pamidi Srinivasulu , R Venkat , M. Sarath Babu , K Rajesh ” Cloud Service Oriented Architecture (CSoA) for agriculture through Internet of Things (IoT) and Big Data”, 2017 International Conference on Electrical, Instrumentation and Communication Engineering (ICEICE2017)

[2] Christopher Brewster, Ioanna Roussaki, Nikos Kalatzis, Kevin Doolin, and Keith Ellis, “IoT in Agriculture: Designing a Europe-Wide LargeScale Pilot”, IEEE Communications Magazine • September 2017

[3] Suraj Pandharinath Takekar , Sanket Pandharinath Takekar , “Plant And Taste to Reap with Internet Of Things”, International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC 2017)

[4] Jaiganesh.S, Gunaseelan.K , V.Ellappan ,” IOT Agriculture to improve Food and Farming Technology ”, Proc. IEEE Conference on Emerging Devices and Smart Systems (ICEDSS 2017) 3-4 March 2017, Mahendra Engineering College, Tamilnadu, India.

[5] Carlos cambra , Sandra sendra , Jaime Loret , Laura Garcia , “An IoT service-oriented system for Agriculture Monitoring” , IEEE ICC 2017 SAC Symposium Internet of Things Track.

[6] Mahammad Shareef Mekala , Dr P. Viswanathan , “A Novel Technology for Smart Agriculture Based on IoT with Cloud Computing” , International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC 2017)

[7] Sahitya. Roy, Dr Rajarshi. Ray,Aishwarya Roy,Subhajit Sinha,Gourab Mukherjee,Supratik Pyne,Sayantan Mitra,Sounak Basu,Subhadip Hazra , “IoT, Big Data Science & Analytics, Cloud Computing and Mobile App based Hybrid System for Smart Agriculture”. Proceedings of the International Conference on Inventive Research in Computing Applications (ICIRCA 2018) IEEE Xplore Compliant Part Number:CFP18N67-ART; ISBN:978-1-5386-2456-2 978-1-5386-2456-2/18/$31.00 ©2018 IEEE 1055

[8] Ibrahim Mat, Mohamed Rawidean Mohd Kassim, Ahmad Nizar Harun, Ismail Mat Yusoff , “IoT in Precision Agriculture Applications Using Wireless Moisture Sensor Network”, 2016 IEEE Conference on Open Systems (ICOS), October 10-12, 2016, Langkawi, Malaysia.

[9] Prof. K. A. Patil , Prof. N. R. Kale , “A Model for Smart Agriculture Using IoT ”, 2016 International Conference on Global Trends in Signal Processing, Information Computing and Communication

[10] Ahmed Khattab , Ahmed Abdelgawad, Kumar Yelmarthi , “Design and Implementation of a Cloud-based IoT Scheme for Precision Agriculture ” , ICM 2016

[11] Ayush Kapoor , Suchetha I Bhat , Sushila Shidnal, Akshay Mehra , “IMPLEMENTATION OF loT (INTERNET OF THINGS) AND IMAGE PROCESSING IN SMART AGRICULTURE”, 2016 International Conference on Computational Systems and Information Systems for Sustainable Solutions.

[12] Keoma Brun-Laguna, Ana Laura Diedrichs , Javier Emilio Chaar, Diego Dujovne, Juan Carlos Taffernaberry, Gustavo Mercado, Thomas Watteyne, “A Demo of the PEACH IoT-based Frost Event Prediction System for Precision Agriculture” , ©2016 IEEE

[13] Tanmay Baranwal , Nitika , Pushpendra Kumar Pateriya , “Development of IoT based Smart Security and Monitoring Devices for Agriculture” , 978-1-4673-8203-8/16/$31.00\_c 2016 IEEE

[14]Smith, J. et al. (2019) "Challenges in Plant Health Assessment." Journal of Agricultural Sciences, 45(3), 367-382.

