



Senior Design Project Summary for Publicity, Marketing & Display
Virtual Showcase: Fall 2020

Each Senior Design team is required to submit this completed form to their instructor who will forward to:

Kimberly Lewis, Director of Marketing AND Francesca Botteri, Events Manager
UCF College of Engineering & Computer Science
Harris Engineering Center, Suite 114-115
Kimberly.Lewis2@ucf.edu and Francesca.Botteri@ucf.edu

Due to the Covid-19 pandemic, the Dean's office has decided to make this semester's Senior Design Showcase, **a virtual event**. We hope to still promote student work just as we have before, only without the in-person showcase. A website will be established with brief project summaries and team videos discussing your projects. Guidance on the creation of these video submissions is provided below. Please read through this entire form carefully. Should you have any questions regarding the website or the videos, please reach out to Francesca Botteri (contact information provided above).

The information in this form will be used in promotional materials, media outreach, and to create the website. Some projects may have potential for coverage in UCF and external news media. Your team may be contacted by the Dean's Office to learn more, get photos, etc. Please inform Kimberly Lewis if you are contacted by media about your project. ***Your contact info here will be for internal use only.***

PROJECT TITLE (Spell out acronyms or define them in the summary below. Do not put your internal team name here – We want a few short words that say what your project is.) This title will be displayed on your table during the showcase. Please be clear and specific.

Correct: "Sundial" Solar Sculpture for Orlando Utilities Commission

Wrong: OUC Green Team

- "IntelliDate" Digital Calendar Display

SUMMARY: In non-scientific terms, describe the problem that your project aims to solve, and then answer:

- **What does the project do?**
 - o IntelliDate is a consumer product that aims to increase the efficiency and feasibility of organizing and maintaining a wall-mounted calendar, such as a dry-erase or paper calendar.
 - o The project consists of a monitor that acts as a digitally updateable calendar. Once the user links this monitor to their account and accesses/edits the calendar's contents through a web-based application, the monitor will automatically reflect all changes made. The calendar is capable of displaying a month, week, and day view, along with a subsection for free-typed notes.
- **Who needs it/who would use it?**
 - o Having an organized, easily-updateable calendar display can be useful to a wide range of users, spanning from a college student, keeping track of their assignments and work schedule, to an entire restaurant staff, displaying the weekly or nightly schedule of all employees.
- **How does it work?**
 - o The user creates an account on the [IntelliDate website](#), and can utilize the website as a basic calendar scheduling app (create/edit/delete events, add free-typed notes, change the calendar view, between month, week, and day).
 - o Through the *IntelliDate website*, the user links an *IntelliDate Display Panel* to their account, via a unique serial number, hardcoded into each Panel. Once a Panel is added to a user's account, the Panel will display a page that instructs the user to connect their Panel to Wi-Fi, using an external device (smart phone, PC, tablet, etc.).
 - o Once the Panel has been connected to Wi-Fi, it will display the same calendar seen on the website and will automatically update to reflect any changes the user makes (such as creating/editing/deleting events, editing notes, changing calendar view, locking/unlocking the Panel).
 - o When the IntelliDate Panel boots, it begins to continuously execute the *Panel Application* which is a desktop application that displays a similar view of the website and updates its displayed contents every timed second. The Panel Application reads data (events, notes, calendar view, lock status), from a local text file, to render its displayed contents on each timed update.
- **Why is it different or better than what's available?**
 - o Having a dry-erase/paper calendar keeps a user's schedule present in their everyday life; however, maintaining the calendar is a manual chore that can lead to confusion and mistakes.
 - o Having a digitally updateable calendar allows the user to: easily and neatly edit any event's contents, display specific timeframes in a time-grid format, and set a "lock" on the calendar, increasing privacy measures when the user wishes to do so.
 - o One product of this nature currently exists ([DAKboard](#)), but the product costs \$399.95 and requires a monthly service fee, starting at \$5/month.
 - *IntelliDate* offers the same calendar-based scheduling and display service at much lower cost.
- **What are possible applications?**
 - o The average user can utilize IntelliDate in their home, replacing their dry-erase/paper calendar.
 - IntelliDate is a perfect product for elderly people. Along with the Panel displaying events on a big screen in large font, events and notes can be added to the calendar through typing, rather than writing, which may not be an ability that certain individuals possess.
 - College students can utilize IntelliDate by managing their assignments, lectures, and work schedules, while keeping all of the information visibly present.
 - o IntelliDate can also be utilized by businesses, displaying meetings and deadlines for all employees to see, or displaying work schedules for all employees to see.

