**National Grassroots ICT Research Initiative**

**Application Form for Funding of Final Year Project (FYP) Nominated by University/Institute**

**Final Year Project Details:**

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| **A. Project Title:** | **Smart Mirror** |
| **B. Project Start Date:** | **1st- February- 2021** |
| **C. Project Finish Date:** | **30 – December- 2021** |

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| **D. Project Summary (less than 200 words)** |  |
| A Smart mirror is a two-way mirror with in-built display behind the glass.it looks like a regular mirror but have a screen inside. Smart mirror is also known as magic mirror and the ability of smart mirror which makes it smart is to display any information you want on it. A smart mirror can be customized to display local weather forecasts, news bulletins, your upcoming calendar schedule, social media etc.  It can also be interact by using voice commands (using Google assistant or Alexa), hand gestures, touch screen and smartphones. With voice commands we can ask mirror questions and can operate other devices of home and can set reminder and many more. | |
| **E. Project Objectives:** |  |
| **1. Saving time :**  This smart mirror aims to reduce and possibly eliminate the need for the user to make time in their daily morning or nightly routine to check their PC, tablet, or smartphone for the information they need. The mirror will provide the information with little to no effort from the user with the goal of not being a burden that he or she must maintain. The mirror wouldn’t be another activity, rather an enhancement to the already common use of mirrors in most modern bathrooms.  **2. Easy to use:**  The use of touch-less gestures will keep things simple and easy to use. No keyboards to try to keep dry and clean. The gestures will also allow the user to still use the mirror despite whether their hands are wet or dirty.  **3. Daily routine:**  It helps person to remind daily routine. The mirror will do the thinking for the user. First, it will turn on and off by itself. Then, it will update with the user’s calendar schedule, to-do lists, Twitter, news, and weather. This allows the users to read, think, and plan their day while getting ready in the morning or night.  **4. Entertainment:**  We can also connect mobile with it to enjoy music and videos.  **Modal Diagram:** | |
| **F. Project Implementation Method** | **AGILE/Sprial/waterfall…etc.** |
| Methodology is the main part for the construction of computer project. In our Smart mirror project we will be following the Agile methodology. The agile approach proposes an additional and repetitive approach to software development, where we can make further changes to the project if necessary, this approach is considered unstructured where small projects can be easily implemented. If we find any flaws in the performance of our product so with the help of the agile method we can correct the error right easily. Smart Mirror is hardware and software integrated software in which we use the Face detection, voice recognition and for this we need to focus on the coding and testing, where it will be tested every step of the way so that we know about the final product. In our project we will use AI which means we need to train our model continuously. Agile is very efficient method to implement for the AI project due to continuously testing and training the project model, that’s why we adopt Agile method for our project.  Our project is consist of six phases which are mention below:  **1: Planning:**  In this phase we decide what will be the functional and non-functional requirements of our project and note down these all.  For example, how smart mirror will wake up, how it detect the user face and on which gesture it will response and what should it display on it etc.  **2: Design:**  After planning all the requirements we will design the frame and architecture of smart mirror such as where to put the camera which type of material we will use in construction of mirror etc.  **3: Implementation of project:**  Now after designing and integrating the hardware we will start implementing the functions of mirror. For example, making model for face detection and voice recognition of user and designing the UI for the user means how the display of mirror will be shown etc.  **4: Testing:**  After completing all the implementation of software it will be integrated into the system and testing of each unit and each functional requirement. The software designed need to go through constant software testing to find out if there are any bug and error. If yes then resolving it again in implementation phase, so that the client does not face any problem during installation.  **5: Deployment:**  Once the functional and non-functional requirements are done then the project is ready to deploy.  **6: Modification**  The project can be update with the new features and can improve its performance time to time. | |

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| **S. No.** | **Elapsed time since start of the project** | **Milestone** | **Deliverable** |
| 1. | Week 01 – 04 | Requirement gatherings | Requirement gatherings finalized |
| 2. | Week 05 – 08 | Functional and non-functional requirements  Use cases, DFD and other documentation | Documentation completed |
| 3. | Week 09 – 12 | Purchasing equipment(Hardware) | Done |
| 4. | Week 13 – 16 | Ordering imported equipment(Rasberry pi etc.) | Done |
| 5. | Week 17 – 20 | Assembling frame of smart mirror | Done |
| 6. | Week 21 – 23 | Assembling hardware in the frame( all the equipment of smart mirror such as screen two way mirror etc.) | Done |
| 7. | Week 24 – 28 | Integrating hardware and coding | Done |
| 8. | Week 29 – 32 | Integrating software | Done |
| 9. | Week 33 – 36 | Finalizing requirements |  |
| 10. | Week 37 – 40 | Final testing | Test done ready to use |
| (Please add more rows if required.) | | | |

