Final Project Proposal

Year: 2019 Semester: Fall Team: 1 Project: Smartest Mirror

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Team Members (#1 is Team Leader):

Member 1: Rtvik Sriram Bharadwaj Email: bharadwr@purdue.edu

Member 2: Ishaan Ahuja Email: ahujai@purdue.edu

Member 3: Abhay Sasidharan Email: asasidh@purdue.edu

Member 4: Pratyaksh Sharma Email: sharm235@purdue.edu

1.0 Project Description:

The intended design of the project incorporates a smart computer interface that provides cosmetic accessories to the user in the form of a digitally enhanced mirror. The design can be fit onto any flat surface or hung from a wall, and in addition to simply serving as a mirror, will present a set of users the option to view metrics important to their daily needs like indoor temperature, weather, a news feed, and a user interface that will allow users to try out accessories like hats, mustaches, and popular image filters, all controllable through the usage of an infrared gesture system.

2.0 Roles and Responsibilities:

Team leader, Technical Writer – Rtvik Sriram Bharadwaj

Rtvik has had experience in project management and ground-up system design at both his previous companies, Tesla and Oracle, specializing in cloud computing and distributed systems and computer networks

Lead Systems engineer – Abhay Sasidharan

Abhay has worked with systems in his summer research and personal projects, and his skills are further bolstered by his status as an ECE 368 Teaching Assistant.

Lead Hardware engineer – Ishaan Ahuja

Ishaan has completed two work terms at AMD as an RTL Design Engineer, and is a functional hardware engineer with experience in PCB & chip design, and soldering.

Lead Software engineer – Pratyaksh Sharma

Pratyaksh has had experience working with a range of software and has completed internships at ASML and ITaP working with cross functional development teams.

2.1 Homework Assignment Responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| *Design Component Homework* | | *Professional Component Homework* | |
| 3-Software Overview | RSB | 9-Legal Analysis | RSB |
| 5-Electrical Overview | IA | 10-Reliability and Safety Analysis | PS |
| 7-Mechanical Overview | PS | 11-Ethical/Environmental Analysis | IA |
| 8-Software Formalization | AS | 12-User Manual | AS |

3.0 Estimated Budget

|  |  |  |  |
| --- | --- | --- | --- |
| Part | Price (USD) | Quantity | Cost (USD) |
| **Electrical** |  | | |
| Nvidia Jetson Nano | 99 | 1 | 99 |
| STM23F0 Kit | 25 | 2 | 50 |
| 22” Monitor | 100 | 1 | 100 |
| Nano Camera | 79 | 1 | 79 |
| Misc. Sensors | 20 | 1 | 20 |
| **Mechanical** |  | | |
| Wooden Frame | 50 | 1 | 50 |
| Acrylic Mirror (24x24”) | 40 | 1 | 40 |
| Packaging Tools | 25 | 1 | 25 |
| **Other** |  | | |
| Logistics | 50 | 1 | 50 |
| **Total** |  | | 513 |

4.0 Project Specific Success Criteria

1. An ability to successfully read ambient conditions using a temperature and light sensor using ADC, GPIO.
2. An ability to perform user gesture detection using an Infrared Sensor on the STM using ADC.
3. An ability to successfully communicate gesture readings, ambient light and temperature values between the STM and the Jetson through USART.
4. An ability to authenticate the user via the camera using a facial recognition module.
5. An ability to display metrics and relevant information (email, weather, stock tickers and news) using a dashboard on the Jetson Monitor.

5.0 Sources Cited:

NVIDIA Developer. (2019). *Jetson Nano Developer Kit*. [online] Available at: https://developer.nvidia.com/embedded/jetson-nano-developer-kit [Accessed 21 Aug. 2019].

E-consystems.com. (2019). *NVIDIA Jetson Cameras*. [online] Available at: https://www.e-consystems.com/nvidia-jetson-camera.asp#nano-cameras [Accessed 21 Aug. 2019].

Walmart.com. (2019). *Craft Wood*. [online] Available at: https://www.walmart.com/browse/arts-crafts-sewing/craft-wood/1334134\_6172404\_4705167\_7636839 [Accessed 21 Aug. 2019].