- **Other selling points? (Ex: provides a low-cost way to do something; it makes something easier to do or last longer; it's never been done before, it conserves energy/ water/reduces pollution, etc.)**
 - o As previously stated, IntelliDate provides an organized, efficient, and precise method of maintaining and displaying a calendar display that is more affordable than any other existing products.
 - o The contents of the calendar can be updated from any location, so long as the user has a device capable of accessing the website with an active internet connection.
 - o The IntelliDate display can also be locked/unlocked, from the website, introducing a novel layer of privacy to their calendar display, previously unattainable with dry-erase/paper calendars.

LIST ALL TEAM MEMBERS, MAJOR & CONTACT E-MAIL: Please highlight Team Lead and list at least 1 cell number contact for internal use only.

- **Kyle Dennis, Computer Engineering, kwd15@knights.ucf.edu, (443) 847-1840 – Team Lead**
- **Dat Tran, Electrical Engineering, dtran27@knights.ucf.edu**
- **Kory Marks, Electrical Engineering, marks_kory@knights.ucf.edu**
- **Tyler Claitt, Computer Engineering, tylerclaitt@knights.ucf.edu**

SPONSORS (if any):

- N/A

VIDEO DETAILS & GUIDANCE: (to be submitted later, around Nov 30th)

- All videos must be submitted by **Monday November 30th**. A designated submission folder will be created and shared with team leaders no later than Tuesday November 10th.
- Video submissions must be between 5-8 minutes in length.
- All team members should appear
- Ensure that you speak clearly and succinctly
- Dress code for the videos can be casual, but should still look professional (i.e. khakis/black pants and a polo are ok, shorts and a t-shirt are not).
- Please record videos in a wide-screen format (i.e. if using a cell phone, please hold it horizontally)

- **Specific content that your videos should cover:**
 1. **Clear description of project goals/objectives**
 - *What does the project do, what makes it different from previous products.*
 2. **Explanation of broader impacts of project**
 - IntelliDate could serve as an extremely helpful tool for the elderly and disabled, as it can keep users' lives organized and visually present on a large screen with large readable font, and its contents can be updated with a keyboard, rather than having to write. The feature of updating the calendar's contents from any location (via the website) allows for a caretaker to add/edit events and notes for someone else, in a separate physical location, to read.
 3. **Description of project test plan and its implementation**
 - For the web application, iterative debugging strategies were implementing when designing the frontend code. When developing the backend code, Postman was used. Postman is a tool that allows developers to make HTML requests to a RESTful API without having to write frontend code to perform the same test (e.g., instead of developing an HTML <button/> that performs an HTML GET request when clicked, in the Postman interface, a developer can simply enter the GET request URL and observe the returned output).
 - Before connecting the custom PCB to the Raspberry Pi (IntelliDate Display): an *Arduino WeMos D1 WiFi UNO ESP8266* MCU board was used to request data from the website's database (MongoDB) and send said data to a *SAMD21 Arduino M0* MCU board which acts as a middleware to transfer the data from the ESP8266 to the Raspberry Pi.
 - Once data was sent from the M0 to the Raspberry Pi, a Python script, executing on the Raspberry Pi, was designed to store the saved data into a local text file for the IntelliDate Panel [desktop] application to read and display.
 - Before ensuring database-communication functionality of the ESP8266, hardcoded strings (e.g., "test_string") were transferred from the ESP8266 to the Raspberry Pi.
 4. **Display the technical aspects of project during demo—i.e. HOW does it work?**
 - Same as #3.