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| **H. Final Deliverable of the Project:** | | | | | | (Please tick one of the following) | | | |
| Hardware System | | | * HW/SW integrated system | | | | |  | |
| Software Simulation results | | | Comparative Study | | | | | Theoretical  Design/Architecture | |
| Simulator Design | | | Other Please specify | | | | | Blockchain | |  |
| **I. Please Specify Technical Details of Final Deliverable** | | | | | | | | | |
| **Dimensions**  The first and most important part of our design phase was to determine the size of our mirror. we decided to use Samsung 32inch monitor, and we needed a screen equal to both display items and your display not competing for space. We quickly settled on a 32 "x48" rating as the best looking and most efficient size.  **Deliverable: 32”x48” dimension**  **Frame construction**  Next, a frame had to be drawn to accommodate both mirrors and a list of electronic items behind it. A wooden frame that is common in many mirrors, we look at what is important to find a construction solution. We have seen that due to the weight and quantity of the mirror content we will need solid wood, so while browsing Home Depot we resorted to using 2x3 construction. Packed together in the form of a box, it provides strength and depth to our contents.  **Deliverable: Wooden 2x3 box frame**  **Mirror Material**  We decide to use two way mirror to display the screen of monitor and it should be look like normal reflation  **Deliverable: 20”x30” Two-Way Mirror**  **Microcontroller type**  This design feature has given us a lot of flexibility, as most microcontrollers fit our system requirements. We have selected the Raspberry Pi 4 for its popularity, performance, and a wealth of lessons and instructions available online in it.  **Deliverable: Raspberry Pi 4 Microcontroller**  **Display elements**  We decide that at display we will show the beneficiary things such as weather forecast, news, traffic situation etc. and we can change it also as we want .  **Deliverable: Date, time, and weather display widgets**  **Web Page**  The web page is where the Smart Mirror’s display actually exists. To begin creating it, we first had to download a server application (Apache) capable of hosting it locally (meaning on the controller itself, as opposed to being hosted on a third-party server). Once finished, we created a file in which to enter the HTML coding that would form the actual display. In this way we were able to insert applications to display the date, time, and local weather.  **Deliverable: Locally hosted web page on the Pi containing date, time, and weather widgets.**  **Touch Screen**  Our smart mirror will be also operate by touching it like smart phone. To achieve this we will use the IR frame of 32 inch because monitor size is 32 inch.  **Deliverable: IR Frame.** | | | | | | | | | |
| **J. Equipment required for making** (Please indicate in tabular form the required **prototype/working model:** equipment along with estimated cost)  **Budget must be somewhere in between 60k-80k** | | | | | | | | | |
| S.No | Item Name | No of Units | | Per Unit Cost (in Rs) | | | Total (in Rs) | | Need |
| **01.** | **Rasberry Pi 4 model B** | 1 | | 20000(20K) | | | 20000 | | Its micro controller which control all the functions of smart mirror |
| **02.** | Raspberry Pi camera | 1 | | 4000 | | | 4000 | | For face recognition and taking pictures |
| **03.** | **Two-way mirro** | 1 | | 2500 | | | **2500** | |  |
| **04.** | **MicroSD(32GB)** | 1 | | 1600 | | | **1600** | | To hold the memory |
| **05.** | **MicroHDMI cable** | 2 | | 500 | | | **500** | | To connect monitor with Raspberry |
| **06.** | **Charger (USB C)** | 1 | | 500 | | | **500** | | For Raspberry pi |
| **07.** | **Monitor** | 1 | | 32000 | | | **32000** | | Display |
| **08.** | **IR Frame** |  | | 30000 | | | **30000** | | For touch |
| **09.** | **Miscellaneous** |  | |  | | | **1,0000** | | Wooden frames, wires and some online paid platforms. |
|  |  |  | |  | | |  | |  |
|  | **Grand Total** | | | | | | 101100 | |
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| **K. Benefits of the Project** | | | | |  | | | | |
| The big benefit of a smart mirror is the ability to display information without needing to open apps.You can simply look at your smart mirror and the information is there.For example, you go through your morning routine you can simply look at your mirror and see a weather forecast, traffic report and whatever you can customize you mirror to display anything you want. | | | | | | | | | |