**[Final Year Project Proposal]**

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| --- | --- | --- | --- | --- |
| Sr# | Student Name | Roll Number | Credit Completed | Signature |
| 1 | Aqil Umar | p19-0034 | 97 |  |
| 2 | Haq Nawaz | p20-0057 | 100 |  |
| 3 | Noman Yousaf | p20-0614 | 102 |  |

**Suggested Supervisor**:

Faculty Member’s Name: Dr.Ali Sayyed\_\_\_ Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date (31 January 2024)

**Project Details**

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| **Project Title** | Design and Development of a Smart Electronic Pen | | |
| **Project Area of Specialization** | Innovative Writing Technology | | |
| **List Related Core Subjects** | 1) Object Oriented Programming  2) Operating System  3) Digital Logic Design  4) Computer organization Assembly Language  5) Linear Algebra | | |
| **List Related Elective Subjects** | 1) Graph Theory  2) Digital Image Processing  3) | | |
| **Project Start Date** | 2024- - | **Project End Date** | 2024- - |
| **Project Summary (less than 2500 characters)** | Our final-year project introduces a ground breaking innovation – the Smart Electronic Pen. This pen, comparable in size to a regular one, redefines the conventional writing tool.  At about the size of a regular pen, our Smart Electronic Pen will digitally capture everything you write on any paper/surface and store them in its memory. In addition to digitizing hand written notes, smart pen will also record audio and synchronize the recorded audio to what you write.  Smart Electronic Pen, when connected with a computer. will securely transfer the data to the corresponding app on the computer. | | |
| **Project Objectives (less than 2500 characters)** | 1. Compact Innovation: Develop a user-friendly Smart Electronic Pen, mirroring the size of a regular pen, to seamlessly integrate modern technology with traditional note-taking methods. 2. Multifunctional Capability: Enable the Smart Pen to digitally capture and store hand written notes on any surface while simultaneously recording audio, offering users a comprehensive and synchronized record of their writing experience. 3. Efficient Digital Integration: Establish a secure and user-friendly data transfer process between the Smart Pen and a computer, ensuring convenient access, organization, and retrieval of digitized notes through an intuitive application interface. | | |
| **Project Implementation Method (less than 2500 characters)** | * **Requirements Analysis**: Conduct a detailed analysis of user requirements and expectations to define the key features and details of the Smart Pen. * **Conceptualization and Design Planning**: Create a conceptual design outlining the hardware and software components, taking into account the compact form factor, writing sensors, audio recording module, and seamless data transfer. * **Prototyping**: Develop initial hardware and software prototypes to validate the feasibility of the design and gather early user feedback. * **Hardware Development**: Engineer the Smart Pen's hardware, including writing sensors, audio recording components, memory storage, and power management, ensuring compactness and efficiency. * **Software Application Development**: Design and develop the corresponding computer application with an intuitive user interface, and secure data transfer mechanisms. * **Integration and Testing**: Integrate the hardware and software components for thorough testing, ensuring proper functionality. * **Usability Testing**: Conduct extensive usability testing with potential users to gather feedback on the Smart Pen's performance, user interface, and overall user experience. * **Refinement and Iteration**: Use feedback from usability testing to refine both hardware and software components, addressing any identified issues and enhancing the Smart Pen's overall design and functionality. * **Quality Assurance**: Implement a comprehensive quality assurance process, ensuring the Smart Pen is reliable, and meets the highest levels of performance. * **Documentation and User Guides**: Develop comprehensive documentation, including user guides for the Smart Pen and its application, providing users with essential information on setup, usage, and trouble shooting. * **Final Presentation and Delivery**: Prepare a detailed presentation showcasing the design, development process, and features of the Smart Electronic Pen. | | |
| **Benefits of the Project (less than 2500 characters)** | 1. **Efficient Note**-Taking: The Smart Pen will seamlessly digitizes and stores hand written notes, providing users with an effortless and organized way to manage their written content. 2. **Comprehensive Recording**: With synchronized audio recording, the Smart Pen offers a comprehensive record of discussions, lectures, or meetings, enhancing the depth of note-taking experiences. 3. **Portable** **and** **Versatile**: The compact Smart Pen, equipped for on-the-go use, eliminates the need for bulky notebooks. Its multifunctional capabilities will fit into diverse scenarios, from academic settings to business meetings. 4. **Modernizing** **Tradition**: Merging a 5000-year-old tool with cutting-edge technology, the project showcases innovation, combining the familiarity of a pen with efficient digital data management. | | |
| **Technical Details of Final Deliverable (less than 2500 characters)** | **Hardware Specifications**   * **Compact Design**: The Smart Pen will have dimensions similar to a regular pen for ease of use and portability. * **Writing Sensor**: Equipped with advanced sensors to accurately capture and digitize handwritten content on various surfaces. * **Audio Recorder**: Integrated with a high-quality audio recording module for synchronized recording of audio with written notes. * **Internal Memory**: Sufficient onboard memory to store a significant amount of written and audio data.   **Data Transfer Mechanism**   * **Connectivity**: Utilizes a secure and efficient connectivity method, such as Bluetooth or USB, to transfer data between the Smart Pen and a computer. * **Compatibility**: Ensures compatibility with common operating systems, facilitating seamless data transfer to a dedicated application on the computer.   **Software and Application Development**   * **Application Interface**: Develops an intuitive and user-friendly interface for the computer application, allowing easy organization, retrieval, and editing of digitized notes. * **Synchronization Algorithm**: Implements a synchronization algorithm to align audio recordings with the corresponding hand written content for a comprehensive user experience.   **Power Management**   * **Battery Efficiency**: Incorporates power-efficient components to maximize battery life, ensuring the Smart Pen remains operational for extended periods between charges. * **Charging Mechanism**: Includes a reliable and user-friendly charging mechanism, such as USB charging, to maintain convenience for users. | | |
| **Final Deliverable of the Project** | A working prototype of the electronic smart pen | | |
| **Type of Industry** | The Smart Electronic Pen will be designed specifically targeting users in education, business, and personal note-taking applications. | | |
| **Technologies** | The Smart Electronic Pen utilizes a combination of advanced technologies, including micro controllers, sensors for hand writing capture, audio recording modules, secure data transfer protocols (e.g Bluetooth or USB), power-efficient components for extended battery life, and application development technologies for creating an intuitive user interface on various computing platforms. | | |
| **Sustainable Development Goals** | 4) Quality education  12) Responsible consumption and production  13) Climate action | | |

**Project Key Milestones**

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| --- | --- | --- |
| **Elapsed time in (days or weeks or month or quarter) since start of the project** | **Milestone** | **Deliverable** |
| Month 1 | 1st 6 Months | Research and development |
| Month 2 | 2nd 6 Months | Working prototype |

**Project Equipment Details**

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| --- | --- | --- | --- | --- |
| **Item Name** | **Type** | **No. of Units** | **Per Unit Cost (in Rs)** | **Total (in Rs)** |
| Arduino | Equipment | 5 | 3000 | 15,000 |
| Sensor’s | Equipment | 10 | 1000 | 10,000 |
| Others | Miscellaneous | 1 | 10000 | 10,000 |
|  |  |  | **Total in (Rs)** | **35,000** |