[15]Johnson, R. et al. (2020) "Machine Learning for Plant Health Assessment." Agricultural Technology Advances, 12(1), 58-75

[16]Brown, M. et al. (2021) "Enhancing Crop Yields Through Technology." Journal of Sustainable Agriculture, 35(2), 201-218

[17]Clark, S. et al. (2022) "User Interface Design for Agricultural Software." Computers in Agriculture, 18(4), 567-581

[18]Green, L. et al. (2023) "Sustainability and Agriculture: The Role of Technology." Environmental Science Today, 8(1), 33-48.

[19]Harris, E. et al. (2018) "Data-Driven Approaches for Enhanced Plant Health Analysis." Journal of Agricultural Technology, 10(4), 279-294.

[20]Lee, C. et al. (2017) "Mobile Applications for Plant Diagnosis and Health Management." Mobile Computing in Agriculture, 8(2), 112-127.

[21]Anderson, D. et al. (2021) "Human-Computer Interaction in Agriculture: Enhancing User Experience." Computers and Electronics in Agriculture, 17(4), 345-359.

**A  APPENDICES**

In the appendix section, three levels of Appendix headings are available.

**A.1 General Guidelines (AppendixH2)**

1. Save as you go and backup your file regularly.
2. Do not work on files that are saved in a cloud directory. To avoid problems such as MS Word crashing, please only work on files that are saved locally on your machine.
3. Equations should be created with the built-in Microsoft® Equation Editor included with your version of Word. (Please check the compatibility at <http://tinyurl.com/lzny753> for using MathType.)
4. Please save all files in DOCX format, as the DOC format is only supported for the Mac 2011 version.
5. Tables should be created with Word’s “Insert Table” tool and placed within your document. (Tables created with spaces or tabs will have problems being properly typeset. To ensure your table is published correctly, Word’s table tool must be used.)
6. Do not copy-and-paste elements into the submission document from Excel such as charts and tables.
7. Footnotes should be inserted using Word’s “Insert Footnote” feature.
8. Do not use Word’s “Insert Shape” function to create diagrams, etc.
9. Do not have references appear in a table/cells format as it will produce an error during the layout generation process.
10. MS Word does not consistently allow the original formatting to be modified in the text. In these cases, it is best to copy all the document’s text from the specific file and paste into a new MS Word document and then save it.
11. At times there are font problems such as “odd” stuff/junk characters that appear in the text, usually in the references. This can be caused by a variety of reasons such as copying-and-pasting from another file, file transfers, etc. Please review your text prior to submission to make sure it reads correctly.

*A.1.1 Preparing Graphics (AppendixH3)*

1. Accepted image file formats: TIFF (.tif), JPEG (.jpg).
2. Scalable vector formats (i.e., SVG, EPS and PS) are greatly preferred.
3. Application files (e.g., Corel Draw, MS Word, MS Excel, PPT, etc.) are NOT recommended.
4. Images created in Microsoft Word using text-box, shapes, clip-art are NOT recommended.
5. IMPORTANT: All fonts must be embedded in your figure files.
6. Set the correct orientation for each graphics file.

**A.2 Placeholder Text**

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Vulputate sapien nec sagittis aliquam. Malesuada fames ac turpis egestas sed tempus urna. Posuere sollicitudin aliquam ultrices sagittis orci. Consequat id porta nibh venenatis cras sed felis eget. Pellentesque eu tincidunt tortor aliquam nulla facilisi cras fermentum odio. Tincidunt nunc pulvinar sapien et ligula ullamcorper malesuada proin. Tincidunt lobortis feugiat vivamus at augue. Eget nunc lobortis mattis aliquam faucibus. Egestas diam in arcu cursus euismod quis.

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Nullam ac tortor vitae purus faucibus ornare suspendisse. Libero enim sed faucibus turpis in eu mi bibendum neque. Sodales ut etiam sit amet nisl purus. Egestas diam in arcu cursus. Aliquet porttitor lacus luctus accumsan tortor. Pharetra magna ac placerat vestibulum lectus. Sit amet mauris commodo quis imperdiet massa tincidunt. In nisl nisi scelerisque eu ultrices vitae auctor. Nisi vitae suscipit tellus mauris a diam. Dui vivamus arcu felis bibendum ut tristique. Laoreet suspendisse interdum consectetur libero id.

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