- **Questions your team should answer in the video:**

1. **Please explain how your group was able to creatively collaborate and achieve successful teamwork when you may not have been able to all work hands on in person**

- Starting Senior Design I, a Microsoft Excel chart was designed to organize each team member's work and course schedules. Online Zoom meetings were scheduled in timeslots where each team member was available. These meetings were held on a weekly basis.
- Outside of meetings, team members effectively communicated, consistently, over phone calls, SMS, and the Discord application.
- Once various pieces of the project that individual team members were responsible for began to approach convergence, team members began holding physical meetings.
- Various components of the project were assigned to team members (as responsibilities) on a basis of skill area/expertise. These responsibilities were organized and listed in an online Google Document to be viewed and edited by all team members. As team members completed various tasks and/or encountered obstacles, each team member was responsible for communicating this progress to the rest of the team. If team members encountered certain obstacles that they could not overcome, the task was transferred to another team member who was able to rectify the highlighted issue(s).
 - After designing the printed circuit board, the task of soldering components onto the PCB was transferred to another team member who had a great deal of experience in soldering.
 - During the process of developing code to transfer data from the ESP8266 to the Arduino M0, certain obstacles produced the necessity to transfer the task to another team member who had more experience with programming.

2. **Please share a difficulty that your team faced during planning, and how you overcame it (This should NOT be Covid or social distancing related)**

- When transferring data (in the form of a string spanning 1k+ characters) from the ESP8266 to the Arduino M0, it was observed that the received data would consist of only the first 63 characters of the total string.
 - This error was found to stem from the Arduino buffer size consisting of only 64 bytes, meaning that only the first 64 characters of a string could be transferred, with the remaining characters being deleted.
 - This error was rectified by creating a loop, in the ESP8266 code, that sends 64-character substrings (of the total string) to the M0 until all of the characters have been sent.
 - Another error occurred, where certain substrings would be missing characters.
 - This error was rectified by executing a 100-millisecond delay, in the ESP8266 code, after sending each 63-character substring.
 - Once all of the substrings had been transferred, the last substring had a newline character ('\n') appended to it, signifying the end of the total data string, on the receiving side.

- 3. What motivated you to stay focused and see your project through to completion, despite the challenges posed by Covid/social distancing, and in turn, how did you use this to your advantage?**
 - The team stayed focused through consistent communication (progress-reports, routine meetings, etc.), and reminders of deadlines.
 - Though in-person meeting was not always an option, communication technologies served as valuable tools for remaining present with the rest of the team, throughout the development process.
 - Although Covid/social distancing introduced obvious difficulties for a group-task, some negative effects (such as working-from-home) gave certain team members much more time and availability to make progress on the project and accommodate to various meeting times.
- 4. How did you process stakeholder feedback? How did you implement the feedback into your final project?**
 - Though there were no stakeholders involved with the project, feedback received from professors served as proficient encouragement to direct a focus on defining and displaying specific engineering specifications and constraints, other than providing a functional product.
- 5. What is the biggest lesson you learned throughout the project process that you will be able to apply to your future work in the industry?**
 - During software development, it became very clear that the power of research and its effects on developing software should never be underestimated. When facing a software-related error, formulating a proper search-engine query, that is proportionately balanced between generality and specificity, to obtain a narrow selection of specific results, proved to be a valuable and amendable skill.
 -
- 6. What was your motivation behind choosing to focus on your particular project topic/problem that needed solving?**
 - Before beginning Senior Design, one of our group members had used a dry-erase calendar for numerous years, throughout their undergraduate career, and had thought of the idea that is IntelliDate.
 - Once in Senior Design, IntelliDate was seen as a novel project topic that required both Electrical and Computer Engineering expertise.
 - Due to the team lacking any sort of sponsor or funding, IntelliDate was seen as a project that would maintain a reasonable production cost and could even propose low-cost production as a primary goal, for the project.
 - After describing the idea of IntelliDate to numerous peers, adults, and family members alike, the unanimous response was that if such a product existed, they and many others would most likely purchase and utilize it.
 - Producing the IntelliDate project required knowledge of many topics that none of the group members were immensely familiar with, causally appearing as a project that would provide a great learning experience for all team members involved.

YouTube Link: <https://youtu.be/R8COu0U3sNw>